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RESEARCH REPORT

Women Offender Assessment: Can Gender-Informed Variables Improve Risk Prediction?

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Women Offender Assessment: Can Gender-Informed Variables Improve Risk Prediction?

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Executive Summary

Key words: *women offenders, gender-informed risk assessment, scale development*

In recent decades, correctional organizations have begun to recognize the differences between factors related to men and women's involvement in the criminal justice system and their response to interventions and have incorporated this information into the development of treatment approaches for women offenders. Increasingly, gender differences have also been hypothesized to be important in the assessment of criminal risk and needs, with some scholars proposing that there may be factors that are more important for women than men (i.e., female-salient) or only important to women (i.e., female-specific).

The aim of the current study was to examine the feasibility of using the Correctional Service of Canada's (CSC) Offender Management System (OMS) to develop a gender-informed risk/need assessment tool. All federal women offenders admitted to custody for a new warrant of committal between September 28, 2009 to January 8, 2017 who had a subsequent release into the community were included in this study. Women were randomly classified into two groups: those in the development group ($n = 646$, 35.3% Indigenous) and those in the validation group ($n = 620$, 37.9% Indigenous). As well, a matched-comparison group of men ($n = 647$, 36.3% Indigenous) was used to assess the utility of the assessment tool across gender.

CSC's OMS was reviewed to identify both gender-neutral (e.g., equally predictive for men and women) and gender-responsive (e.g., more predictive for women than for men) variables to consider in the development of a gender-informed assessment tool. Then, a combination of descriptive statistics, regression analyses, and principle components analyses were used to develop the gender-informed tool. The resultant measure included 22 items across 9 domains: 1) criminal history, 2) drug misuse and unstable accommodation, 3) antisocial personality, 4) employment, 5) alcohol misuse, 6) negative childhood experiences, 7) violence and weapons, 8) support and resources, and 9) incidents and charges.

Results showed that the individual items included in this assessment and the overall rating of risk/need significantly predicted any return to federal custody for women; however, comparable predictive accuracy was also found for the men. As well, ratings determined by the gender-informed tool incrementally predicted any return to federal custody over and above other CSC established tools (i.e., Static Factor Assessment, Dynamic Factor Identification and Analysis – Revised and the Criminal Risk Index) that previous research has found to be reliable and valid for women offenders (Brown & Motiuk, 2005; Helmus & Forrester, 2014; Motiuk & Vuong, 2018; Stewart et al. 2017).

Overall, this research highlights the complementary, not competing, perspectives of gender-neutral and gender-responsive risk and need factors. Results showed that incorporating a holistic approach to offender assessment produced useful information in the prediction of community outcomes and has the potential to augment existing offender case management tools. Nevertheless, additional research is required to validate this assessment tool on Indigenous women and to further explore hypothesized gender-responsive factors.

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Introduction

Only in recent decades have correctional agencies begun to empirically examine the differences between men and women offenders that affect reintegration and risk and to develop and incorporate gender-informed approaches to the assessment and treatment of women offenders. The impetus for this change within Canada was a ground-breaking report completed by the Task Force on Federally Sentenced Women (1990), established by Correctional Services Canada (CSC) to examine the management practices and guiding policies concerning women offenders, recommending principles for change whereby CSC was mandated “to create the environment that empowers federally sentenced women to make meaningful and responsible choices in order that they may live with dignity and respect” (p. 117). Since the early 1990s, CSC has made considerable gains in developing and implementing a number of policy and operational changes to embody these principles for change. For example, CSC has implemented a comprehensive women-centred correctional program model whereby women’s unique social realities are considered, with a focus on helping women understand the impact their behaviour has in different settings and on different relationships. Additionally, CSC has developed and implemented a women-centred training program for staff who work in women offender institutions. This training provides staff members with information on the specific needs of women offenders related to common histories of trauma, self-injury and suicide attempts, as well as an understanding of what promotes women’s empowerment (for a more detailed description see Nolan, Harris, & Derkzen, 2017).

Although criminal justice research and program development have come to recognize the distinctiveness of women offenders in comparison to men, it is only recently that research has directly examined gender differences among mixed-gender correctional samples with regard to risk assessment. For instance, traditional risk assessment tools have typically been developed and validated primarily on samples of men offenders; comprised of factors found to be predictive of offending for men. However, in recent years several risk assessment and case management planning tools have been developed for use with women offenders, including the Service Planning Instrument for Women (SPIn-W; Orbis Partners, 2006) and the Women’s Risk/Needs Assessment (WRNA; Van Voorhis, Wright, Salisbury, & Bauman, 2010). These assessment tools focus on factors that are gender-neutral (e.g., equally predictive for men and women, such

as criminal history and employment) as well as factors that are considered gender-responsive (e.g., more predictive for women than for men, such as mental health and childhood abuse). Overall, preliminary research has supported the use of these assessment tools in predicting a variety of community outcomes for women offenders (Desmarais & Singh, 2013; Van Voorhis, Bauman, & Brushette, 2013). Although promising, more research is needed on risk assessment and women offenders to replicate previous findings and further explore factors hypothesized to be particularly important in the prediction of criminal behaviour in women.

Gender-Neutral Perspective

Correctional agencies have predominately been guided by gender-neutral perspectives of criminal behaviour whereby effective offender assessment and treatment are thought to explain and prevent criminal conduct regardless gender (e.g., Andrews et al., 2012; Bonta & Andrews, 2017). Notably, this perspective incorporates research that typically focuses on men and highlights factors that are found to be predictive of men's offending behaviour, often failing to include a comparison group of women offenders, examine gender differences, or examine hypothesized female-salient (i.e., risk factors that predict recidivism for both genders, but the strength of the effect is stronger for females) and/or female-specific risk/need factors (i.e., unique risk factors for females, not predictive for males). The risk factors that have been found to have the strongest empirical support for men and women (i.e., most predictive of reoffending) include criminal history, antisocial attitudes, antisocial peers, antisocial personality, friends/marital dysfunction, educational/employment deficits, substance abuse, and inappropriate use of leisure time (e.g., the "Central Eight" risk factors; Bonta & Andrews, 2017). Although there has been an abundance of empirical evidence supporting the predictive strength of these risk factors with women (e.g., Andrews et al., 2012; Brown & Motiuk, 2005; Motiuk & Vuong, 2018; Stewart et al., 2017), there has also been emerging evidence suggesting that additional risk factors currently not considered by most risk assessment tools may be especially important for women (e.g., history of trauma, mental health problems; Van Voorhis et al., 2010).

Gender-Responsive Perspective

A body of scholarship (referred to as gender-responsive research) stemming over the last 35 years posits that traditional theories of criminal behaviour are insufficient in explaining women's offending behaviour as they are centered around men (e.g., Belknap, 2015; Blanchette & Brown, 2006; Chesney-Lind & Pasko, 2013; Covington & Bloom, 2006). As such, these

scholars argue that existing risk/needs assessment models developed on male samples neglect key risk factors relevant for women offenders (Blanchette & Brown, 2006). Importantly, gender-responsive assessment models (e.g., Rettinger & Andrews, 2010; Stewart, 2011; Van Voorhis et al., 2010) have highlighted several key risk/need factors deemed especially salient for women—including parental stress, family support, self-efficacy, educational assets, housing safety, anger/hostility, current mental health, and relationship dysfunction. However, results from this body of work are limited as researchers have typically failed to include male comparison groups and have not looked at gender-neutral risk factors in addition to the risk factors hypothesized to be especially important for females (Chesney-Lind, 1997; Finkelhor & Baron, 1986; Simkins & Katz, 2002).

Gender-Informed Perspective

To ensure a more holistic approach to offender risk assessment, it is important for research to consider risk factors from both the gender-neutral and gender-responsive perspectives. Specifically, a gender-informed approach is needed whereby research and expertise on women offenders are incorporated into risk assessment protocols, including gender-responsive risk factors, in combination with gender-neutral risk factors that have strong empirical support (i.e., Central Eight; Bonta & Andrews, 2017).

A recent literature review conducted by Brown (2017) summarized research examining the hypothesis that women offenders are different from men offenders with respect to their risk factors. Overall, Brown reviewed 30 articles, of which 16 included direct gender comparisons. Generally, there was evidence supporting the global constructs of *substance abuse* and *personal-emotional problems* as women-salient predictors. In terms of gender-neutral factors, there was an abundance of research concluding that the risk/need domains of *criminal history*, *criminal peers*, *criminal attitudes*, *employment*, *family/marital*, and *community functioning* are predictors of recidivism for both males and females, and to the same degree. In contrast, there is very little research showing that there are true gender-specific factors. More research is needed that examines whether proposed gender-responsive domains—such as abuse, trauma, anxiety, depression, relational dysfunction, criminal romantic partners, parental stress, and unsafe housing are gender-specific or gender-salient risk factors, as well as how these risk factors may operate together for both women and men offenders.

A previous attempt to develop a dynamic risk scale for women in CSC had been

conducted (Zakaria, Allenby, Derkzen, & Jones, 2013). Items retained in this assessment included five or more previous adult convictions, previous revocation of conditional release, average number of major institutional incidents per year of current sentence, unstable employment history, previous break and enter offence, contraband charge during current sentence, previous assault offence, and, two or more previous youth convictions. This gender-informed assessment tool could not be validated, however, given variables that contributed to the model were largely static in nature (i.e., not amenable to change) and none of the gender-responsive factors (e.g., self-esteem, victimization) contributed to the predictive validity of the measure.

Current Study

Given that the majority of risk assessment tools used within correctional settings were developed on offender samples of men, it is imperative to examine whether the inclusion of factors promoted as gender-responsive could improve CSC's risk/needs assessment of federally-incarcerated women offenders, with a particular focus on incorporating both static and dynamic factors. Developing and validating a risk assessment tool on a sample of women offenders can aid in the understanding of risk-relevant factors for women and could enhance the ability to classify and treat women offenders. The current study consists of three main research questions:

1. Can CSC's offender management system (OMS) information be used to develop a gender-informed risk prediction tool?
 - a. Which of these established gender-responsive variables are already captured in the OMS?
 - b. What is the relationship of these variables with women's correctional outcomes in the community?
 - c. Could these items in OMS be used to develop a gender-informed CSC-risk assessment tool?
2. How does the predictive validity of the gender-informed tool compare by gender?
3. How does the predictive validity of the gender-informed tool compare with the predictive validity of risk tools currently used to assess women offenders in CSC?

Method

Participants

The population of all federal women offenders admitted to custody between September 28, 2009 to January 8, 2017, who had a subsequent release into the community, and who had a valid Dynamic Factors Identification and Analysis-Revised (DFIA-R) assessment were included in this study. Women were randomly classified into two groups: (1) those in the development group used to develop the gender-informed assessment tool; and (2) those in the validation group used to validate the developed assessment tool. To facilitate comparisons with men for the validation study, a one-to-one matched comparison group of male offenders admitted and released within the same period was used.¹ These individuals were matched on Indigenous identity, offender age at admission, static risk rating, dynamic need rating, and the most serious offence on the sentence (violent vs. non-violent). This resulted in the inclusion of 1,266 women, with 646 in the development group (35.3% Indigenous) and 620 in the validation group (37.9% Indigenous) and 647 men (36.3% Indigenous) as a matched-comparison group for validation.

Unsurprisingly, given the matching procedure the profiles of the three groups were remarkably similar (see Table A1 in Appendix A for more detailed information), with the majority of offenders across groups serving a sentence of three years or less, being rated as medium static risk and high dynamic need, and being in their mid-30s at admission. The male comparison group, however, was more likely than women to be rated as having lower motivation and to be released on statutory release rather than discretionary release. Low numbers prevented the disaggregation of results by Indigenous identity.

Procedure and Data sources

Given the goal of the present study was to develop a gender-informed risk/need

¹ Matching is a statistical technique used to assess the outcomes (or effectiveness) of a treatment group to a comparable non-treatment group in observational or quasi-experimental design by “balancing” the distribution of covariates in both groups (e.g., ethnicity, risk, need, etc.). Given the established differences between men and women offenders (Stewart et al., 2017), it was necessary to control for these differences when assessing the predictive accuracy of a gender-informed risk/need assessment tool. Compared to the 1,266 women, there were 27,097 men who were admitted to and released from federal custody during the same time period available for matching. A one-to-one matching strategy was then employed to identify men who had the same characteristics as each individual woman. Exact matches were identified for all but one woman and it was concluded that this would be a reasonable comparison group for the current research. Once the one-to-one matching strategy was employed, offenders were randomly assigned to the development and validation groups, resulting in slightly unequal sample sizes.

assessment tool, a review of existing literature and content analysis of existing gender-responsive assessment tools was undertaken (e.g., Proquest databases, grey literature, etc.). The purpose of this review was to identify areas and factors empirically shown to be important in the prediction of criminal justice outcomes, namely returns to custody, for women offenders. Based on the results of this examination, information collected within the Offender Management System (OMS) was examined to identify possible variables to consider in the development of a gender-informed risk/need assessment tool.

Offender Intake Assessment

Many of the variables considered in the development of this assessment tool originated from information collected as part of the Offender Intake Assessment (OIA), an assessment process that has a long history within CSC (Motiuk, 1997; 1998; Brown & Motiuk, 2005; Stewart et al., 2017). Occurring upon admission to federal custody, the OIA collects information regarding criminal history (e.g., offence, sentencing) and other important socio-demographic information (e.g., dynamic needs, mental health, security, etc.) to inform the offender's correctional plan (Commissioner's Directive (CD) 705).

One component of the OIA is the Dynamic Factors Identification and Analysis-Revised (DFIA-R) tool, which evaluates an offender's level of dynamic need in seven domains: employment/education, marital/family, associates, substance abuse, community functioning personal/emotional orientation, and attitudes. These domains are assessed through the completion of 100 dichotomous indicators rated as "present" or "absent."

Another assessment tool within the OIA is the Static Factor Assessment (SFA) which assesses an offender's level of static risk. This assessment tool examines the criminal history record, offence severity record, and sex offence history checklist, consisting of individual indicators that are scored as "present" or "absent."

The assessment of offender accountability, motivation, responsivity, engagement, and reintegration potential was also considered. These appraisals contribute to the development of the offender's correctional plan which informs the approach taken to target identified criminogenic needs and develop the skills necessary for successful re-entry into society (CSC, 2015).

Other assessments completed at admission to federal custody that were considered in the current research included the Women's Computerized Assessment of Substance Abuse (W-

CASA; including the Alcohol Dependence Scale (ADS) and The Drug Abuse Screening Test (DAST)) and the Computerized Mental Health Intake Screening System (CoMHIS).

Institutional variables

A particular consideration in the development of a gender-informed assessment tool was whether the inclusion of institutional variables may be meaningful in the predication of community outcomes, as these items may augment the predictive accuracy of re-assessment prior to release. A number of variables were considered including both risk-based and protective variables.

Risk-based institutional variables included: experiencing segregation placement, various types of institutional incidences,² and minor and serious charges. Protective or strength-based variables included the presence of institutional visits from family and friends, completing educational achievements, completing moderate or high intensity correctional programs, and positive Generic Program Performance Measure (GPPM) scores.

For a complete list of variables considered in the development of the gender-informed risk/need assessment tool see Table B1 in Appendix B. Notably, many of the constructs hypothesized to be important in the prediction of recidivism for women were identified; however, self-efficacy in women was not able to be operationalized.

Community Outcomes

The purpose of this research was to explore the possibility of developing a gender-informed risk/need assessment tool that was related to offender behaviour in the community upon re-entry. A variety of community outcomes were considered,³ including any return to custody before warrant expiry and a combined recidivism indicator that included any return to custody before warrant expiry and any post-warrant expiry offences.⁴ Parallel analyses to develop the gender-informed risk/need assessment tool were completed for each community outcome of interest. Then, results were examined to see how the assessment tools differed. As the constructs and many of the items in each assessment tool were markedly similar, the results

² It should be noted that while involvement in incidents were not limited to only instigators, less than 5% of women were only ever involved in incidents as a victim.

³ Due to the low frequency of women returning to custody with a new offence (6.5%), we were unable to assess the relationship between gender-informed variables and the likelihood of committing a new offence.

⁴ Any post-warrant expiry recidivism was coded from Canadian Police Information Centre (CPIC) data. Approximately 10% of CPIC records were coded by a second rater to assess inter-rater reliability. Resultant kappa coefficient values showed substantial to perfect agreement (Hallgren, 2012).

presented in this report are based on any return to custody prior to warrant expiry.

Analytic Approach

Data extraction and analysis were conducted using SAS (Version 9.4), SPSS (Version 22), and R statistical software (Version 3.3.2).

Scale development

The process by which the gender-informed risk/need assessment tool was developed entailed a multi-step process, including descriptive statistics, bivariate Cox regression, and principle components analysis. For a detailed description of scale development methods and results, please see Appendix B.

Scale validation

The validation of the gender-informed risk/need assessment tool was multi-pronged. Analyses were completed in the following steps:

- a) Predictive validity of the gender-informed risk/need assessment tool.

Cox regression was applied to assess the relationships of the overall risk/need ratings and individual items with the likelihood of experiencing any return to custody. The predictive validity of the items were assessed individually in a series of bivariate Cox regression analyses⁵ and then all items were entered simultaneously into a single stepwise Cox regression analysis to determine which items were the most influential in the prediction of returns to custody. For example, if an item was statistically significant when predicting returns to custody on its own, but not in the stepwise regression model, we would conclude that while it was related to returns to custody, it did not contribute unique information to the outcome prediction when stronger indicators were considered. Harrell's c statistics⁶ were used to assess the magnitude of the association between the overall risk/need ratings and returns to custody. Analyses were completed for both the development and validation samples in an effort to assess the reliability

⁵ The proportional hazards assumption of Cox regression assumes that the impact of covariates does not function differently as time passes. This assumption was violated in the development sample for the following items: "Impulsive," "Has been involved in at least one assault incident," and "Has been involved in at least one behavioural incident". This assumption was also violated in the men's comparison sample for the following items: "Marketable job skills obtained through experience are limited" and "Has been involved in at least one assault incident". The hazard ratios associated with these items change at different points of follow-up time.

⁶ As SAS does not routinely calculate Harrell's c, R statistical software was used in this capacity. The Harrell's c statistic, while similar to the Area Under the Curve (AUC) statistic, allows for data with varying follow-up periods (e.g., offenders can be included whether they are followed for 3 months or 3 years). Similar cut-off values are employed with values of .56, .64, and .71 representing small, moderate, and large effect sizes, respectively (Rice & Harris, 2005).

of the results.

b) Gender comparisons.

In an effort to assess the degree to which the gender-informed risk/need assessment tool was gender-responsive (e.g., only predictive or more predictive for women as compared to men), bivariate Cox regression analysis was used to concurrently assess the relationship between individual items and returns to custody in the women's validation and the matched men's comparison samples. Items were determined to be gender-neutral if the confidence intervals surrounding their respective hazard ratios overlapped – suggesting that the effect of the item was essentially equivalent across groups. Similarly, if the confidence intervals did not overlap, the item was considered to be gender-responsive.

Gender comparisons of the overall risk/need rating were completed using Cox regression to examine the relationship between ratings and returns to custody. Harrell's c statistics were used to assess the magnitude of these relationships. Finally, using Conditional Process Analysis (a macro for SPSS, developed by Hayes, 2013), a moderated regression model was used to further assess the potential interaction between gender and risk/need ratings in the prediction of returns to custody.

c) Comparison of the gender-informed risk/need assessment tool to existing tools.

CSC currently assesses offender risk and need using a number of established assessment tools. Of interest in the current research is the SFA, DFIA-R, and the Criminal Risk Index (CRI) which are completed as part of the OIA process. A considerable amount of research has shown these tools to be reliable and valid for Indigenous and non-Indigenous men and women (Brown & Motiuk, 2005; 2008; Helmus, 2014; Helmus & Forrester, 2014; Motiuk & Vuong, 2018; Stewart et al., 2017). The CRI, for example, is derived from Criminal History Record data contained within the SFA assessment of the OIA process. Research has shown that ratings on the CRI significantly predicted discretionary release and post-release re-offending for a variety of offender subpopulations such as men, women, and Indigenous offenders. As well, convergent validity estimates were established between the CRI and other measures of release risk (Motiuk & Vuong, 2018).

The association between the gender-informed risk/need assessment tool and other assessment tools currently used by CSC (i.e., SFA, DFIA-R, CRI) were examined to assess their degree of relatedness. Cramer's V and a comparison of percentages were used to assess the

degree of association between these tools. Cramer's V values range from 0 (no association) to 1 (perfect association). In general, Cramer's V values of less than .1 represent a negligible association; values of .1 and under .2 represent a weak association; values of .2 and under .4 represent a moderate association; and values of .4 or greater represent a strong association (Rea & Parker, 1992).

Finally, hierarchical Cox regression was used to assess whether the gender-informed risk/need assessment tool incrementally contributed to the predictive validity of existing CSC assessment tools (i.e., SFA, DFIA-R, Criminal Risk Index (CRI)). First, one of the existing assessment tools were entered into the model to determine what effect it had on returns to custody by itself. Second, the gender-informed risk/need rating was added to the model to see what effect it had on predicting returns to custody when controlling for the effect of the existing assessment tool. Then, by calculating the difference in the Wald χ^2 statistic from the two steps, the incremental predictive contribution of the gender-informed risk/need assessment, over and above the existing assessment, on returns to custody could be assessed.

Results

Final Gender-Informed Risk/Need Assessment Tool

Tables 1 and 2 show the prevalence of the overall risk/need ratings and items for the development and validation groups. Most women were assessed as having Medium risk/need on the gender-informed assessment tool (see Table 1). Close to a quarter of women were rated as Low risk/need, with the remaining women being rated as High risk/need.

As seen in Table 2, the final gender-informed risk/need assessment tool contained 22 items, representing nine meaningful components. Items were both static and dynamic in nature, and reflected constructs thought to be both gender-neutral and gender-responsive. The accompanying prevalence of item endorsement also helps to illustrate the risk/need profile of federally-sentenced women. We can see, for example, that the majority of women have a history of previous criminal activity, financial instability, and negative childhood experiences. They tend to struggle with substance misuse and impulsivity and, while in custody, experienced at least one minor institutional charge.

Table 1

Prevalence of the overall gender-informed risk/need ratings across development (n = 645) and validation (n = 620) samples

	DEVELOPMENT	VALIDATION
	<i>% (n)</i>	<i>% (n)</i>
Low (0 to 33% of items endorsed)	23.1 (149)	23.7 (147)
Medium (33% to 66% of items endorsed)	46.9 (303)	49.2 (305)
High (66% or more of items endorsed)	30.0 (194)	27.1 (168)

Table 2

Prevalence of final items that comprise the gender-informed risk/need assessment tool for development (n = 645) and validation (n = 620) samples

	DEVELOPMENT	VALIDATION
	%	%
Component 1: Criminal History		
Five or more previous convictions	51.4	52.1
Sanctions - Community supervision	64.8	68.0
Component 2: Drug Misuse and Unstable Accommodation		
Unstable accommodation	47.5	53.0
Associates with substance abusers	79.1	79.1
Has combined the use of different drugs	62.8	62.3
Component 3: Antisocial Personality		
Impulsive	71.8	76.3
Engages in thrill seeking behaviour	33.6	37.9
Frequently acts in an aggressive manner	24.3	25.3
Component 4: Employment		
Employment history is absent	26.5	27.7
Job history has been unstable	72.8	75.8
Marketable job skills obtained through experience are limited	65.3	64.7
Component 5: Alcohol Misuse		
Excessive alcohol use is part of the offender's lifestyle	36.8	39.6
Component 6: Negative Childhood Experiences		
Limited attachment to family unit during childhood	41.5	44.4
Relations with parental figure were negative during childhood	58.8	59.4
Component 7: Violence and Weapons		
Violence (assault, robbery)	45.0	46.9
Threaten victim with a weapon	25.4	27.0
Component 8: Support and Resources		
Financial instability	73.0	74.3
Prosocial support from an intimate partner is limited	69.8	73.4
Constructive leisure activities are limited	65.1	64.2
Component 9: Incidents and Charges		
Has been involved in at least one assault incident	34.8	38.4
Has been involved in at least one behavioural incident	29.0	31.0
Has had at least one minor charge	51.2	51.3

Predictive Validity of the Gender-Informed Risk/Need Assessment Tool

With the final gender-informed risk/need assessment tool developed, its predictive validity was assessed using a combination of Cox regression analyses and Harrell's C statistics (see Table 3). Results showed that, in the development sample, overall risk/need ratings were strongly associated with any return to federal custody. Ratings of Low, Medium, and High risk/need had increasingly greater proportions of offenders with revocations. This result was confirmed by the Cox regression analyses, where the hazard of returning to custody was 4.5 and 13 times more likely for women rated as Medium and High risk/need than those rated as Low risk/need. These findings held for the validation sample.

The predictive validity of the individual items contained within the gender-informed risk/need assessment tool were also assessed using a series of bivariate Cox regression analyses. All items were individually associated with returns to federal custody for both the development and validation samples (see Table A2 in Appendix A for hazard ratios). Results showed, for example, that the hazard of returning to custody for women who had a history of associating with substance abusers was over four and a half times more compared to those who did not.

The items were then entered into a stepwise Cox regression together to determine which items were the most influential in the prediction of any return to federal custody (see Table A3 in Appendix A). Consistent across the development and validation samples the following items were the most predictive of community outcomes: "Associates with substance abusers," "Employment history is absent," "Has been involved in at least one assault incident," and "Has had at least one minor charge," as they were highly predictive of returns to custody for both samples when considering the effects of other items.

Table 3

Predictive validity of the overall gender-informed risk/need ratings across development (n = 645) and validation (n = 620) samples

	DEVELOPMENT				VALIDATION			
	% (n) return to custody	χ^2 (df)	Hazard Ratio	95% CI	% (n) return to custody	χ^2 (df)	Hazard Ratio	95% CI
Low	10.5 (16)	-	-	-	11.3 (16)	-	-	-
Medium	34.7 (110)	30.7 (1)***	4.51	[2.65 – 7.69]	37.1 (108)	30.5 (1)***	5.24	[2.91 – 9.43]
High	62.9 (110)	88.83 (1)***	13.24	[7.74 – 22.65]	60.4 (113)	64.0 (1)***	11.37	[6.27 – 20.64]
<i>Model Fit</i>								
	χ^2 (df)	117.8 (2)***				74.3 (2)***		
	Harrell's C	.71				.68		

Note. An overall rating of “Low” was the reference category. Harrell's C values of .56, .64, and .71 are considered small, moderate, and large effect sizes, respectively. χ^2 = Chi-square; df = degrees of freedom; 95% CI = confidence interval

*** $p < .001$

Examining the Gender-Informed Risk/Need Assessment Tool by Gender

The predictive validity of the individual items was assessed for men and women using a series of bivariate Cox regression analyses (see Table A4 in Appendix A). While results showed that the predictive strength of most indicators was stronger for women than for men, this difference was not statistically significant (i.e., the confidence intervals surrounding the hazard ratios overlapped).

The association between the overall risk/need rating and returns to custody was similar by gender, with risk/need ratings being moderately associated with community outcome (see Table A5 in Appendix A). A moderation regression analysis was conducted, as outlined by Hayes (2013), to further examine whether there was an interaction between gender and risk level in the prediction of returns to federal custody, while controlling for release type. Results indicated that gender did not moderate the relationship between risk (ratings of Low, Moderate, or High) and returns to custody ($b = .146$, $Z = 1.09$, $p = .274$, 95% CI [-.116, .408]). Nevertheless, this relationship was found to be significant for both women and men, indicating that higher risk classifications are related to increased returns to custody regardless of gender (see Table A6 in Appendix A).

Comparisons of the Gender-Informed Risk/Need Assessment Tool to Established Assessment Tools used within CSC

Table 4 outlines the level of risk and/or need of women using existing assessment tools currently employed by CSC and the gender-informed risk/need assessment tool. Results showed that the distribution of women rated as Low, Medium, and High risk/need in the gender-informed assessment tool was very similar to that of the SFA and CRI assessment tools. Proportionally more women were rated as high need on the DFIA-R than were rated as High risk/need on the gender-informed assessment tool. This is not necessarily surprising, given that federally sentenced women have elevated criminogenic need profiles (Stewart et al., 2017) and many of the items comprising the gender-informed assessment were found within existing tools. Regardless of the assessment tool examined, however, ratings on all existing CSC tools were moderately to strongly associated with ratings on the gender-informed risk/need assessment tool.

Table 4

Prevalence of the overall gender-informed risk/need ratings compared to existing assessment tools for the validation (n = 620) sample

	SFA	DFIA-R	CRI ^a	Gender-Informed
	% (n)	% (n)	% (n)	% (n)
Low	19.5 (121)	6.9 (43)	23.6 (146)	22.9 (142)
Low/Moderate			13.1 (81)	
Medium or Moderate	51.6 (320)	34.2 (212)	22.5 (139)	46.9 (291)
Moderate/High			23.3 (144)	
High	28.9 (179)	58.9 (365)	17.5 (81)	30.2 (187)
Cramer's V	0.29	0.45	0.43	

Note. Cramer's V values of less than .1 are negligible; values of .1 and under .2 represent a weak association; values of .2 and under .4 represent a moderate association; and values of .4 or greater represent a strong association.

^a Two women did not have CRI ratings.

Finally, ratings on the gender-informed risk/need assessment tool were examined to determine whether they incrementally predicted any return to federal custody, over and above established assessment tools used by CSC (see Tables A7 through A9 in Appendix A for detailed results). As seen in Table 5, results showed the gender-informed risk/need assessment tools provided an incremental contribution to predictive accuracy of returns to custody over all existing assessment tools examined. Together, the combination of the gender-informed risk/need assessment ratings and each CSC established tool represented a moderate-to-strong ability to predict any return to custody for women.

Table 5

Incremental predictive accuracy of the gender-informed risk/need assessment tool over existing CSC assessment tools

	SFA	DFIA-R	CRI
Gender-informed tool incrementally predicted any return to custody	✓	✓	✓
Strength of the association	moderate	moderate	strong

Note. ✓ represents the gender-informed risk/need assessment tool incrementally predicting any return to custody over and above existing CSC assessment tools. Harrell's C values of .56, .64, and .71 are considered small, moderate, and large effect sizes, respectively.

Discussion

Assessment instruments that evaluate the risk and needs of offenders are a critical component of the menu of case management tools available to correctional staff, contributing to public safety and rehabilitation goals. These tools serve to provide estimates regarding the likelihood of further criminal behaviour, help to identify criminogenic needs that should be addressed through intervention, and provide insight into the appropriate level of services required, consistent with Risk-Need-Responsivity principles (Bonta & Andrews, 2017). When completed prior to release or while in the community, risk/need assessments that include dynamic factors that can be reassessed can provide valuable information regarding the progress offenders made during their sentence. Given that the majority of risk assessment tools used within correctional settings were developed on samples of predominately men offenders, the primary objective of this study was to develop a gender-informed tool to assess post-release risk for women offenders.

The current research demonstrated the capacity of using CSC's OMS to develop a gender-informed risk/need assessment tool. Many gender-responsive constructs, such as substance misuse and relationship dysfunction, could be identified within existing information collected through OMS. A multi-step process could then be used to develop a gender-informed assessment tool from a combination of variables hypothesized to be either gender-neutral or gender-responsive. The resultant tool revealed that items from both contrasting perspectives were important in the prediction of community outcomes for women and overall risk/need ratings were moderately predictive of women experiencing any return to custody. The inclusion of gender-neutral items, such as those relating to criminal history and antisocial personality, supports a plethora of research showing that the central eight risk factors are important in the prediction of criminal behaviour for both men and women (Andrews et al., 2012; Bonta & Andrews, 2017; Brown, 2017). Further, aligning with previous gender-responsive research (Andrews et al., 2012; Benda, 2005; Brown, 2017), items theoretically believed to be particularly important for women were included in the assessment tool (e.g., drug misuse, absent employment history, negative childhood experiences, and intimate partner concerns). Even though the gender-neutral items outnumbered the hypothesized gender-responsive items, the development of this risk/need assessment tool represents a gender-informed approach to offender assessment – blending gender-neutral and gender-responsive perspectives. Further, this

assessment tool parallels existing risk/need assessment tools developed specifically for women offenders (e.g., WRNA, SPIn-W) that incorporate items pertaining to both perspectives to create a gender-informed assessment tool.

Results also showed that this gender-informed risk/need assessment tool had predictive utility for both men and women offenders. Given that the majority of the items contained within this assessment tool would be considered gender-neutral, it is not surprising that the overall risk/need rating was similarly predictive of community outcomes across gender. However, individual items that were hypothesized to be gender-responsive (e.g., “Limited attachment to family unit during childhood,” “Prosocial support from an intimate partner is limited”) were also equally predictive for men as they were for women. There could be a number of possible explanations for these results. It could indicate that the hypothesized gender-responsive items included in this measure are, in fact, gender-neutral as opposed to female-specific or female-salient. As discussed previously, research exploring the presence of gender-responsive factors is mixed, with some researchers finding support for gender-responsive risk factors (Bersani, Laub, & Nieuwbeerta, 2009; Brown, 2017; Desmarais & Singh, 2013; Gehring & Van Voorhis, 2014; Rettinger & Andrews, 2010; Van Voorhis et al., 2013) and others concluding that, by and large, men and women have the same risk factors (Andrews et al., 2012; Bonta & Andrews, 2017; Thompson, 2012). Alternatively, it could suggest that the way gender-responsive constructs were operationalized in this research was not specific or detailed enough to adequately assess them (i.e., not measured in a way that gender-responsive researchers would choose to assess them, typically, through interview based tools). Further, it could suggest that gender-responsive constructs may be more salient for women when they are first entering into a criminal lifestyle, rather than those who have a criminal history or who commit serious offences. Much of the research focusing on gender-responsive factors tends to center on women (and girls’) entry points into the criminal justice system, with less research focusing on how these factors relate to reoffending. Research by Gehring and Van Voorhis (2014), for example, examined the predictive validity of the WRNA in both men and women pre-trial defendants. The results showed that gender-responsive constructs, such as trauma and unstable accommodation, were predictive of rearrests for women, but were not predictive for men. Other research summarizing a series of WRNA pilot studies in a variety of American jurisdictions saw some of the strongest associations with unsatisfactory offender outcomes when using probation samples (as opposed to

prison and pre-release samples) (Van Voorhis et al., 2010). This suggests that constructs, such as trauma, have a greater influence on women's propensity to begin criminal behaviour, but as women become more involved in the criminal justice system (e.g., receive a federal sentence) gender-neutral constructs become more important in the maintenance and prediction of criminal behaviour. Clearly, more research is needed to better understand whether there are unique factors that are more important in the prediction of community outcomes for women in comparison to men.

Lastly, the gender-informed risk/need assessment tool worked well in conjunction with other established CSC tools. This is perhaps unsurprising given that most items that were included in the gender-informed assessment tool originated from other CSC intake assessments, ratings on the gender-informed tool were moderately to strongly related to ratings provided by existing measures. The gender-informed tool showed considerable promise, however, when predicting community outcomes. It appears that the gender-informed assessment tool organizes risk-relevant information in a beneficial manner as these ratings incrementally predicted any return to custody over established CSC tools. Evidently, the gender-informed assessment tool contributes unique information to the prediction of community outcomes and could provide strong predictions of women's community outcomes.

Implications

A particular strength of this research is that this tool represents a holistic assessment approach for women offenders that parallels the gender-informed approach CSC uses in their correctional interventions. While the individual items were found to be predictive for both men and women, the method used to develop the assessment tool was gender-informed. By developing this assessment tool specifically on women, the combination of gender-neutral and gender-responsive items were ensured to be relevant for the federal women offender population. This research responds to those who have commented on the reliance that many correctional organizations have on gender-neutral assessment tools and answers the call of gender-informed scholars and researchers to build ground-up assessment tools that are developed *on* women, *for* women (Belknap, 2015; Blanchette & Brown, 2006; 2011; Chesney-Lind & Pasko, 2013; Office of the Auditor General, 2017).

Research has demonstrated the association between offender behaviour in the institution and offender outcomes in the community (Gobeil, Cousineau, Power, & Stewart, 2015). As such,

an added benefit of this risk/need assessment tool is its ability to incorporate information about women's institutional adjustment. This provides the opportunity to tailor the risk/need reassessment to the current period of a woman's sentence. At intake, the assessment would consider the information included in the first eight components of the tool (e.g., Criminal History through Support and Resources) which relies on information collected in the OIA process. A woman's level of risk/need could then be updated throughout her period of incarceration to integrate relevant information about her institutional adjustment. CSC would then be better positioned to more comprehensively understand a woman's level of risk prior to release or while on community supervision.

Limitations and Future Research

This research has several limitations that should be noted. There are a number of considerations when using existing administrative data. First, while the process by which this assessment tool was developed was gender-informed (i.e., developed on women), the majority of the items considered in the tool-building process originated as a means to assess risk and need in populations of primarily men offenders. As such, there may be relevant gender-responsive constructs that were not sufficiently operationalized from existing information within OMS. Certainly, constructs such as current parenting stress (Blanchette & Brown, 2006), self-esteem (Salisbury & Van Voorhis, 2009; Salisbury et al., 2009) and other psychological variables such as mental health status, extent of cognitive deficits, levels of impulsivity (Brown, 2017; Stewart, Wilton, Kelly, Nolan, & Talisman, 2016) may provide risk-relevant information; however, they were not possible to consider due to administrative data limitations and privacy concerns. Second, there is an increasing amount of research focusing on the importance of strength-based factors, particularly as most women offenders do not pose a significant risk to reoffend (Blanchette & Brown, 2006). Current gender-responsive research and assessment tools often consider factors relating to educational strengths, strong prosocial family ties, and prosocial identity (Orbis Partners, 2006; Salisbury & Van Voorhis, 2009; Van Voorhis et al., 2010; 2013). As the information collected through OMS tends to focus on risk-based information, it was difficult to assess these constructs for the purposes of the current research. Including strength-based factors or risk factors outside of the gender-neutral factors identified by Andrews and Bonta may provide additional relevant information for risk/need assessment methods and, consequently, CSC is currently completing research to explore this further (Brown et al., in

progress). Third, many of the items considered in the development of this gender-informed assessment tool were based on historical information collected at intake. It may be that risk assessments could be augmented with the inclusion of more recent information that is relevant to women's environment and experiences while on community supervision. For example, while a history of unhealthy intimate relationships prior to admission to custody may be related to community outcomes, it may be that this prediction could be improved with updated information regarding the quality of relationships while on community supervision. Lastly, provided the information sources used in this research, individuals with a compressed OIA were excluded from consideration. As these individuals are likely to be lower risk and need, it was not possible to assess the utility of the gender-informed assessment tool for these individuals.

Furthermore, this research was also limited by the inability to disaggregate by Indigenous identity due to small numbers. While this assessment tool was developed with a population reflective of the correctional reality, it is not known whether this tool works equally well for Indigenous women, compared to non-Indigenous women, and there may be additional risk/need factors that are particularly relevant for Indigenous women that have not been considered.

Lastly, the utility of this risk/need assessment tool may be further improved by more formally considering this information alongside an existing static risk assessment such as the CRI. Given the strengths of the CRI (Motiuk & Vuong, 2018), this static risk rating could replace the Criminal History component of the gender-informed risk/need assessment tool, allowing both static and gender-informed dynamic needs assessments to be considered together. Future research would need to assess the benefit of this approach.

Conclusions

Overall, this research highlights that gender-neutral and gender-responsive perspectives are complementary, not competing, approaches. Incorporating a holistic approach to assessing the risk and need of women offenders produces an assessment tool that can predict any return to custody for women, even incrementally over existing CSC assessment tools, and represents a ground-up approach in assessment development. The implementation of this risk/need assessment tool would augment CSC assessment methods by using a ground-up, gender-informed assessment tool that would have the capacity to assess changes in dynamic risk and need. However, further research is needed to better understand hypothesized gender-responsive

needs and the utility of this assessment tool with Indigenous women.

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Appendix A: Supplementary Results

Table A1

Profile of offenders by group

	Development		Validation	
	Women	Women	Men	
	(n = 646)	(n = 620)	(n = 647)	
	% or M (SD)	% or M (SD)	% or M (SD)	
Demographic				
Age in years	35 (11)	34 (11)	35 (11)	
Indigenous	35.3	37.9	36.3	
Sentence				
Aggregate sentence				
Indeterminate	†	0.0	0.0	
Three years or less	62.5	61.8	54.0	
More than three years	37.2	38.2	46.0	
Most serious offence on the sentence				
Violent	50.3	53.9	50.2	
Non-violent	49.7	46.1	49.8	
Static Risk				
Low	20.9	19.5	19.4	
Medium	52.0	61.9	52.7	
High	27.1	17.7	27.4	
Dynamic Need				
Low	6.4	6.9	8.4	
Medium	38.4	34.2	36.8	
High	55.3	58.9	54.8	
Reintegration Potential				
Low	16.9	20.3	20.8	
Medium	65.0	61.9	49.7	
High	18.1	17.7	20.5	
Motivation Level				
Low	3.3	4.7	9.4	
Medium	45.5	46.0	71.6	
High	51.2	49.4	19.0	
Type of Release				
Statutory release	39.5	46.6	54.7	
Discretionary release	60.5	53.4	45.3	
Average number of days followed in the community	381 (305)	368 (289)	359 (276)	
Experienced any revocation	36.6	38.2	38.5	
Average number of days until any revocation	223 (175)	227 (173)	223 (155)	

† Information suppressed due to frequency fewer than 5 in one category

Table A2

Predictive validity of the gender-informed risk/need items across development (n = 645) and validation (n = 620) samples

	DEVELOPMENT			VALIDATION		
	<i>n</i>	HR	95% CI	<i>n</i>	HR	95% CI
Criminal History						
Five or more previous convictions	645	2.04	[1.56 – 2.67]	618	2.44	[1.81 – 3.28]
Sanctions - Community supervision	637	2.14	[1.58 – 2.90]	614	2.62	[1.84 – 3.73]
Drug Misuse and Unstable Accommodation						
Unstable accommodation	635	2.45	[1.86 – 3.22]	609	2.13	[1.59 – 2.86]
Associates with substance abusers	637	4.76	[2.89 – 7.82]	615	4.69	[2.80 – 7.87]
Has combined the use of different drugs	627	3.04	[2.22 – 4.17]	602	2.42	[1.72 – 3.40]
Antisocial Personality						
Impulsive	641	2.72	[1.88 – 3.94]	615	2.02	[1.41 – 2.90]
Engages in thrill seeking behaviour	624	2.40	[1.84 – 3.13]	601	1.66	[1.25 – 2.21]
Frequently acts in an aggressive manner	627	2.04	[1.55 – 2.69]	610	2.43	[1.81 – 3.25]
Employment						
Employment history is absent	638	2.33	[1.78 – 3.05]	617	2.14	[1.61 – 2.84]
Job history has been unstable	635	3.32	[2.24 – 4.92]	613	3.39	[2.23 – 5.17]
Marketable job skills obtained through experience are limited	638	2.52	[1.83 – 3.47]	617	1.96	[1.42 – 2.69]
Alcohol Misuse						
Excessive alcohol use is part of the offender's lifestyle	635	2.15	[1.66 – 2.80]	607	1.77	[1.33 – 2.34]
Negative Childhood Experiences						
Limited attachment to family unit during childhood	638	2.11	[1.62 – 2.74]	618	1.64	[1.24 – 2.17]
Relations with parental figure were negative during childhood	636	1.90	[1.43 – 2.52]	614	1.68	[1.25 – 2.26]
Violence and Weapons						
Violence (assault, robbery)	642	2.06	[1.58 – 2.69]	615	1.96	[1.48 – 2.61]
Threaten victim with a weapon	625	1.98	[1.51 – 2.60]	598	1.84	[1.36 – 2.49]
Support and Resources						
Financial instability	629	2.90	[1.98 – 4.25]	613	1.90	[1.33 – 2.72]
Prosocial support from an intimate partner is limited	629	2.08	[1.49 – 2.89]	600	1.86	[1.31 – 2.64]
Constructive leisure activities are limited	629	2.63	[1.91 – 3.62]	603	1.43	[1.05 – 1.93]
Institutional Behaviour						
Has been involved in at least one assault incident	645	2.47	[1.91 – 3.20]	620	2.62	[1.97 – 3.47]
Has had at least one minor charge	645	2.71	[2.06 – 3.57]	620	2.77	[2.04 – 3.75]
Has been involved in at least one behavioural incident	645	2.17	[1.66 – 2.83]	620	1.82	[1.37 – 2.42]

Note. HR = hazard ratio; 95% CI = confidence interval

Table A3

Multivariate association of gender-informed risk/need items across development (n = 533) and validation (n = 508) samples

	DEVELOPMENT		VALIDATION	
	HR	95% CI	HR	95% CI
Criminal History				
Five or more previous convictions	-	-	1.62	[1.16 – 2.26]
Sanctions - Community supervision	-	-	-	-
Drug Misuse and Unstable Accommodation				
Unstable accommodation	-	-	-	-
Associates with substance abusers	2.92	[1.52 – 5.61]	2.39	[1.34 – 4.24]
Has combined the use of different drugs	-	-	-	-
Antisocial Personality				
Impulsive	-	-	-	-
Engages in thrill seeking behaviour	1.73	[1.28 – 2.35]	-	-
Frequently acts in an aggressive manner	-	-	-	-
Employment				
Employment history is absent	1.38	[1.02 – 1.87]	1.71	[1.06 – 2.76]
Job history has been unstable	1.91	[1.12 – 3.26]	-	-
Marketable job skills obtained through experience are limited	-	-	-	-
Alcohol Misuse				
Excessive alcohol use is part of the offender's lifestyle	1.61	[1.20 – 2.16]	-	-
Negative Childhood Experiences				
Limited attachment to family unit during childhood	-	-	-	-
Relations with parental figure were negative during childhood	-	-	-	-
Violence and Weapons				
Violence (assault, robbery)	-	-	1.37	[1.00 – 1.87]
Threaten victim with a weapon	-	-	-	-
Support and Resources				
Financial instability	-	-	-	-
Prosocial support from an intimate partner is limited	-	-	-	-
Constructive leisure activities are limited	1.56	[1.09 – 2.22]	-	-
Institutional Behaviour				
Has been involved in at least one assault incident	1.82	[1.33 – 2.50]	1.55	[1.11 – 2.17]
Has had at least one minor charge	1.48	[1.06 – 2.06]	1.83	[1.28 – 2.62]
Has been involved in at least one behavioural incident	-	-	-	-

Note. HR = hazard ratio; 95% CI = confidence interval

Table A4

Predictive validity of the gender-informed risk/need items across women's validation (N = 620) and men's comparison (N = 647) samples

	WOMEN			MEN		
	<i>n</i>	HR	95% CI	<i>n</i>	HR	95% CI
Criminal History						
Five or more previous convictions	618	2.44	[1.81 – 3.28]	647	2.19	[1.64 – 2.94]
Sanctions - Community supervision	614	2.62	[1.84 – 3.73]	644	2.13	[1.53 – 2.97]
Drug Misuse and Unstable Accommodation						
Unstable accommodation	609	2.13	[1.59 – 2.86]	639	2.07	[1.57 – 2.73]
Associates with substance abusers	615	4.69	[2.80 – 7.87]	641	3.43	[2.22 – 5.30]
Has combined the use of different drugs	602	2.42	[1.72 – 3.40]	628	2.93	[2.18 – 3.93]
Antisocial Personality						
Impulsive	615	2.02	[1.41 – 2.90]	638	2.35	[1.69 – 3.27]
Engages in thrill seeking behaviour	601	1.66	[1.25 – 2.21]	632	1.99	[1.51 – 2.63]
Frequently acts in an aggressive manner	610	2.43	[1.81 – 3.25]	631	2.17	[1.62 – 2.89]
Employment						
Employment history is absent	617	2.14	[1.61 – 2.84]	638	2.70	[1.94 – 3.75]
Job history has been unstable	613	3.39	[2.23 – 5.17]	634	2.19	[1.60 – 3.01]
Marketable job skills obtained through experience are limited	617	1.96	[1.42 – 2.69]	631	1.74	[1.32 – 2.29]
Alcohol Misuse						
Excessive alcohol use is part of the offender's lifestyle	607	1.77	[1.33 – 2.34]	639	2.00	[1.52 – 2.64]
Negative Childhood Experiences						
Limited attachment to family unit during childhood	618	1.64	[1.24 – 2.17]	643	2.09	[1.59 – 2.75]
Relations with parental figure were negative during childhood	614	1.68	[1.25 – 2.26]	644	1.85	[1.38 – 2.48]
Violence and Weapons						
Violence (assault, robbery)	615	1.96	[1.48 – 2.61]	646	1.73	[1.32 – 2.28]
Threaten victim with a weapon	598	1.84	[1.36 – 2.49]	639	1.06	[0.77 – 1.46]
Support and Resources						
Financial instability	613	1.90	[1.33 – 2.72]	640	2.28	[1.68 – 3.09]
Prosocial support from an intimate partner is limited	600	1.86	[1.31 – 2.64]	629	1.54	[1.16 – 2.05]
Constructive leisure activities are limited	603	1.43	[1.05 – 1.93]	622	2.36	[1.77 – 3.14]
Institutional Behaviour						
Has been involved in at least one assault incident	620	2.62	[1.97 – 3.47]	647	2.53	[1.88 – 3.40]
Has had at least one minor charge	620	2.77	[2.04 – 3.75]	647	2.11	[1.60 – 2.78]
Has been involved in at least one behavioural incident	620	1.82	[1.37 – 2.42]	647	2.08	[1.57 – 2.77]

Note. HR = hazard ratio; 95% CI = confidence interval

Table A5

Predictive validity of the gender-informed risk/need ratings across women's validation (n = 620) and men's comparison (n = 647) samples

	χ^2 (df)	<i>p</i>	Hazard Ratio	95% CI
WOMEN				
Low risk/need	-	-	-	-
Medium risk/need	30.543 (1)	<.001	2.91	[2.91 – 9.43]
High risk/need	63.955 (1)	<.001	6.27	[6.27 – 20.64]
<i>Model Fit</i>				
Wald χ^2 (df)	74.278 (2)	<.001		
Harrell's c statistic	0.682			
MEN				
Low risk/need	-	-	-	-
Medium risk/need	48.865 (1)	<.001	3.82	[2.62 – 5.57]
High risk/need	87.011 (1)	<.001	8.03	[5.18 – 12.44]
<i>Model Fit</i>				
Wald χ^2 (df)	87.934 (2)	<.001		
Harrell's c statistic	0.683			

Note. 95% CI = confidence interval. Harrell's C values of .56, .64, and .71 are considered small, moderate, and large effect sizes, respectively.

Table A6

Conditional effect of risk level on returns to custody for men and women (n = 2,644)

	Effect	<i>Z</i>	<i>p</i>	95% CI
Women	1.00	10.33	< .001	[.811 – 1.19]
Men	.855	8.98	< .001	[.668 – 1.04]

Note. 95% CI = confidence interval

Table A7

Incremental predictive accuracy of the gender-informed risk/need assessment tool over the SFA in the validation sample (n = 620)

	χ^2 (df)	<i>p</i>	HR	95% CI
Block 1				
SFA				
Medium vs. Low risk	9.69 (1)	.002	1.96	[2.91 – 9.43]
High vs. Low risk	23.28 (1)	<.001	2.94	[6.27 – 20.64]
<i>Model Fit</i>				
χ^2 (df)	23.93 (2)	<.001		
Harrell's C	0.60			
Block 2				
SFA				
Medium vs. Low risk	0.09 (1)	.764	1.07	[0.67 – 1.66]
High vs. Low risk	0.81 (1)	.369	1.25	[0.77 – 2.02]
Gender-Informed				
Medium vs. Low risk/need	28.04 (1)	<.001	5.09	[2.79 – 9.29]
High vs. Low risk/need	52.44 (1)	<.001	10.37	[5.51 – 19.52]
<i>Model Fit</i>				
χ^2 (df)	75.47 (4)	<.001		
$\Delta \chi^2$ (df)	51.54 (2)	<.001		
Harrell's C	0.70			

Note. HR = hazard ratio. 95% CI = confidence interval. Harrell's C values of .56, .64, and .71 are considered small, moderate, and large effect sizes, respectively.

Table A8

Incremental predictive accuracy of the gender-informed risk/need assessment tool over the DFIA-R in the validation sample (n = 620)

	χ^2 (df)	<i>p</i>	HR	95% CI
Block 1				
DFIA-R				
Medium vs. Low need	4.72 (1)	.030	2.78	[1.11 – 7.00]
High vs. Low need	18.18 (1)	<.001	7.08	[2.88 – 17.40]
<i>Model Fit</i>				
χ^2 (df)	46.04 (2)	<.001		
Harrell's C	0.64			
Block 2				
DFIA-R				
Medium vs. Low need	0.03 (1)	.866	1.09	[0.40 – 3.00]
High vs. Low need	1.21 (1)	.271	1.78	[0.64 – 4.95]
Gender-Informed				
Medium vs. Low risk/need	18.28 (1)	<.001	4.23	[2.18 – 8.18]
High vs. Low risk/need	35.79 (1)	<.001	8.13	[4.09 – 16.16]
<i>Model Fit</i>				
χ^2 (df)	81.29 (4)	<.001		
$\Delta \chi^2$ (df)	35.25 (2)	<.001		
Harrell's C	0.70			

Note. HR = hazard ratio. 95% CI = confidence interval. Harrell's C values of .56, .64, and .71 are considered small, moderate, and large effect sizes, respectively.

Table A9

Incremental predictive accuracy of the gender-informed risk/need assessment tool over the CRI in the validation sample (n = 618)

	χ^2 (df)	<i>p</i>	HR	95% CI
Block 1				
CRI				
Low/Moderate vs. Low risk	12.6 (1)	<.001	2.67	[1.55 – 4.59]
Moderate vs. Low risk	24.0 (1)	<.001	3.35	[2.07 – 5.44]
Moderate/High vs. Low risk	38.7 (1)	<.001	4.46	[2.79 – 7.15]
High vs. Low risk	59.0 (1)	<.001	6.59	[4.07 – 10.66]
<i>Model Fit</i>				
χ^2 (df)	64.5 (4)	<.001		
Harrell's C	0.66			
Block 2				
CRI				
Low/Moderate vs. Low risk	5.81 (1)	.016	1.97	[1.14 – 3.42]
Moderate vs. Low risk	2.91 (1)	.088	1.56	[0.94 – 2.62]
Moderate/High vs. Low risk	7.26 (1)	.007	2.01	[1.21 – 3.32]
High vs. Low risk	9.35 (1)	.002	2.29	[1.35 – 3.90]
Gender-Informed				
Medium vs. Low risk/need	22.5 (1)	<.001	4.05	[2.27 – 7.22]
High vs. Low risk/need	45.3 (1)	<.001	8.25	[4.46 – 15.25]
<i>Model Fit</i>				
χ^2 (df)	103.9 (6)	<.001		
$\Delta \chi^2$ (df)	39.4 (2)	<.001		
Harrell's C	0.71			

Note. HR = hazard ratio. 95% CI = confidence interval. Harrell's C values of .56, .64, and .71 are considered small, moderate, and large effect sizes, respectively.

Appendix B: Scale Development Procedures

Method

Table B1 summarizes the variables considered in the development of the gender-informed risk/need assessment tool that were identified through OMS. In total 296 variables were considered.

Table B1

Variables considered for gender-informed risk/need assessment instrument

Variables collected at intake to federal custody

Marital status (Has a significant other vs. Does not have a significant other)

Reintegration level

Motivation level

Accountability level

Responsivity flag

Engagement flag

Dynamic Factors Identification and Analysis-Revised indicators

Static Factors Assessment indicators

Computerized Assessment of Substance Abuse – Alcohol Dependence Scale

Computerized Assessment of Substance Abuse – Drug Abuse Screening Test

Computerized Assessment of Substance Abuse – Problems Related to Drinking Scale

Computerized Assessment of Substance Abuse – substance crime link

Computerized Assessment of Substance Abuse – treatment required

Computerized Mental Health Intake Screening System – Brief Symptom Inventory – Global Severity Index

Computerized Mental Health Intake Screening System – Depression, Hopelessness, and Suicide Scale

Computerized Mental Health Intake Screening System – Mental Health Indicators

Computerized Mental Health Intake Screening System – General Ability Measure for Adults

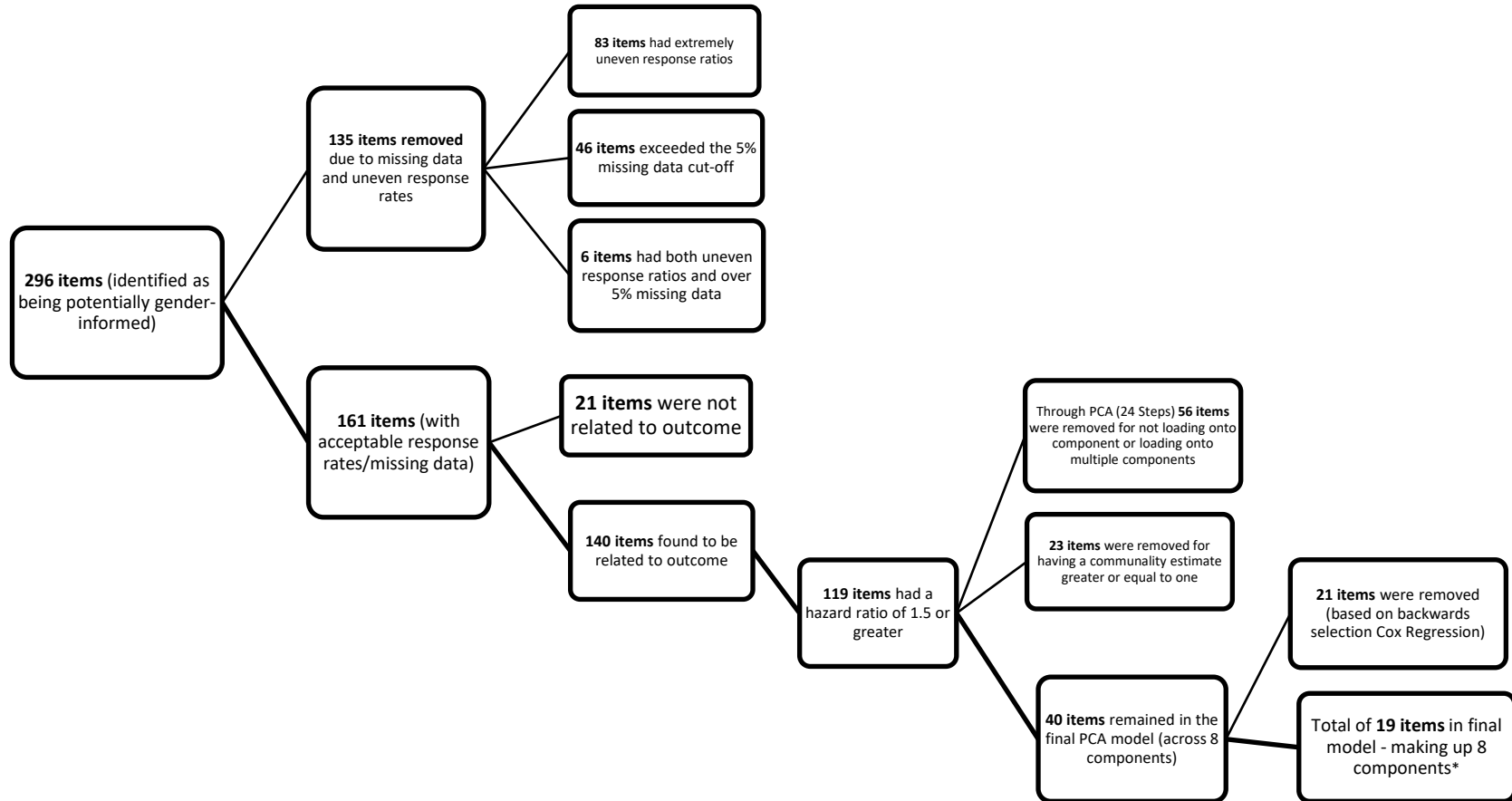
Computerized Mental Health Intake Screening System – Adult ADHD Self-Report Scale Symptom Checklist

Table B1 *Continued*

Variables collected throughout custodial sentence
At least one segregation placement (yes/no)
Involved in at least one incident as a victim (yes/no)
Involved in at least one incident as an instigator (yes/no)
Involved in at least one assault incident (yes/no)
Involved in at least one behaviour-related incident (yes/no)
Involved in at least one contraband incident (yes/no)
Involved in at least one death incident (yes/no)
Involved in at least one escape incident (yes/no)
Involved in at least one miscellaneous incident (yes/no)
Involved in at least one property incident (yes/no)
Involved in at least one self-injury incident (yes/no)
Experienced at least one minor charge (yes/no)
Experienced at least one serious charge (yes/no)
Experienced at least one private family and/or regular visit (yes/no)
Experienced at least one private family visit (yes/no)
Experienced at least one regular visit (yes/no)
Experienced at least one visit from immediate family (yes/no)
Experienced at least one visit from step/children/grandchildren (yes/no)
Experienced at least one visit from extended family (yes/no)
Experienced at least one visit from friends (yes/no)
Experienced at least one visit from partner or ex-partner (yes/no)
Experienced at least one visit from others (yes/no)
Completed at least one education achievement (yes/no)
Completed at least one moderate or high intensity correctional program (yes/no)
Most recent post-program Generic Program Performance Measure score
Mean post-program Generic Program Performance Measure score
Mean change Generic Program Performance Measure score

As seen in Figure B1, the process by which variables were considered in the development of the gender-informed risk/need assessment tool was multi-pronged.

Figure B1. How items were reduced through the various item reduction steps.



*Please note that 3 additional items from Component 8 (Support and Resources) emerged in the analysis focused on the combined recidivism analyses (pre-WED returns to custody and post-WED recidivism). As such, the final model consisted of 22 items.

Scale development analyses were undertaken through the following steps:

- a) Extremely uneven responses and missing data.

As a first step in the reduction of the number of potential predictor variables, the distributions and the amount of missing data for each variable was considered. Variables were excluded from further consideration if there was extreme uneven responses (e.g., less than 10% or greater than 90% endorsement) or if there was more than 5% missing data. Some variables that had three or more levels (e.g., reintegration level) that had issues with uneven responses were collapsed to become dichotomous (e.g., collapsing low with medium versus high motivation).

- b) Bivariate Cox regression analyses.

The second step in variable reduction involved a series of bivariate Cox regression analyses⁷ to determine the individual associations with experiencing any return to custody. Variables were retained if the hazard ratio was greater than 1.50, similar to other scale development research (e.g., Scott, 2017).^{8,9}

- c) Principle Components Analysis.

The remaining variables were entered into a Principal Components Analysis (PCA) to reduce the number of items into more meaningful/useful components. As the variables flagged for inclusion were dichotomous and ordinal in nature, these analyses were based on the polychoric correlation matrix as this approach reduces error associated with extracted components (Holgado-Tello, Chacón-Moscoso, Barbero-García, & Villa-Abad, 2010; Kolenikov & Angeles, 2004; Kubinger, 2003). Item reduction decisions were based on the size of the component loadings (greater than .40; Stevens, 2002), as well as eigenvalues, scree plots, and

⁷ Cox regression, a type of survival analysis, produces an estimate of the hazard of an event occurring, allowing for variable follow-up times within the community. In this study, the event is whether an offender experiences a return to custody while on community supervision. In conjunction with the significance level or confidence interval, a hazard ratio of 1.0 would indicate no difference in the hazard of experiencing a return to custody for those who endorsed a particular item compared to those who did not endorse the item. A hazard ratio of greater than 1.0 would indicate an increased likelihood of returning to custody and a hazard ratio of less than 1.0 would suggest a decreased likelihood.

⁸ As hazard ratios are scale dependent, the cut-off of a hazard ratio of 1.50 may be too stringent for variables that were not dichotomous (e.g., motivation level). Nonetheless, all the non-dichotomous variables that were included in the bivariate analyses met this criterion or were previously dichotomized to address uneven responses.

⁹ It should be noted that the reason Area Under the Curve (AUC) statistics were not used to assess the magnitude of relationships between variables and community outcomes was because this statistic would have required fixed follow-up time periods in the community. This would have reduced the number of women available for follow-up by a considerable amount. Whereas, cox regression allows for varying follow-up periods in the community, maintaining the full sample of women.

communality measures. If items did not load onto a component or if it loaded onto multiple components, the item was removed from consideration. This process was repeated until a simple solution was established.

d) Backwards selection Cox regression analyses.

Within each component identified through PCA, a series of backwards selection Cox regression analyses were used to identify the remaining items that were uniquely contributing to the prediction of any return to custody. Items that did not uniquely contribute to the prediction of any return to custody were eliminated from further consideration in the development of the gender-informed risk/need assessment tool.

e) Final item review.

The remaining items were examined for multicollinearity concerns (e.g., items being extremely highly correlated with one another). Items that were correlated at .80 or higher were removed from consideration. Finally, the potential items were critically reviewed to assess their theoretical and practical utility. The remaining items comprised the final gender-informed risk/need assessment tool.

f) Overall risk/need rating development.

A number of methods were explored to determine the overall rating of risk/need. In the end, a simple average of the number of items endorsed was determined to be the most parsimonious way to calculate a total score and had comparable predictive accuracy against other, more complicated, methods assessed.¹⁰ Women's total scores were then categorized as Low (less than 33% of items endorsed), Medium (between 33% and 66% of items endorsed), and High (more than 66% of items endorsed) risk/need. The prevalence of the overall risk/need ratings, as well as the individual items, were examined for both the development and validation women samples to better understand their risk/need profiles.

¹⁰ The other methods to calculate an overall rating are as follows:

- (1) Using a Burgess-like weighting method, item weights were calculated by the degree that the return rates of individuals who endorsed the item deviated from the overall rate of return to custody. For every 5% deviation, a weight of 1 was applied. Scores were then summed across all items to calculate a total score, with scores ranging from 0 to 10 (Low), 10 to 20 (Medium), and 20 to 30 (High). Results showed comparable predictive accuracy to the simple average scoring method.
- (2) The Five Level Risk and Needs System (Hanson, et al. 2016) was also explored; however, the current sample did not meet the data requirements for this approach.

Results

Preliminary Variable Examination

The first step of item reduction included examining the variable distributions for extreme uneven responses and missing data. This examination resulted in 161 items being retained for further consideration, as 83 items had extreme uneven response ratios, 46 items exceeded the missing data cut-off requirements, and 6 items violated both of these conditions.

Bivariate cox regression analysis was then used to examine the association between the remaining 161 items and the likelihood of experiencing any return to custody (see Table B2). This resulted in 119 items to be retained for the next step in item reduction – Principle Components Analysis.

Table B2

Bivariate cox regression associations between OMS variables and any return to custody for the women development sample (n = 646)

OMS variables	n	χ^2 (df)	p	Hazard Ratio
Marital Status				
Does not have significant other		-	-	-
Has significant other	612	0.865 (1)	.352	1.16
Reintegration Level				
High		-	-	-
Medium		16.914 (1)	<.001	2.38
Low		24.615 (1)	<.001	3.30
Wald χ^2 (df)	645	24.989 (2)	<.001	
Motivation Level				
High		-	-	-
Low or Medium	645	6.299 (1)	.012	1.39
Accountability Level				
High		-	-	-
Low or Medium	645	11.744 (1)	<.001	1.66
Responsivity Flag				
	645	7.317 (1)	<.001	1.44
DFIA-R Domain Indicators				
Employment/Education				
1. Less than grade 10	633	35.854 (1)	<.001	2.32
2. Less than high school	635	26.649 (1)	<.001	2.31
3. Employment history is absent	638	38.228 (1)	<.001	2.33
4. Unemployed at arrest	636	17.202 (1)	<.001	2.13
5. Unstable job history	635	35.627 (1)	<.001	3.32
6. Marketable job skills through experience are limited	638	32.243 (1)	<.001	2.52
7. Job skills through formal training are limited	632	27.839 (1)	<.001	3.16
8. Dissatisfied with job skills	625	17.235 (1)	<.001	1.80
10. Belief in oneself to improve employability are limited	632	2.175 (1)	.140	1.30
12. Has previously been referred to programs addressing deficit(s)	621	2.798 (1)	.094	1.30

Table B2 *Continued*

OMS variables	<i>n</i>	χ^2 (df)	<i>p</i>	Hazard Ratio
Marital/Family				
1. Limited attachment to family unit during childhood	638	30.781 (1)	<.001	2.11
2. Relationships with parental figure were negative during childhood	636	19.521 (1)	<.001	1.90
3. Abused during childhood	631	19.764 (1)	<.001	1.85
4. Witnessed family violence during childhood	620	18.801 (1)	<.001	1.81
6. Inability to maintain enduring intimate relationship	631	14.027 (1)	<.001	1.66
7. Intimate relationship(s) have been problematic	635	11.857 (1)	<.001	2.11
8. Victimized by spousal abuse	635	7.262 (1)	.007	1.49
9. Perpetrated spousal violence	614	16.958 (1)	<.001	1.78
10. Attitudes support spousal violence	625	1.156 (1)	.282	1.25
11. Has no parental responsibilities	638	17.352 (1)	<.001	1.75
16. Has previously been referred to programs addressing deficit(s)	626	0.218 (1)	.640	1.09
Associates				
1. Associates with substance abusers	637	37.768 (1)	<.001	4.76
2. Has many criminal acquaintances	624	38.999 (1)	<.001	3.69
3. Has many criminal friends	624	48.992 (1)	<.001	2.84
5. Has criminal partner	621	19.675 (1)	<.001	1.82
8. Prosocial support from intimate partner is limited	629	18.771 (1)	<.001	2.08
9. Prosocial family support is limited	637	27.012 (1)	<.001	2.00
10. Prosocial support from friends is limited	631	31.370 (1)	<.001	2.77
11. Has been previously referred to programs addressing deficit(s)	631	1.233 (1)	.267	1.28
Substance Abuse				
1. Early age alcohol use	634	34.337 (1)	<.001	2.37
2. Frequently engages in binge drinking	629	27.051 (1)	<.001	2.00
3. Has combined the use of alcohol and drugs	631	34.326 (1)	<.001	2.45
4. Alcohol use interferes with employment	631	30.702 (1)	<.001	2.11
5. Alcohol use interferes with interpersonal relationships	635	29.676 (1)	<.001	2.07
6. Alcohol use interferes with physical or emotional wellbeing	637	33.183 (1)	<.001	2.16
7. Excessive alcohol use is part of the offender's lifestyle	635	33.242 (1)	<.001	2.15
8. Early age drug use	639	47.212 (1)	<.001	3.20
9. Has gone on drug-taking bouts or binges	631	53.818 (1)	<.001	3.49
10. Has combined the use of different drugs	627	48.084 (1)	<.001	3.04
11. Drug use interferes with employment	627	39.585 (1)	<.001	2.66
12. Drug use interferes with interpersonal relationships	638	44.513 (1)	<.001	3.20
13. Drug use interferes with physical or emotional wellbeing	638	46.103 (1)	<.001	3.39
14. Regular drug use is part of the offender's lifestyle	639	41.737 (1)	<.001	2.92
15. Alcohol or drug use has resulted in law violations	638	41.696 (1)	<.001	4.93
16. Alcohol and/or drug use is part of the offence cycle	637	36.394 (1)	<.001	3.47
17. Previously referred to programs	637	17.338 (1)	<.001	1.75
Community Functioning				
1. Unstable accommodation	635	40.890 (1)	<.001	2.45
2. Financial instability	629	29.702 (1)	<.001	2.90
3. Has used social assistance	625	18.905 (1)	<.001	2.46
4. Leisure activities are limited	629	35.315 (1)	<.001	2.63
5. Community attachment limited	629	22.862 (1)	<.001	2.06
6. Use of community resources limited	632	7.150 (1)	.008	1.43
7. Has previously been referred to programs	623	5.150 (1)	.023	1.58

Table B2 *Continued*

OMS variables	<i>n</i>	χ^2 (df)	<i>p</i>	Hazard Ratio
Personal/Emotional				
1. Displays narrow and rigid thinking	640	6.211 (1)	.013	1.40
2. Problem recognition skills are limited	644	0.083 (1)	.773	1.04
3. Ability to generate choices is limited	641	3.665 (1)	.056	1.36
4. Ability to link actions to consequences is limited	643	0.406 (1)	.524	1.09
5. Has difficulty coping with stress	630	18.176 (1)	<.001	2.52
7. Impulsive	641	27.944 (1)	<.001	2.72
8. Engages in thrill seeking behaviour	624	41.832 (1)	<.001	2.40
10. Has difficulty setting long-term goals	633	14.827 (1)	<.001	1.67
11. Has difficulty setting realistic goals	628	2.183 (1)	.140	1.23
13. Assertiveness skills are limited	630	0.006 (1)	.938	0.99
14. Listening skills are limited	631	4.328 (1)	.038	1.42
15. Has difficulty solving interpersonal problems	641	12.413 (1)	<.001	1.68
17. Empathy skills are limited	625	8.195 (1)	.004	1.48
18. Frequently feels intense anger	627	19.160 (1)	<.001	1.86
19. Frequently suppresses anger	618	7.162 (1)	.007	1.43
20. Frequently acts in an aggressive manner	627	25.387 (1)	<.001	2.04
21. Has low frustration tolerance	627	19.476 (1)	<.001	1.81
22. Frequently interprets neutral situations as hostile	616	9.387 (1)	.002	1.65
25. Has previously been referred to programs addressing deficit(s)	637	6.713 (1)	.010	1.46
Attitudes				
1. Displays negative attitudes towards the criminal justice system	631	6.671 (1)	.010	1.45
2. Displays negative attitudes towards the correctional system	630	6.785 (1)	.010	1.61
4. Displays non-conforming attitudes toward society	631	21.218 (1)	<.001	1.85
5. Values a substance abusing lifestyle	627	19.254 (1)	<.001	1.82
6. Disrespects personal belongings	626	11.693 (1)	<.001	1.69
7. Disrespects personal belongings	626	11.693 (1)	<.001	1.69
8. Disrespects public or commercial property	624	25.887 (1)	<.001	2.05
9. Attitudes support instrumental/goal-oriented violence	628	34.947 (1)	<.001	2.33
10. Attitudes support expressive/emotional violence	629	28.737 (1)	<.001	2.14
11. Denies crime or uses excuses to justify or minimize crime	634	0.394 (1)	.530	0.92
12. Has previously been referred to programs addressing deficit(s)	628	5.197 (1)	.023	1.57
Static Factors Assessment Indicators				
Criminal History Record				
<i>Previous Offences – Youth Court</i>				
Previous offences in youth court?	629	50.757 (1)	<.001	2.61
Previous youth convictions				
5-9 convictions?	621	59.267 (1)	<.001	3.19
2-4 convictions?	619	64.167 (1)	<.001	3.06
1 conviction?	619	52.345 (1)	<.001	2.67
Scheduled convictions?	622	58.452 (1)	<.001	3.20
Dispositions – community supervision?	623	55.684 (1)	<.001	2.78
Dispositions – Open custody?	618	29.215 (1)	<.001	2.47
Dispositions – Secure custody?	622	32.456 (1)	<.001	2.50
Fail during community supervision?	619	56.682 (1)	<.001	3.04
<i>Previous Offences – Adult Court</i>				
Previous offences in adult court?	639	26.973 (1)	<.001	2.51

Table B2 *Continued*

OMS variables	<i>n</i>	χ^2 (df)	<i>p</i>	Hazard Ratio
Previous adult convictions				
15+ convictions?	639	21.144 (1)	<.001	1.89
10-14 convictions?	639	28.687 (1)	<.001	2.04
5-9 convictions?	639	25.304 (1)	<.001	2.00
2-4 convictions?	639	27.088 (1)	<.001	2.28
1 conviction?	639	26.047 (1)	<.001	2.45
Scheduled convictions?	639	15.152 (1)	<.001	1.68
Sanctions – Community supervision?	637	24.155 (1)	<.001	2.14
Sanctions – Provincial terms?	636	18.387 (1)	<.001	1.80
Sanctions – Federal terms?	638	4.879 (1)	.027	1.46
Failure during community supervision?	626	28.128 (1)	<.001	2.11
Attempt escape/UAL/escapes?	630	8.985 (1)	.003	1.78
Failures on conditional release?	629	23.564 (1)	<.001	1.93
No crime free period of one year or more?	632	5.508 (1)	.019	1.56
<i>Current Offences</i>				
Current convictions				
10-14 current convictions?	643	6.108 (1)	.014	1.59
5-9 current convictions?	643	10.571 (1)	.001	1.55
2-4 current convictions?	642	6.505 (1)	.011	1.49
Scheduled current convictions?	643	2.663 (1)	.103	0.77
Offence Severity Record				
<i>Previous Offences</i>				
Previous offences?	640	37.861 (1)	<.001	3.44
Previous serious offences?	640	35.089 (1)	<.001	2.25
Drug trafficking?	639	0.007 (1)	.932	1.02
Violence (assault, robbery)?	639	40.140 (1)	<.001	2.34
Previous victims				
Three or more victims?	622	42.825 (1)	<.001	2.65
Two victims?	621	42.615 (1)	<.001	2.51
One victim?	620	40.041 (1)	<.001	2.37
Threat of violence to victim?	615	57.420 (1)	<.001	2.89
Threaten victim with a weapon?	606	56.593 (1)	<.001	3.23
Violence used against victim?	630	38.295 (1)	<.001	2.32
Weapons used against victim?	616	39.740 (1)	<.001	2.78
Minor injury to victim?	622	37.896 (1)	<.001	2.34
Prior sentence length				
Sentence length 1 day to 4 years?	636	25.390 (1)	<.001	2.07
<i>Current Offences</i>				
Current serious offences?	643	3.383 (1)	.066	0.74
Drug trafficking?	642	0.867 (1)	.352	0.85
Use of prohibited weapons?	641	6.762 (1)	.009	1.63
Violence (assault, robbery)?	642	28.719 (1)	<.001	2.06
Current victims				
Three or more victims?	641	1.470 (1)	.225	1.23
Two victims?	641	6.727 (1)	.010	1.43
One victim?	641	3.660 (1)	.060	1.31

Table B2 *Continued*

OMS variables	<i>n</i>	χ^2 (df)	<i>p</i>	Hazard Ratio
Use of power/position/authority on victim?	639	1.077 (1)	.299	1.20
Threat of violence to victim?	627	20.514 (1)	<.001	1.84
Threaten victim with a weapon?	625	24.326 (1)	<.001	1.98
Violence used against victim?	638	4.577 (1)	.032	1.33
Weapons used against victim?	636	4.859 (1)	.028	1.39
Caused death to victim?	643	9.766 (1)	.002	0.47
Serious injury to victim?	635	3.440 (1)	.064	0.74
Minor injury to victim?	634	6.150 (1)	.013	1.43
Current sentence				
Sentence length 5 to 9 years?	643	19.123 (1)	<.001	0.35
At least one segregation placement	645	38.960 (1)	<.001	2.29
Incidents				
Involved in at least one incident as victim	645	9.560 (1)	.002	1.18
Involved in at least one incident as instigator	645	42.879 (1)	<.001	2.46
Involved in at least one assault incident	645	46.664 (1)	<.001	2.47
Involved in at least one behaviour-related incident	645	32.576 (1)	<.001	2.17
Involved in at least one contraband incident	645	8.039 (1)	.005	1.49
Involved in at least one miscellaneous incident	645	11.878 (1)	<.001	1.58
Charges				
Involved in at least one minor charge	645	50.311 (1)	<.001	2.71
Involved in at least one serious charge	645	43.760 (1)	<.001	2.43
Visitation Information				
Experienced at least one private family and/or regular visit	645	18.928 (1)	<.001	0.56
At least one private family visit	645	9.330 (1)	.002	0.47
At least one regular visit	645	20.514 (1)	<.001	0.55
At least one visit from immediate family	645	21.363 (1)	<.001	0.51
At least one visit from extended family	645	3.011 (1)	.083	0.75
At least one visit from friends	645	9.763 (1)	.002	0.57
At least one visit from partner or ex	645	11.464 (1)	<.001	0.43
Education Achievements				
Completed at least one education achievement	645	2.747 (1)	.097	1.25
Correctional Program Completion				
Completed at least one moderate or high intensity correctional program	645	2.096 (1)	.148	1.26

Note. df = degrees of freedom

Principal Components Analysis (PCA) for Item Reduction

Using the 119 items, the first iteration of PCA identified 25 components to be retained by the Eigenvalue greater than 1 criterion, with many variables loading onto the first component. A varimax rotation was then used to assess whether a more meaningful solution emerged and, while it did improve interpretation to a certain degree, results were still unclear. Given that there were too many variables at this point to compile a meaningful solution, all variables with factor loadings of .40 on the first component were removed and the PCA was repeated to determine whether additional components would emerge. Re-running the PCA resulted in a 15 component solution. In an effort to better understand the underlying factor structure of these items, PCA using the above identified variables was completed using a varimax rotation. Variables that did not load onto a component (loadings of less than .40), loaded onto more than one component, or had a communality estimate of greater than or equal to one (ultra-Heywood or Heywood cases) were removed from the solution. This resulted in an eight-component solution comprised of 40 variables.

Refinement of Final Predictors

A series of backwards selection Cox regression analyses were run on each component identified in the PCA. This was done to identify and exclude any variables that did not significantly contribute to the ability of the component to predict any return to custody. From this analysis, an additional 21 variables were removed from consideration resulting in a total of 19 items clustered into eight meaningful components that represented a combination of hypothesized gender-neutral and gender-responsive constructs. Inter-item correlations were also assessed to examine the potential for multicollinearity between items (e.g., excessively high correlations between variables). As there were no correlations that exceeded 0.80, no variables were removed.

A final step in the development of the gender-informed risk/need assessment tool was to critically evaluate the remaining items with regards to their theoretical importance and practical utility. As described below, a number of items were refined:

Previous convictions

Results of the scale development procedures highlighted the importance of criminal history in the prediction of community outcomes as measured by the SFA, namely the Adult Criminal History Record. However, upon further examination, the way OMS records previous

convictions does not allow for consideration of individuals who have no previous convictions (e.g., the items range from 1 to 15+ previous convictions). As women offenders generally have less extensive criminal histories than men (Covington & Bloom, 2003), it was necessary to operationalize previous convictions in a more inclusive way. Therefore, women who did not endorse having at least one previous conviction as measured by the Adult Criminal History Record and were on their first federal sentence were coded as having no previous convictions. The number of previous convictions was then dichotomized into two equally-sized groups – individuals with five or more previous convictions were rated as a 1, while those with four or fewer convictions were rated as a 0.

Negative childhood experiences

Initially, a variable that emerged from the PCA and Cox regression analyses was the Marital/Family DFIA-R domain indicator “Abused during childhood.” It was determined, however, that there may be the potential to inappropriately disadvantage women with abuse histories if correctional decisions (e.g., discretionary release recommendations) were made in consultation with the results of this gender-informed risk/need assessment tool. Therefore, other items included in the Marital/Family DFIA-R domain that were related to childhood experiences were considered for possible replacement. Ultimately, “Abused during childhood” was replaced with “Limited attachment to family unit during childhood” as this item had a comparable association with any return to custody and was strongly correlated with the original item.

Support and resources

As mentioned previously, concurrent analyses were used to develop a gender-informed risk/need assessment tool focused on two community outcomes of interest: any return to custody before warrant expiry and a combined recidivism indicator that considered any return to custody before warrant expiry and any post-warrant expiry offences. As the constructs, and many of the items, that were included were strikingly similar, the results we present in the current report are based on any return to custody before warrant expiry. The component Support and Resources (e.g., financial instability, prosocial support from intimate partner), however, emerged as an important area when examining the combined recidivism community outcome. Given the theoretical importance of relational support and resources for women (Blanchette & Brown, 2006) and women’s high level of endorsement of these items (see Table 2), the decision was made to retain these items in the final assessment tool to cover nine meaningful components.