Original article

An investigation of reliability and validity of the LS/CMI with French offenders

Investigation sur la fiabilité et la validité convergente du LS/CMI auprès de délinquants français

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A B S T R A C T

Introduction. – The Level of Service/Case Management Inventory (LS/CMI) is one of the best-known recidivism risk instruments. In France, this scale is rarely used because no study had yet been carried out to confirm its psychometric properties on samples of French offenders. The aim of this study was to test the psychometric properties of the LS/CMI on samples of violent French prisoners.
Method. – The Level of Service/Case Management Inventory, the BARR-2002R, Historical Clinic Risk-Scale 20 and the Risk for Sexual Violence Protocol were administered to 128 violent offenders.
Results-Discussion. – The results showed good internal consistency, reliability and convergent validity of the LS/CMI. Assault, robbery and sexual assault were correlated with the LS/CMI. All of these results are discussed and analysed using the international reference literature.
Conclusion. – Confirmation of the psychometric properties of the LS/CMI among French offenders to allow it to be used to assess the risk of recidivism of offenders.

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R É S U M É

Introduction. – Pour être efficace, la prise en charge du risque de récidive doit se doter d'outils permettant une évaluation solide de ce risque. Le Level of Service/Case Management Inventory (LS/CMI) est l'un de ces outils parmi les plus utilisés dans le monde. En France, cette échelle est rarement utilisée car aucune étude n'a été menée pour confirmer ses propriétés psychométriques sur des échantillons de délinquants issus de la population française. Le but de cette étude est de tester les propriétés psychométriques du LS/CMI sur des échantillons de détenus violents issus de la population française.
Méthode. – Le LS/CMI, la BARR-2002R, le Risk for Sexual Violence Protocol (RSVP) et le Historical, Clinical and Risk Management Scale-20 (HCR-20) ont été administrés à 128 délinquants violents.

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Résultats-Discussion. – Les résultats montrent une bonne cohérence interne, fiabilité et validité convergente du LS/CMI. Les agressions, les vols et les agressions sexuelles sont en corrélation avec le LS/CMI.
Conclusion. – La confirmation des propriétés psychométriques du LS/CMI chez les délinquants français permet l'utilisation de cette échelle afin d'optimiser l'évaluation et la prise en charge du risque général de récidive des délinquants.

Introduction

Preventing the recidivism of people who have committed an offence is a major issue for society. The Risk-Need-Responsivity model is one of the most effective models for managing the risk of recidivism of offenders [1]. Its underlying principles are:

- that the frequency and intensity of management should be based on objective assessment of the risk of recidivism (risk);
- that treatment should target scientifically recognized risk factors (needs);
- that management should be personalized (responsivity) [1].

To meet the first requirement, it is essential to carry out a structured risk assessment (more effective than unstructured clinical judgement; [2]. This can be achieved through the use of specific scales aimed at managing the risk of recidivism. Some of these scales are not widely used in France because they have not been validated with French samples [3]. There is thus a need to validate these scales in order to promote their use for effective recidivism prevention.

The LS/CMI is one of the most useful general recidivism risk tools [4]. It makes it possible to predict new breaches of surveillance conditions, new arrests and new violent and general convictions [5]. It has the advantage of:

- facilitating the assessment of responsivity factors;
- aiding professionals to make informed decisions by targeting interventions and monitoring progress in a more systematic manner;
- being used by various health and justice professionals [1].

The LS/CMI has 11 sections. The first section is composed of 43 items assessing 8 domains: "Criminal history", "Education and employment", "Family and marital", "Leisure and recreational activities", "Companions", "Drug or alcohol problems", "Pro-criminal attitudes or orientation" and "Antisocial pattern". Sections 2 to 11 identify therapeutic options, provide a summary of risk levels and help establish a complete and rounded observation of the individuals.

The French version of the LS/CMI was translated and validated by Guay [5] with a sample of 3682 francophone Canadians (301 women, 3381 men) placed under judicial supervision (55.2% in detention and 44.8% under community supervision). It was shown to have both good internal consistency (Kuder-Richardson 20 = .92 for the total LS/CMI score) and good predictive validity (AUC = .72, $p < .001$ for new offences in general and AUC = .70 for new violent offences).

No study has previously been conducted using the LS/CMI with samples of French offenders. For it to be used effectively in France, it thus appears critical to extend work on these targeted samples to confirm its psychometric properties [5]. Using data collected during interviews with detained offenders (unfortunately without access to recidivism data), the aim of this study was thus to test the psychometric properties of the LS/CMI on violent French prisoners.

We focused on the internal and external psychometric properties and the correlations between LS/CMI and the participant's current conviction.

Method

Participants

The sample included 128 French adult male detainees with a mean age of 44.16 years (SD 12.3, range 19-76). They had committed:

- sexual offences;
- violent offences;
- non-violent offences.

They had an average of 10.02 years of education (SD 2.6; 1–15), which corresponds to a Brevet d'Études Professionnelles (vocational school diploma, 10th grade). They were sentenced to an average of 128 months in prison (SD 84.2; 1–360) and had served an average of 58.9 months at the time of data collection (SD 53.1; 1–384).

Instruments

The Level of Service/Case Management Inventory (LS/CMI; [7] assesses recidivism risk and is used to manage the general recidivism risk and reintegration capacity of offenders. Each item of the 11 sections is rated quantitatively, either 0 (no evidence) or 1 (presence of evidence), yielding a score for each of the 8 domains and a total overall score.

The BARR-2002R [8] is an actuarial risk scale, which assesses the risk of general and violent recidivism (including sexual) among male sex offenders. It comprises a measure of general criminality (the Static-2002R subscale, a risk scale already widely used for predicting sexual recidivism) and age at release.

The Risk for Sexual Violence Protocol (RSVP; [9]) is used to assess and manage sexual recidivism risk. The French version was translated by Pham and Michaux (UMons). The RSVP consists of 22 items divided into 5 domains:

- history of sexual violence;
- psychological adjustment;
- mental disorder;
- social adjustment;
- manageability.

These 5 domains are assessed according to their past, recent and future presence.

The Historical, Clinical and Risk Management Scale 20 - version 2 (HCR-20; [10]) is used to predict and manage the risk of violent recidivism. The French version was translated by T.H. Pham with the collaboration of the Philippe Pinel Institute and validated by Claix and Pham [11]. It is composed of 20 items divided into 3 subscales:

Table 1
Average scores on LS/CMI, Static-2002, RSVP and HCR-20 scores.

	Mean	SD	Median	Max	Min
LS/CMI (*n* = 128)					
Total Score	16.76	7.21	16	3	34
Criminal history	3.73	1.99	4	0	8
Education and Employment	3.45	2.54	3	0	9
Family/marital	2.22	1.49	2	0	13
Leisure and Recreational Activities	2.85	0.76	3	0	4
Companions	0.77	0.75	1	0	2
Drug or alcohol problems	1.44	0.76	1	0	8
Pro-criminal attitude or orientation	1.22	1.03	1	0	4
Antisocial pattern	1.15	1.09	1	0	4
BARR-2002R (*n* = 85)					
Total Score	1.40	1.68	1	−2	6
Age	0.40	1.07	0	−2	2
General criminality	1.01	1.09	1	0	6
RSVP (*n* = 86)					
Total Score	48.57	15.77	48	15	80
Total-Past items	19.13	6.39	19	5	34
Total-Recent items	14.37	6.19	13	2	29
Total- Relevant items	15.07	5.25	15	2	25
History of sexual violence	5.76	3.44	5	0	15
Psychological adjustment	15.48	5.52	15	3	30
Mental disorder	9.81	4.61	9	1	23
Social adjustment	11.57	5.56	10.5	0	23
Manageability	5.95	4.23	6	0	17
HCR-20 (*n* = 128)					
Total Score	14.21	6.77	14	0	28
Historical	7.17	4.56	6	0	17
Clinical	3.19	2.00	3	0	8
Risk	3.84	1.92	4	0	9

Max: Maximum; Min: Minimum; LS/CMI: Level of Service/Case Management Inventory; BARR-2002R: Brief Assessment for Recidivism Risk 2002 Revised; RSVP: Risk for Sexual Violence Protocol; HCR-20: Historical, Clinical and Risk Management Scale-20.

- historical items;
- clinical items;
- risk management items.

For the RSVP and HCR-20, each item was scored quantitatively (0 no evidence, 1 partial evidence, 2 definite evidence) in order to obtain a total score and a score for each subscale.

Procedure

This study was approved by a regional ethics group for clinical research. It was conducted between March 2018 and February 2020 in the psychiatric care facilities of four French prisons. Caregivers referred all participants who had been convicted of a violent offence and spoke French. The experimenters administered the risk scales through:

- a semi-structured interview addressing the scale items;
- consultation of the participants' medical records. The evaluator had been trained to use all these tools with approved trainers.

For inter-rater reliability, a double-blind procedure was used, in which a second assessor, also trained in the use of the RSVP, BARR-2002R, HCR-20 and LS/CMI scales, scored the data collected by the main assessor. The inter-rater reliability assessment was carried out for 10 participants (7.81%) by a researcher-psychologist, also trained in the scoring of risk scales.

Data analysis

All the results were analysed using SPSS© IBM© version 25. The internal consistency was measured using the Kuder-Richardson 20 coefficient (KR20). Inter-rater reliability was assessed using intra-class correlation indices (ICC). As there were two evaluators, we used a two-way mixed-effects model with absolute-agreement and

k means measures (Koo and Li, 2016). Spearman correlations were conducted to understand the relationship between the LS/CMI sub-scale and total scores and BARR-2002R, RSVP and HCR-20 scores. The relationships between LS/CMI scores and the types of offence committed were analysed using point-biserial correlation coefficients. In view of the large number of correlations carried out, a Bonferroni correction was applied; the significance threshold of the *P*-value is therefore 0.0005 instead of 0.05.

Results

Descriptive results

In their current conviction, 86 participants (67.2%) in our sample had been charged with at least one act of sexual violence, and 42 (32.8%) with at least one act of physical (non-sexual) violence. For 6 participants (5%), these offences were associated with non-violent and non-sexual offences. Participants had been charged with a total of 181 offences, with an average of 1.41 offences per person, broken down as follows: 65 violent offences (35.9%), including 35 cases (19.3%) of assault and battery, 23 cases (12.7%) of homicide, 5 cases (2.76%) of kidnapping and false imprisonment, and 2 cases (0.5%) of arson; 104 sexual offences (57.5%), including 43 cases (23.8%) of sexual assault, 60 cases (33.2%) of rape, and 1 case (0.5%) of indecent exposure; 12 non-violent and non-sexual offences, including 6 cases (3.3%) of simple or aggravated theft, 3 cases (1.7%) of drug offences, 2 cases (1.2%) of illegal weapons possession, and 1 (0.5%) traffic offence.

Table 1 summarises the average scores obtained on the LS/CMI, BARR-2002R, RSVP and HCR-20 scales. Participants obtained an average total score of 16.76 (SD: 7.21; range 3–34) for LS/CMI, 1.40 (SD: 1.68; −2 to 6) for BARR-2002R, 48.57 (SD: 15.77; 15–80) for RSVP, and 14.21 (SD: 6.77; 2–28) for HCR-20.

Table 2
Inter-rater reliability and internal consistency of the LS/CMI.

	Intra-class correlation (ICC) (n = 10)	Kuder-Richards coefficient (KR20) (n = 128)
	k means measures	
BARR-2002R	0.97	–
RSVP	0.94	–
HCR-20	0.96	–
LS/CMI		–
Total Score	0.88	0.72
Criminal history	0.96	0.70
Education and Employment	0.82	0.79
Family/marital	0.77	0.26
Leisure and Recreational Activities	−0.31	0.30
Companions	0.07	0.49
Drug or alcohol problems	0.78	0.76
Pro-criminal attitude or orientation	0.78	0.43
Antisocial pattern	0.93	0.52

LS/CMI: level of service/case management inventory.

Reliability and internal consistency

The inter-rater reliability of the total score, evaluated on 10 participants, was good (ICC = 0.88 in single measurement). The internal consistency of the total sample was acceptable for the total score (KR20 = 0.72). Table 2 summarises all these results.

Convergent validity

Table 3 summarises all the correlations observed between the LS/CMI and the BARR-2002R, the RSVP and the HCR-20. The total LS/CMI score was positively correlated with the total scores on the BARR-2002R ($\rho = 0.48$, $P < 0.01$), the RSVP ($\rho = 0.75$, $P < 0.01$) and the HCR-20 ($\rho = 0.80$, $P < 0.01$).

Correlations between LS/CMI scores and types of current convictions

Table 4 presents the point-biserial correlations with the Bonferroni correction between LS/CMI scores and offences committed by participants.

Discussion

The aim of this study was to test the psychometric properties of the LS/CMI with a sample of French violent offenders. The results show acceptable to good inter-rater reliability and internal consistency of the LS/CMI. The convergent validity showed strong correlations between the LS/CMI, the RSVP, and the HCR-20 scores, and weaker but significant associations with the BARR-2002R score. The LS/CMI shows correlations with certain reasons for convictions.

Good inter-rater reliability was observed for the total score and the majority of the LS/CMI domains except for "Companions" and "Leisure and recreation". To our knowledge, no study has shown the inter-rater reliability of the LS/CMI in exclusively male detainee populations. The inter-rater reliability of the total score of our sample was slightly higher than the results obtained in the study by Labrecque et al. [12]. The low inter-rater reliability for the "Companions" domain and no inter-rater reliability for the "Leisure and recreation" domain is in line with the relevant literature ([13] with LS/CMI; [13] with an early version of the LS/CMI). The variation in scoring between the different evaluators in these domains can be explained by:

- the small number of items (2 and 4 items respectively);
- particularly subjective elements [6].

The internal consistency of our sample was acceptable to good for the total score and for the majority of areas, with the exception of "Leisure and Recreation" and "Companions", which show unacceptable internal consistency. All results are consistent with the literature (e.g. [5] with French version; e.g. [14] with English version). The poor internal consistency of "Leisure and Recreation" and "Companions" can be explained by the small number of items [15].

Regarding the total scores, the results show that concurrent validity is excellent for the HCR-20, good for the RSVP, and moderate for the BARR-2002R. The lower correlations with the BARR-2002R can be explained by the fact that it is an actuarial scale composed only of static factors, unlike the LS/CMI, which also includes more dynamic factors. This moderate correlation was also observed in Babchishin et al.'s study with 360 Canadian sexual abusers ($r = 0.61$ for [16]). The LS/CMI also showed lower correlations with the RSVP scale (which assesses the risk of sexual recidivism). The prediction of sexual and violent risk is based on similar factors but also on specific factors that do not appear in the LS/CMI [17]. The relationship between the LS/CMI and the HCR-20 is consistent with the literature [18], and no study has shown any correlation between the LS/CMI and the RSVP. Finally, Bonta et al. [19], in their meta-analysis of risk factors for violent recidivism, report that among the 8 risk domains for recidivism of the LS/CMI, those of "Companions" and "Leisure and recreational activities" are less predictive factors for populations suffering from psychological difficulties.

The results show moderate and positive correlations between the total LS/CMI score and a history of assault, robbery and aggravated assault, but moderate and negative correlations with sexual assault. These correlations show that participants sentenced for assault and robbery are at higher risk in the "Criminal History" and "Antisocial pattern" domains. Among the predictors of general recidivism, history of antisocial behaviour, antisocial personality pattern, antisocial attitudes, and antisocial associates are the "big four risk" factors that are the most predictive of recidivism [20,21]. "Assault and battery" were positively correlated with the "Education and Employment" sub-domain. Crime, particularly of a violent nature, is associated with long-term unemployment [22]. Alcohol and drug use is a factor closely linked to general antisocial behaviour [23]. Our sample was composed mainly of child sexual offenders who characteristically display less antisocial profiles than sexual offenders of adults [24]. This may explain the negative links between the total LS/CMI score, the "Alcohol and drug problems" subdomain and the sexual assault offence.

Although it is an essential index in the validation of psychometric properties, the predictive validity of the LS/CMI could not be tested in our study; first, because of the time required to monitor the participants (e.g. 2 years for the study by Wormith et al. [14], and secondly because the participants would have to have been released from detention (to be in a more optimal context of possible recidivism). At the time of data collection, the participants in our sample, who had all been sentenced to long prison terms, had served just over half of their sentences (45.6%) and were due to be released on average 69.7 months later, making it impossible to evaluate predictive validity.

This study has a number of other limitations. It was carried out in a detention centre, which is not a major risk environment for recidivism because it limits exposure to certain contextual risk factors (e.g. the presence of potential minor victims), while increasing exposure to other factors (e.g. antisocial companions). Due to the sample size (128 participants) we used non-parametric psychometric measures, requiring caution in generalizing the results.

Table 3

Correlations between total score and LS/CMI subscale scores and total scores in Static-2002, RSVP and HCR-20.

	Total BARR-2002R (n = 85)	Total RSVP (n = 85)	Total HCR-20 (n = 128)
LS/CMI			
Total Score	0.48[b]	0.75[b]	0.80[b]
Criminal history	0.70[b]	0.62[b]	0.76[b]
Education and Employment	0.24[a]	0.51[b]	0.54[b]
Family/marital	0.06	0.39[b]	0.37[b]
Leisure and Recreational Activities	−0.02	0.26[a]	0.32[b]
Companions	0.19	0.24[a]	0.16
Drug or alcohol problems	0.32[b]	0.44[b]	0.60[b]
Pro-criminal attitude or orientation	0.11	0.43[b]	0.45[b]
Antisocial pattern	0.29[b]	0.48[b]	0.63[b]

LS/CMI: Level of Service/Case Management Inventory; BARR-2002R: Brief Assessment for Recidivism Risk 2002 Revised; RSVP: Risk for Sexual Violence Protocol; HCR-20: Historical, Clinical and Risk Management Scale-20.

[a] $P < 0.05$.

[b] $P < 0.01$.

Table 4

Point-biserial correlation coefficients with Bonferroni correction between LS/CMI scores and type of offence.

Type of offence	n	Total Score	Criminal history	Education and Employment	Family/ marital	Leisure Recreational Activities	Companions	Drug/alcohol problems	Pro-criminal attitude or orientation	Antisocial pattern
Homicide	23	−0.10	−0.17	−0.03	−0.13	0.05	0.15	−0.02	−0.05	−0.15
Assault and battery	35	0.37[a]	0.28	0.36[a]	0.07	0.19	0.06	0.25	0.14	0.34[a]
Kidnapping and false imprisonment	5	0.17	0.16	0.13	−0.05	0.13	0.17	−0.09	0.26	0.25
Simple and aggravated theft	6	0.31[a]	0.33[a]	0.27	0.10	0.20	0.16	0.03	0.25	0.28
Drug offences	3	0.10	0.15	0.11	−0.12	−0.04	0.21	−0.02	0.11	0.10
Rape	60	−0.08	−0.03	0.16	0.07	0.03	0.03	−0.07	−0.09	−0.08
Sexual assault	43	−0.33[a]	−0.26	−0.26	−0.12	−0.16	−0.26	−0.36[a]	−0.03	−0.25

LS/CMI: level of service/case management inventory.

[a] $P < .0005$.

This study revealed the good psychometric properties of the LS/CMI on a sample of violent French offenders, in line with international literature. Future studies should focus on:

- further validating the psychometric properties of the LS/CMI with other populations (e.g. non-prisoners, psychiatric patients, a wider variety of offences);
- conducting other analyses (e.g. predictive validity).

Disclosure of interest

The authors declare that they have no competing interest.

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