Validity of the LS/CMI for the Prediction of Recidivism among Male and Female Offenders

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Abstract: Most actuarial tools in criminology have been developed based on male offenders. However, there have been few studies on the nature and extent of crime in the female population. It has been suggested that this gendered difference in the development of robust actuarial tools for the assessment of criminal behaviours is mainly attributable to the fact that tool development requires a large representative sample—it is an undeniable fact that males commit far more offences and pose a greater offending threat than females do. However, applying tools that have been specifically developed for males to female prison populations neglects potential behavioral and situational differences between genders, and may have an impact on the quality of decisions made in day-to-day practice in the criminal justice system. Based on a global sample comprising 61,324 offenders (male offenders = 41,557; female offenders = 19,767) sentenced to custody (n = 7,588) or probation (n = 53,736), this study aims to fill this gap by analyzing all the items in the five sections of the Level of Service/Case Management Inventory (LS/CMI), a tool developed in order to predict criminal recidivism. Thus, this study explores indicators of criminal recidivism in male and female offenders. Our results regarding Section 1 of the LS/CMI are very similar to the results reported in previous studies. Our results for sections 2 to 5 indicate that only a few items are highly correlated to recidivism, and that those items—for example, criminal history and personal problems—are largely redundant with those in Section 1. In addition, the majority of the items in sections 2 to 5 present low levels of endorsement.

Keywords: LS/CMI; Risk assessment; male offenders; female offenders; in custody; on probation.

Introduction

According to Covington and Bloom (2003), behavioral and situational differences between female and male offenders are ignored in numerous areas of the day-to-day practice of the criminal justice system. Examples of this include bail, sentencing policies, mother-child contact programming, management strategies, transition to the community, and risk assessment for criminal recidivism. Risk evaluation of offenders has become an essential activity in the penal justice system. The offender-risk-evaluation process helps with sentence management, and provides indicators regarding the correctional intervention strategies to be prioritized as a function of criminogenic needs. Evaluation of the risk of criminal recidivism and identification of criminogenic needs constitute common and necessary procedures in effective case management and social reintegration of criminal offenders (Andrews & Bonta, 2010; Olver *et al.* 2014; Gendreau *et al.* 1996; Wormith *et al.*, 2012). Several researchers (e.g., Grove & Lloyd, 2006; Makarios & Latessa, 2013) have stated that actuarial approaches and risk- assessment tools are so important that they need to be supported by empirical evidence if the decisions based on them are to be appropriated. Most of the objective classification instruments being used today were originally developed with samples of male offenders and then later implemented for use with females (Andrews & Bonta, 1995; Holtfreter & Cupp, 2007; Reising *et al.* 2006; Van Voorhis & Presser, 2001). The main reason that this type of instrument was developed with male offenders, according to Blanchette and Brown (2006, p. 51), is that "the development of a good actuarial classification tool requires a large representative sample: criteria more easily met within the dominant male correctional population."

Literature Review

It was mainly in the 1970s that a change appeared in the management of the female prison population. In the United States, there was a tightening of laws on drug-related convictions and barriers to post-conviction reintegration that largely affected women. Between 1980 and 2017, the number of incarcerated women increased by more than 750%, from 26,378 in 1980 to 225,060 in 2017 (Cahalan & Parsons, 1986; Gilliard & Beck, 1998). Though many more men are in prison than women, the rate of growth of female imprisonment since 1980 has been twice as high as that of men. In the United Kingdom, the total number of women convicted of a drug- and alcohol-related offence accounts for 48% of women convicted, and almost half of the women reported to need help for a drug problem upon entering prison. In addition, 24% of women reported having an alcohol and drug problem upon entering prison (Prison Reform Trust, 2018). In Canada, 6% of federal offenders are women (Correctional Service Canada, 2019). On average, 693 women were incarcerated in penitentiaries between 2018 and 2019. According to the Correctional Service of Canada, convicted women have a higher incidence of substance abuse and mental-health problems, and are more likely to have a history of physical and/or sexual abuse. Women tend to spend

less time in remand and sentenced custody than their male counterparts. In 2017- 2018, 83% of women who were released from remand had been detained for one month or less, compared with 74% of men. Among those accused of crimes in 2017, 25% of females were accused of violent crimes compared with 28% of males (Savage, 2019). In the province of Quebec, women represent approximately 5% of the correctional population, which is very similar to the proportion found in Canada (Correctional Service Canada, 2019).

Morash and Bynum (1999), in their evaluation of American correctional facilities housing female offenders, found that classification, screening, and assessment were not developed for this population of offenders. Most actuarial tools, like many aspects of criminological science, have traditionally been based on male offenders. In contrast to the situation with males, there have been few studies on the nature and extent of crime in the female population (Liddell & Martinovic, 2013). It is an undeniable fact that males commit far more offences and pose a greater threat to public safety from offences, particularly for violent crimes, than females (see Daly & Chesney-Lind, 1988).

In a meta-analysis, Smith *et al.* (2009) found that the Level of Service Inventory–Revised (LSI-R) predicts recidivism risk for both men and women, but recommended further research on the issue of gender differences. In addition, Reising *et al.* (2006) demonstrated that the LSI-R misclassifies a large portion of socially and economically marginalized women in gender-based offending contexts. Predictive accuracy was observed in women whose offending background was like that of men and who enjoyed a relatively privileged social status. Andrews *et al.* (2012) compared the validity of Section 1 of the Level of Service/Case Management Inventory (LS/CMI) in predicting recidivism in males and females. Except for the substance abuse factor, which was more strongly correlated with recidivism in women, the authors found that predictive validity was not affected by gender: each risk/need factor in the LS/CMI was equally predictive of recidivism for both male and female offenders.

The scientific literature does not contain many psychometric analyses of sections 2 to 5 of the LS/CMI. For sex offenders, Wormith *et al.* (2012) found a high correlation between the Specific Risk/Need section and general recidivism, but a lesser one for violent recidivism. The other sections had significant correlations, but the magnitude of their associations was markedly lower. Thus, there is some evidence to suggest that some LS/CMI sections, particularly the Specific Risk/Need section, may have some utility in predicting recidivism. For general recidivism, Wormith *et al.* (2012) reported correlation coefficients of .32 for "Personal Problems with Criminogenic Potential", .31 for "Criminal History", .23 for "History of Incarceration", .18 for "Social Life, Health and Mental Health", and, finally, .18 for "Special Responsivity Considerations". Comparable correlation coefficients were reported for violent and sexual recidivism.

Many feminist models claim that gender plays a central role in female offending (see Blanchette & Brown, 2006). Researchers cite well-established gender differences in the prevalence, incidence and developmental course of antisocial behavior as evidence that

men and women experience distinct life challenges—for example, mental health problems, victimization experiences, rate and degree of education, and employment disadvantages—that contribute differentially to criminal offending (Hannah-Moffat & Shaw, 2001). Although we would have expected here that financial problems be predominately found among women, there is every reason to believe that financial challenges affect both men and women equally, regardless of correctional measure.

Gender is a primary concern in studies of offender risk assessment. Management of female correctional populations is increasingly supported by actuarial tools based on standardized risk factors for men adapted to the realities of women (Hannah-Moffat & Shaw, 2001). Several researchers (Blanchette & Brown, 2006; Hannah-Moffat, 2001) have argued that actuarial tools are insensitive to the reality of female offenders. As a result, it is possible that these tools, when used with women, may provide an erroneous estimate of risk, and potentially penalize them, creating a gender bias. Since criminogenic needs are assessed using actuarial tools, it is important to ensure that they consider the reality of female offenders.

Gobeil and colleagues (2016) have outlined how women are more likely to respond to approaches that consider gender issues related to their backgrounds and their pathways to offending. Daly's (1992) research contributed significantly to this perspective. Her research identified five categories of female offenders, each with a distinct trajectory into the criminal justice system. Four of the pathways were described as gendered, that is, characterized by events that are more likely among females than males (e.g., sexual abuse, domestic violence, childcare responsibilities). The gendered pathway categories identified were: 1) street women, who run away from home as youth, have histories of substance abuse, and engage in prostitution and drug dealing; 2) drug-connected women, who use, manufacture, and/or traffic drugs as a result of involvement with intimate partners or family members; 3) harmed and harming women, who are characterized by childhood abuse, violent acting out, and continued victimization into adulthood; and 4) battered women, who experience domestic violence. The fifth category was composed of more economically advantaged women who did not have histories of victimization and were less likely to have substance-abuse problems. This nongendered pathway group has subsequently been referred to as "economically motivated" (Reising *et al.*, 2006).

Actuarial tools such as the LSI-R and the LS/CMI are rooted in male criminology theories (Chesney-Lind, 1989; Lowenkamp *et al.* 2001; Van Voorhis *et al.* 2010) but the remaining empirical question is whether or not actuarial tools are instruments that are contaminated by gender bias. Manchak *et al.* (2009) ascertained that these risk-assessment tools were developed based on male offenders, calling into question the appropriateness of their use in female cohorts. This echoes Reising *et al.* (2006), who explained that the validity of the LSI-R is well documented for men, but not as much for women. Researchers (e.g., Manchak ,*et al.*, 2009; Reising *et al.*, 2006) have debated the use of actuarial risk tools, such as the LSI-R, for female correctional populations, and this debate primarily

involves two opposing sides: 1) a group of Canadian psychologists, referred to as "Ottawa LSI-R", who argue in support of the gender-neutrality of the tool; and 2) practitioners and criminologists who believe the utility of these tools is highly suspect because they ignore female-specific risks and needs (Holtfreter & Cupp, 2007).

The predictive validity of actuarial tools, such as the LSI-R, is less clear for females (Gendreau *et al.*, 1996). Although very few studies have examined the validity of actuarial tools for women, some proposals have been made to make these tools more relevant to women's reality (see Blanchette & Brown, 2006). For example, Andrews *et al.* (2012) compared the predictive validity of Section 1 of the LS/CMI for recidivism in males and females. The authors concluded that predictive validity was not affected by gender, except in the case of substance abuse, which was more strongly correlated with recidivism in female (mean r_{xy} = .53.) than in male (mean r_{xy} = .39) offenders. In addition, Dyck *et al.*, (2018) found that the LS/CMI was a strong predictor of general recidivism for both males (AUC = .75) and females (AUC = .94). Thus, while some recidivism studies have investigated predictive validity as a function of gender (Ostermann & Herrschaft, 2013), a disequilibrium in the quantity of scientific studies persists between the two genders.

Although predictive-related validity is important evidence to collect to assess the risk of recidivism, it is also important to consider other psychometric evidence to understand what characterizes female and male offending. It should be noted that predictive-validity coefficients (r_{xy}) do not take into account the discrimination and difficulty parameters (p_i) that correspond to the level of endorsement of the items on which these coefficients are based.

Aims of this Study

The main objective of this study was to document all the sections of the LS/CMI and explore indicators of criminal recidivism, using large samples of female and male offenders sentenced to custody or probation. First, the predictive validity of all the items of the LS/CMI (sections 1 to 5) was analyzed. Second, the level of endorsement— which corresponds to the difficulty index (p_i)— of all the items in sections 2 to 5 of this instrument was investigated. Male and female offenders in custody or on probation were analyzed separately. In summary, this study, which investigated gender specificity, was undertaken to improve the effectiveness and efficiency of the case management of offenders. Its results should facilitate the implementation of improved correctional interventions for female and male offenders.

Methodology

Samples

The global sample comprised 61,324 male and female offenders; the mean age of offenders in custody and on probation was 34.9 years (SD = 12.4) and 36.7 years (SD = 12.1),

respectively. All offenders had received sentences of less than two years for a criminal offence, which means that they were under the supervision of the Quebec Department of Public Safety. There were 7,588 female offenders (custody: n = 1,148, mean age = 39.1 years; probation: n = 6,440, mean age = 37.6 years) and 53,736 male offenders (custody: n = 18,619, mean age = 34.9 years; probation: n = 35,117, mean age = 36.6 years) (Table 1).

With regard to recidivism, 36.4% of male offenders in custody and 30.9% of those on probation were repeat offenders. These percentages were 33.4% and 28.7%, respectively, for female offenders. In keeping with the practice of previous studies that examined the predictive value of risk-evaluation instruments, including the LS/CMI (Wormith *et al.*, 2007), only official data on the time at risk for criminal recidivism was included in the study. The follow-up period began as soon as the offenders were at risk of committing another offence. For those on probation, the follow-up period began as soon as the sentence began. For those in custody, the follow-up period began when they were released from the detention center.

Table 1. Descriptive Statistics on Recidivism by Male and Female Inmates and Probationers

	Male (n = 53,736)		Female (n = 7,588)		Total (N = 61,324)	
	Custody (n = 18,619)	Probation (n = 35,117)	Custody (n = 1,148)	Probation (n = 6,440)	Custody (n = 19,767)	Probation (n = 41,557)
Recidivism (%)	36.4	30.9	33,4	28,7	36,2	30,5

Note. Age:
Males: Custody: *M* = 34.91, *SD* = 12.37; Probation: *M* = 36.65, *SD* = 12.09
Females: Custody: *M* = 39.13, *SD* = 11.35; Probation: *M* = 37.69, *SD* = 12.18

LS/CMI

The Level of Service/Case Management Inventory (LS/CMI) was developed by Andrews *et al.* (2004), and is based on the general-personality and cognitive-social -learning approach (see Andrews & Bonta, 2010). Items are classified into five sections. Section 1, General Risk/Need Factors, contains 43 items distributed in eight subcomponents (Criminal History; Antisocial Personality Pattern; Criminal Attitudes; Antisocial Companions; Family and Marital Circumstances; Education and Employment; Leisure; Alcohol and Drug Problems). Each item is coded on a binary- response scale (present or absent) by a probation officer or prison counselor who has conducted an interview with the offender and consulted his or her criminal record. This section generates a total score that can be used to determine the offender's level of risk and criminogenic needs. There have been numerous studies of the validity of Section 1 of the LS/CMI and the previous version of the instrument (LSI-R), using samples of various categories of convicted persons (adults,

adolescents, sexual offenders, violent men, criminals with mental-health problems) (see Girard & Wormith, 2004; Olver *et al.*, 2014).

The LS/CMI User Manual states that sections 2 to 5, in contrast to Section 1, do not generate scores that are the sum of each sections' items. However, Canales *et al.* (2014) indicated that although sections 2 to 5 of the LS/CMI are not intended to predict risk and are not part of the formal risk-score calculation generated in the General Risk/Need section, they are used to qualitatively inform case management. These sections were designed essentially to document the case management of offenders. The User Manual states that interpretation of sections 2 to 5 requires examination of each of the answers to the 81 items in these sections. Section 2, "Specific Risk/Need Factors", is divided into two components: "Personal Problems with Criminogenic Potential" (14 items) and "History of Perpetration" (21 items). Section 3 evaluates "History of Incarceration" (11 items) and "Barriers to Release" (3 items). Section 4, "Other Client Issues", evaluates "Social Life, Health and Mental Health" (21 items). Section 5 evaluates "Special Responsivity Considerations" (11 items). Although sections 2 to 5 are traditionally interpreted in qualitative terms, some researchers have created total scores for these sections by summing their yes/no items (binary data), and have tested these scores' association with recidivism. Using such a method, Girard and Wormith (2004) found modest associations between the Specific Risk/Need section and general recidivism and violent recidivism among on probation and in custody, with a stronger association being reported for the Specific Risk/Need section and violent recidivism in in custody.

The French Version of the LS/CMI

The French version of the LS/CMI for the Quebec offender population was developed using a cross-cultural procedure (see Geisinger, 1994). The Coding Guide was translated into French. This version was then translated back into English, and the two versions were submitted to the designers of the instrument. The preliminary version was revised by a committee comprising researchers and Quebec correctional services managers and practitioners prior to final review by a scientific editor.

Procedure

The study distinguishes between offenders as a function of gender and type of sentence for a first offence committed between 2008 and 2016. Offenders sentenced to custody were considered separately from those on probation. This data collection and analysis strategy complies with that indicated in the User Manual (Andrews *et al.*, 2004), which presents psychometric data separately for these two groups. The operational definition of general recidivism is the commission of an offence following a sentence under a penal justice system. The follow-up period was set at two years. At the end of that period, official files were consulted to determine whether the offender had been newly sentenced, either to

probation or to custody. Breach of conditions was not considered a new conviction. Data was obtained from the databases of the Québec correctional services.[1]

Analytical Strategy

Analyses performed for this article were based on the items that compose sections 1 to 5 of the LS/CMI. The relative percentage ("difficulty"; see below) for each item in Sections 2 to 5 is presented as a function of the four groups of offenders (males and females in custody, males and females on probation). The degree of association between each item and recidivism is then presented.

There were two phases to the analysis of data: 1) correlational analysis of the subcomponents of Section 1 of the LS/CMI and recidivism; 2) descriptive analyses of sections 2 to 5 of the LS/CMI, specifically difficulty index (p_i), bivariate analyses (phi and effect size), and correlation between the items of these sections and recidivism. If an item is dichotomously endorsed (0 or 1), the most basic difficulty index is the percentage of responses endorsed by the correctional practitioner (p_i). An item with a difficulty index of .50 can be interpreted as having been coded as present in 50% of cases. The phi correlation index was used as a measure of whether the items were associated with the two-year incidence of recidivism. Its value is situated between 0 (independence between the two variables), and 1 (perfect association between the two variables) (Siegel & Castellan, 1988). For effect size, the square of the coefficient of correlation (r-family of effect sizes) was used. The intensity of this effect size can be interpreted by reference to Cohen's guidelines for the d index (Cohen, 1988), with a d of .2 considered weak, a d of .5 considered medium, and a d of .8 considered strong.

Results

Most psychometric analyses of the LS/CMI refer to Section 1 of the tool. This section is composed of eight subcomponents that ultimately generate a total score that correlates with a criterion related to criminal recidivism. The analyses of the eight subcomponents of Section 1 of the LS/CMI are presented first, followed by the analyses that measure predictive validity of the items in sections 2 to 5.

Section 1 General Risk/Need Factors

For this study, the predictive validity coefficients calculated based on the eight risk factors from Section 1 of the LS/CMI are: .44 males in custody; .36 males on probation; .43 females in custody; and .38 females on probation. The highest predictive validity was observed for "Criminal History" among females in custody (.47); this index was lower in males in custody (.39). The other dimension that had a high predictive validity coefficient is "Antisocial Personality Pattern" among males and females in custody (respectively: .36 and .34). The predictive validity coefficients for "Alcohol and Drug Problems" are slightly

higher for females in custody (.34) than for male ones (.31). It should be noted that the predictive validity coefficients for "Education and Employment" are relatively low in our sample (males in custody: .29; males on probation: .24; females in custody and on probation: .20). Table 2 compares the predictive validity observed in this study for each of the eight subcomponents of LS/CMI of Section 1 and those reported by Andrews (2012) and by Wormith *et al.* (2012).

Table 2: Predictive Validity Coefficients for Section 1 (General Risk/Need Factors) of the LS/CMI

LS/CMI section	Male, custody	Male, probation	Female, custody	Female, probation	Andrews et al. (2012) males	Andrews et al. (2012) females	Wormith et al. 2012 males
CH	.39	.31	.47	.36	.30	.41	.41
E/E	.29	.24	.20	.20	.28	.35	.31
F/M	.24	.16	.20	.10	.18	.20	.17
L/R	.22	.16	.18	.15	.23	.30	.24
C	.26	.24	.22	.27	.32	.39	.31
A/DP	.31	.25	.34	.27	.17	.46	.29
P/AO	.26	.17	.20	.19	.26	.35	.24
AP	.36	.27	.34	.27	.32	.36	.33
Global	.44	.36	.43	.38	.41	-	-

CH = Criminal History; E/E = Education/Employment; F/M = Family/Marital; L/R = Leisure/Recreation; C = Companions; A/DP = Alcohol/Drug Problems; P/AO = Procriminal Attitude/Orientation; AP = Antisocial Pattern

Sections 2 to 5: Global Analysis

The predictive validity coefficients for sections 2 to 5 of the LS/CMI were: Section 2.1 Personal Problems with Criminogenic Potential: .25–.33; Section 2.2 History of Perpetration: .19–.30; Section 3.1 History of Incarceration: .19–.28; Section 3.2 Barriers to Release: .01–.15; Section 4 Social, Health, and Mental Health: .15–.22; and Section 5 Special Responsivity Considerations: .14–.23 (Table 3).

Sections 2 to 5: Item Analysis

The difficulty index, phi coefficient, significance, and effect size for sections 2 to 5 of the LS/CMI are presented in Table 4, for offenders of both genders and both types of sentence (custody, probation). Only the items present in at least 10% of the participants (difficulty index equal to or greater than .10) are presented.

<p align="center">**Table 3: Predictive Validity Coefficients for Sections 2 to 5 of the LS/CMI**</p>

Sections LS/CMI Section 2 to 5	Male, custody	Male, probation	Female, custody	Female, probation	Wormith et al. 2012 males
2.1. Personal problems with criminogenic potential	.33	.25	.31*	.30	.31
2.2. History of perpetration	.28	.19	.30	.25	.21
3.1 History of incarceration	.27	.19	.28	.21	.28
3.2. Barriers to release	.15	.02	.12	.01	-
4.0. Social Life, Health and Mental Health	.22	.15	.19	.18	.18
5.0. Special Responsivity Considerations	.23	.15	.18	.14	.16

*$p < 0.05$ **$p < 0.01$ ***$p < 0.001$

Section 2.1: Personal Problems with Criminogenic Potential

As can be seen from Table 4, there were three items in Section 2.1 that exhibited a difficulty index of at least 0.10. "Clear problems of compliance (specific conditions)" (Item 1) must be coded present if the evaluator judges that the behaviour of the offender or the circumstances surrounding at least one of the probation or parole conditions is problematic and requires intervention. This item was endorsed frequently for both males (p_i = .46) and females (p_i = .32) in custody. "Problem-solving/Self-management skill deficits" (Item 5) must be coded present by the evaluator when the offender tends to act thoughtlessly or impulsively. This item was coded present for more than half of males in custody (p_i = .55) and 41% (p_i = .41) of males on probation. Among female offenders, these proportions were 45% and 35%, respectively. "Anger management deficits" (Item 6) is a corollary to the previous item. The coding guide specifies that this item must be coded present if the person is "explosive, angers easily or imagines that other people have hostile intentions", even without a history of problems of this type. For men, this item had a difficulty index of .36 for those in custody and .30 for those on probation. For women, the difficulty index was relatively high: .28 for those in custody and .21 for those on probation.

Turning to recidivism, it was found that "Clear problems of compliance (specific conditions)" (Item 1) yielded one of the best phi indices of the group, at .36 ($p < 0.01$) for male offenders in custody and .25 ($p < 0.01$) for male offenders on probation. For women, phi coefficients were practically the same: .36 ($p < 0.01$) and .27 ($p < 0.01$), respectively. Items 5 and 6 were associated with phi indices of .26 ($p < 0.01$) and .24 ($p < 0.01$), respectively, for males in custody. For females in custody, these indices were practically the same: .25 ($p < 0.01$) and .24 ($p < 0.01$), respectively. For offenders on probation, the phi values were still statistically significant, but lower.

Table 4: Items from Section 2 to 5 of the LS/CMI having a difficulty index of .10 or more

Items	Custody								Probation							
	Difficulty Index		phi		p		Effect size		Difficulty Index		phi		p		Effect Size	
	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M
Section 2.1.																
1. Clear problems of compliance (specific conditions)	.32	.46	.356	.362	.01	.01	.127	.131	.17	.22	.274	.252	.01	.01	.075	.064
5. Problem-solving/Self-management skill deficits	.45	.55	.252	.263	.05	.01	.064	.069	.35	.41	.22	.18	.01	.01	.048	.032
6. Anger management deficits	.28	.36	.243	.246	.05	.01	.059	.061	.21	.30	.176	.158	.01	.01	.031	.025
7. Intimidating/controlling	.09	.21	.107	.179	.05	.01	.011	.032	.05	.14	.085	.104	.01	.01	.007	.011
Section 2.2.																
8. Physical assault, extrafamilial, adult victim	.21	.39	.219	.234	.01	.01	.048	.055	.17	.25	.173	.157	.01	.01	.030	.025
10. Physical assault, intrafamilial, adult-partner victim	.10	.22	.128	.167	.01	.01	.016	.028	.08	.17	.109	.101	.01	.01	.012	.010
11. Assault on an authority figure	.13	.21	.216	.219	.01	.01	.047	.048	.11	.13	.178	.139	.01	.01	.032	.019
13. Weapon use	.12	.28	.165	.163	.01	.01	.027	.027	.07	.15	.054	.113	.01	.01	.003	.013
15. Impaired driving	.15	.32	.074	.025	.05	.01	.005	.001	.12	.21	.096	.056	.01	.01	.009	.003
16. Shoplifting	.28	.24	.292	.243	.01	.01	.085	.059	.22	.15	.219	.154	.01	.01	.048	.024
Section 3.																
5. Past state/provincial incarceration	.50	.69	.375	.267	.01	.01	.141	.071	.21	.33	.231	.204	.01	.01	.053	.042
8. Treatment recommended/ordered	.57	.21	.017	.058	n.s.	.01	.000	.003	0.00	0.00	a	a	s.o.	s.o.	s.o.	s.o.
9. Misconduct/behavior report during current incarceration	.45	.25	.229	.166	.01	.01	.052	.028	.02	.03	.094	.092	.01	.01	.009	.008

Items	Custody								Probation							
	Difficulty Index		phi		p		Effect size		Difficulty Index		phi		p		Effect Size	
	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M
Section 4.																
1. Financial problems	.33	.34	.101	.138	.01	.01	.010	.019	.29	.27	.144	.125	.01	.01	.021	.016
10. Depressed	.17	.08	.045	.029	n.s	.01	.002	.001	.16	.09	.052	.017	.01	.01	.003	.000
11. Suicide attempts/threat	.22	.17	.13	.138	.01	.01	.017	.019	.20	.14	.104	.075	.01	.01	.011	.006
16. Victim of family violence	.35	.28	.169	.158	.01	.01	.029	.025	.32	.22	.107	.115	.01	.01	.011	.013
17. Victim of physical assault	.28	.14	.149	.11	.01	.01	.022	.012	.22	.11	.101	.087	.01	.01	.010	.008
18. Victim of sexual assault	.21	.08	.164	.088	.01	.01	.027	.008	.18	.06	.108	.054	.01	.01	.012	.003
19. Victim of emotional abuse	.26	.07	.063	.053	.05	.01	.004	.003	.18	.06	.069	.049	.01	.01	.005	.002
20. Victim of neglect	.06	.07	.054	.074	n.s	.01	.003	.005	.08	.05	.069	.066	.01	.01	.005	.004
Section 5.																
1. Motivation as a barrier	.23	.36	.205	.215	.01	.01	.042	.046	.15	.20	.155	.147	.01	.01	.024	.022
2. Engage in denial/minimization	.38	.50	.142	.166	.01	.01	.020	.028	.24	.32	.119	.117	.01	.01	.014	.014

Section 2.2: History of Perpetration

Section 2.2 "History of Perpetration" provides details on factors related to risk, by collecting information on the offender's entire criminal history, not limited to the current crime. Items 1 to 7, related to criminal history associated with sexual aggression, were practically never coded as present. "Physical assault extra-familial, adult victim" (Item 8), "Physical assault intra-familial, adult-partner victim" (Item 10), "Assault on an authority figure" (Item 11), and "Weapon use" (Item 13) exhibited high difficulty indices, particularly for those in custody. For female offenders, it is no surprise that these proportions were significantly lower. The phi index for "Physical assault extra-familial, adult victim" (Item 8) reaches .23 in males in custody (p_i = .39). With regard to "Weapon use" (Item 13), our results indicate that a weapon was used by 28% of males in custody and by 15% of those on probation. The phi coefficients did not exceed .16 ($p < 0.01$) for any of the offender groups. "Shoplifting" (Item 16) was coded as present for 24.0% of males in custody, 28.0% of females in custody, 15.0% of males on probation, and 22.0% of females on probation. For offenders in custody, the phi indices were .29 for females and .24 for males. For offenders on probation, the phi indices were .22 ($p < 0.01$) and .15 ($p < 0.01$), respectively. "Impaired driving" (Item 15) exhibited high difficulty indices: .32 and .15 for males and females in custody, and .21 and .12 for males and females on probation. However, this item was not related to recidivism, as indicated by low phi scores.

Section 3: History of Incarceration

"Past state/provincial incarceration" (Item 5) exhibited a difficulty index of .50 for females in custody and .69 for males in custody. Moreover, the phi index reached .27 ($p < .01$) for males and .38 ($p < .01$) for females. For offenders on probation, the phi indices were .20 ($p < .01$) for males and .23 ($p < .01$) for females. These observations support the conclusion that previous incarceration is a powerful static predictor of recidivism, and consequently, must be considered in risk and needs evaluations.

Section 4: Other Client Issues

Section 4 "Social, Health, and Mental Health" of the LS/CMI contains items that exhibited few associations with recidivism. However, certain of these items provide information that can improve understanding of offenders' problems. "Financial problems" (Item 1) was seen in 27% of males on probation and 34% of those in custody. Similar proportions were observed in women: 29% and 33%, respectively. However, this item appears to be minimally correlated to recidivism. On the other hand, percentages were high for "Suicide attempts/threat" (Item 11), for both offenders in custody and those on probation. Slightly higher proportions were observed in women (custody: 22%, probation: 20%) than men (custody: 17%, probation: 14%).

"Victim of family violence" (Item 16) exhibited a high difficulty index. Among males, it was .28 for those in custody and .22 for those on probation. Among females, the corresponding values were .35 and .32. For "Victims of physical assault" (Item 17), the indices were lower, but appear to be comparable between the two male groups, with difficulty indices of .14 for those in custody and .11 for those on probation. For women, the indices were .28 and .22, respectively. "Victim of sexual assault" (Item 18) was practically nonexistent in men but was reported by 21% of females in custody and 18% of females on probation. The difficulty index for "Victim of emotional abuse" (Item 19) was low in men, but high in women (custody: .26, probation: .18). While these results may certainly be interesting for clinical and intervention purposes, the phi coefficients do not exceed .16 (p < 0.01) in any case, which indicates a weak link to recidivism.

Section 5: Special Responsivity Considerations

For "Motivation as a barrier" (Item 1), an evaluator must be familiar with the transtheoretical model (Prochaska & DiClemente, 1982) and its definitions of various "stages of change". They must code "Deficient motivation" present if the offender is in the pre-contemplative (not thinking of changing his or her behaviour), or contemplative (seriously thinking of changing his/her behaviour in the next six months) phase. More than 3 out of 10 men in custody (36%) and 20% of men on probation appear to have had deficient motivation at the time of their assessment with the LS/CMI (Table 4). These proportions are respectively 23% and 16% in women. The phi coefficient demonstrates a link with recidivism. The phi coefficient is .21 (p < 0.01) for females in custody and .22 (p < 0.01) for males in custody. These phi indices are lower in those on probation.

There are high difficulty indices related to "Engage in denial/minimization" (Item 2). It should be noted that 50% of males in custody and 32% of those on parole exhibited this attitude about their criminal act. In women, the proportions are 38% and 24%.

Discussion

It is important to note that few of the studies that have analyzed the psychometric properties of the LS/CMI have focused on Parts 2 to 5. Furthermore, there is a trend to conduct psychometric analyses based on total scores regardless of whether the item is: 1) endorsed or not; 2) has an ambiguous wording; or 3) demonstrates a potential for discrimination based on criminal recidivism. The main objective of this study was to document all the sections of the LS/CMI and explore indicators of criminal recidivism. Analyses conducted on a large database provided a wealth of descriptive, psychometric, and correlational statistical information considering gender specificity and type of sentence (custody vs. probation). It is important to note that the items related to sections 2 to 5 are primarily designed for case management and, unlike those in Section 1, do not normally generate total scores. Overall, the various validity coefficients reported in this

study are consistent with those reported by Andrews *et al.* (2012) and by Wormith *et al.* (2012).

In Section 1 "General Risk/Need Factors" the coefficients obtained in our study are comparable with those of Andrews *et al.* (2012) and Wormith *et al.* (2012), with some exceptions. Thus, in the "Criminal History" section of the present study, we obtained a relatively higher predictive validity coefficient for females in custody (r_{xy} = .47) than did Andrews *et al.* (2012). In the "Antisocial Companions" section, we obtained predictive validity coefficients of .26 for males in custody and .27 for females on probation, which are lower than those reported by Andrew *et al.* (.32 and. 39, respectively). In the "Alcohol and Drug Problems" section, we obtained predictive validity coefficients of .31 for males in custody and .34 for females in custody, which are quite different from those reported by Andrews *et al.* (.17 and .46, respectively). In the "Criminal Attitudes" section, we obtained predictive validity coefficients of .26 for males in custody and .20 for females in custody (Andrews *et al.*: .26 and .35, respectively). Finally, in the "Antisocial Personality Pattern" section, we obtained predictive validity coefficients of .36 for males in custody and .34 for females in custody (Andrews *et al.*: .32 and .36, respectively). Taken together, these Section 1 predictive-validity coefficients, as well as the results from other studies, show some stability in the coefficients between gender and the eight subcomponents of Section 1 of the LS/CMI. Criminal history among females in custody exhibited the highest predictive validity coefficient, at .47. This is higher than that of their male counterparts in the studies conducted by either Wormith *et al.* (2012) (.41) or Andrews *et al.* (2012) (.30). On the other hand, the predictive validity of "Alcohol and Drug Problems" was lower for females in custody than in Andrews *et al.* (2012) (.34 vs. .46). That said, there is consistency between the various predictive validity coefficients in this study and those reported by Andrews *et al.*, (2012) and by Wormith *et al.* (2012).

Sections 2 to 5 are intended to document case management. Section 2, "Specific Risk/Need Factors", consists of two subsections. Section 2.1 (Personal Problems with Criminogenic Potential) focuses on personal characteristics that may point to specific criminogenic behavior and needs. Section 2.2 (History of Perpetration) includes historical items related to types of criminal behaviour, which could constitute specific static risk factors. "Clear problems of compliance (specific conditions)" "Problem-solving/Self-management skill deficits "and "Anger management deficits", in Section 2.1, are associated with significant phi coefficients and can be considered indicators that can inform case management of both male and female offenders. What is singular is the similarity of the phi coefficients for both genders. For example, Item 1 has a r_{xy} = .36 for both genders who are serving a custodial sentence.

To conclude the analysis of Section 2.1, we consider that the wording of certain items could be reformulated to provide higher objectivity. This is the case, for example, with "Clear problems of compliance (specific conditions)" (Item 1): the presence of the adjective "Clear" can generate semantic intensity which could affect the level of difficulty of this item. Moreover,

"Problem-solving/self-management skill deficits" (Item 5) combines two elements: problem-solving and self-control. Given that two different problems are included in this wording, it is difficult to identify which is the real difficulty for which the evaluator is coding. Finally, "Anger management deficits" (Item 6), constitutes a corollary to the previous item. The coding guide specifies that this item must be selected if the person is "explosive, angers easily or imagines that other people have hostile intentions", even in the absence of a criminal history. It is therefore difficult to distinguish between self-control and anger management. Items 5 and 6 could therefore be coded as present for the same underlying situations.

Finally, Section 5 of the LS/CMI highlighted two barriers to responsivity: "Motivation as a barrier" (item 1) and "Engages in denial/minimization (item 2). Denial and minimization reach 50% and 38% among men and women in custody, respectively. These proportions are 32% and 24% for offenders on probation. These proportions are far from negligible.

There are also high difficulty indices related to "Engages in denial/minimization" (Section 5, Item 2). That said, the problem related to this item is the fact that the wording confuses two distinct attitudes which are likely to have an influence on responsivity. Denial, as a defence strategy, leads to avoidance, if not denial, of a reality, which is in accordance with the contemporary definition of this defence mechanism. The authors of the instrument mention minimization, but their definition is more like what several authors call externalization of blame or projection (attributing the responsibility to someone else; American Psychological Association, 2001). While the distinction is subtle, it can still confuse the evaluator and compromise the relevance of this item. This item is minimally associated with risks of criminal recidivism.

The inclusion of two ideas in the wording of an item, and the repetition of ideas in different items, are problems that were uncovered during coding and interpretation of items. An item which merges two concepts or actions—for example "Engages in denial/minimization", "Shy/withdrawn" or "Suicide attempts/threats"—generates confusion about both clinical interpretation and measurement and evaluation (Giguère *et al.*, 2015). Ultimately, such items should be reformulated to be more specific and exclusive. This is the case for "Problem-solving/Self-management skill deficits" (Item 5) and "Intimidating/controlling" (Item 7) in Section 2.1, "Security/management concerns" (Item 11) in Section 3.1, "Shy/withdrawn" (Item 13) in Section 4, and "Engage in denial/minimization " (Item 2) in Section 5. There is also major redundancy, with certain items—for example, substance abuse and mental-health problems—of the tool being found in more than one section. It is our opinion that a more exhaustive identification of mental-health problems would offer more specific guidance for professionals.

Conclusion

Recourse to criminogenic and case-management evaluation tools is increasing, but at the same time, methodological, epistemological, legal, and political questions are being raised

(Harcourt 2007, 2011). From a psychometric perspective, those developing reliable and valid actuarial instruments measuring recidivism are faced with problems related to tools and criteria—more specifically, variations in follow-up periods and type of crime, as well as the nature of the measured and evaluated constructs. The psychometric analyses conducted as part of this study demonstrate that LS/CMI items have various properties that can be prioritized. An item that is constantly considered (e.g., Item 24 for offenders in custody) or rarely endorsed (e.g., item 38 for men) generates a constant value in the calculation of a score.

The sentence-specific descriptive portraits of male and female offenders outlined by the items in sections 2 to 5 of the LS/CMI provide information absent from the User Manual (Andrews *et al.*, 2004). The analyses presented here have revealed that these sections include items that contribute to the offender-evaluation process and to case management. Certain items have been identified as indicators of the risk of criminal recidivism. On the other hand, it has been determined that many items are very rarely, if ever, endorsed by evaluators. While these items undoubtedly help with case management, they also encumber the evaluation process, which is demanding in terms of the time invested by evaluators.

Although interesting, the results presented here have some limitations. As an example, because sentences under provincial jurisdiction are short (less than two years), the results obtained cannot be generalized to offenders with more serious convictions. Also, the results reported in this study were obtained from a cohort that is almost completely composed of Quebec francophones. Therefore, it limits the generalization of the results to correctional populations outside of Quebec.

Despite these limits, analysis of all items reported in this study adds to the major work that the authors of the LS/CMI have brought to the evaluation of offenders. The analyses and results reported in this article have increased the documentation of sections 2 to 5 of the LS/CMI, which are less well documented in the specialized literature on adult offenders. The authors hope that this will help evaluators better understand these sections and guide correctional intervention for offenders evaluated with this actuarial tool. In addition, the reported analyses provide additional psychometric information and identify items that offer potential indicators of recidivism risk that consider gender and type of sentence.

The LS/CMI is based on the use of factors to match individual male offenders to appropriate programs. However, it seems a hazardous assumption that this model fits all offenders, especially when considering gender. This paper provides new information that can improve female offenders' management and treatment, by better taking into account their reality and criminal history. This information will facilitate orientation based on programs adapted to this group of offenders, which is increasingly becoming an object of concern. This can be facilitated by the development of risk and needs assessment tools that are more sensitive to the reality of female offenders and/or based on psychometric standards adapted to their reality.

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