

Psychometric Properties of the LS/CMI Among Men Under Correctional Supervision in New Zealand

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Agenda

- Introduction
- Research Questions
- Method
- Results
- Limitations and Future Directions
- Conclusion

Introduction

Background Research

Research Questions

Background

- Ewert v. Canada
- Developed to assess the “Central Eight” risk factors. One of the most used risk assessments. LSCMI properties yet to be examined within a New Zealand sample.
- Olver et al. (2014): largest meta-analysis to date of 124 samples and 130,833 people examining the predictive accuracy of the LS tools.
- LS tool total scores predicted general recidivism with moderate accuracy ($r_w = .30$). Few difference between indigenous and non-indigenous samples.
- Regional differences in performance – potentially due to staff training

Research Questions

1. How accurately do LS/CMI scores predict general and violent recidivism among a New Zealand sample?
2. To what extent does the predictive accuracy of LS/CMI scores differ between Indigenous people (NZ Māori) and the majority ethnic group (NZ Europeans), for general and violent recidivism?
3. To what extent does the predictive accuracy of LS/CMI scores differ as a function of the staff groups completing the assessments, for general and violent recidivism?

Method

Sample

Sample of 772 men

- Serving sentences in the either the Community ($n = 489$, 63.3% of the sample) or Prison ($n = 283$, 36.7%).
- Ethnicity (drawn from official court records):
- NZ Māori ($n = 391$, 50.6% of the sample)
- NZ European ($n = 303$, 39.2%)
- Pasifika ($n = 54$, 7.0%) Other ($n = 12$, 1.6%).

LSCMI assessments

- Completed between November 2020 and October 2023
- More than four out of every five assessments in the sample were completed by Facilitators ($n = 625$, 81.0%), remained were completed by psychologists ($n = 147$, 19.0%).

Measures

1. LSCMI: total score ranges 0 to 43 points categorised into very low risk (0–4), low risk (5–10), moderate risk (11–19), high risk (20–29), and very high risk (30–43).
2. RoC*RoI: static actuarial risk instrument developed by the Department of Corrections in New Zealand
3. Structured Dynamic Assessment Case-Management 21-Item (SDAC-21): three subscales—Stable, Responsivity, and Protect
4. Recidivism: new conviction for offending that occurred within a 1-year fixed follow-up period, general and violent recidivism explored separately

Analysis

RQ1: Explore Psychometric Properties Among the Full Sample

- Distribution of scores, correlations with the RoC*RoI and SDAC-21 subscales
- Logistic regression to determine incremental predictive validity of LSCMI total scores over the RoC*RoI

RQ2: Comparison Between New Zealand Māori and European Groups

- Calibration and AUC for NZ Māori and NZ European for both recidivism outcomes

RQ3: Comparison Between Assessors

- AUC for psychologist and facilitator completed LSCMI assessments for both recidivism outcomes

Results

- 1. Psychometric Properties Among the Full Sample**
- 2. Comparisons Between New Zealand Māori and European Groups**
- 3. Comparisons Between Assessors**

Psychometric Properties Among the Full Sample

- LS/CMI total scores: **skewed towards the higher end**
- Most men were classified as high (**45.7%**; $n = 353$) or very high (**27.8%**; $n = 215$).
- LS/CMI scores and most domain scores had **positive relationships** with the RoC*RoI, SDAC Stable risk and Responsivity subscales, and a **negative relationship** with the SDAC-21 Protect subscale.
- LS/CMI scores demonstrated **significant ($p < .001$) incremental predictive validity** for both recidivism outcomes when entered into logistic regression alongside the RoC*RoI.
- Discriminative accuracy for both recidivism outcomes was generally in the low to moderate range
- Calibration analysis showed increasing recidivism rates across risk categories

Table 1: Psychometric Properties—Means, Standard Deviations, Convergent Validity, and Discriminative Validity Over a 1-Year Follow-up—of the LS/CMI Domain and Total Scores

LS/CMI Measure	<i>M</i> (<i>SD</i>)	Pearson's <i>r</i>				AUC [95% CI]	
		RoC*RoI ^a	SDAC-21 Stable ^b	SDAC-21 Responsivity ^b	SDAC-21 Protective ^b	Any recidivism	Violent recidivism
Criminal history	6.14 (1.55)	.59***	.21***	.17**	-.23***	.60 [.56, .64]	.57 [.51, .64]
Education/employment	5.36 (2.29)	.27***	.30***	.25***	-.31***	.58 [.54, .62]	.61 [.55, .66]
Family/marital	1.87 (1.19)	.16***	.18***	.19***	-.19**	.57 [.53, .61]	.60 [.54, .66]
Leisure/recreation	1.21 (0.80)	.05	.22***	.14**	-.24***	.55 [.51, .59]	.59 [.53, .64]
Companions	2.53 (1.20)	.25***	.28***	.16**	-.26***	.59 [.55, .63]	.61 [.55, .67]
Alcohol/drug problems	4.71 (1.89)	.06	.08	.04	-.04	.54 [.50, .58]	.53 [.47, .59]
Procriminal attitude/orientation	1.07 (1.20)	.21***	.24***	.18***	-.27***	.56 [.52, .60]	.58 [.52, .64]
Antisocial pattern	1.78 (1.18)	.37***	.39***	.28***	-.34***	.60 [.56, .64]	.63 [.57, .68]
Total score	24.67 (6.93)	.41***	.37***	.28***	-.36***	.62 [.58, .66]	.64 [.59, .70]

^a*N* = 760. ^b*N* = 337. LS/CMI = Level of Service/Case Management Inventory (Andrews et al., 2004). Structured Dynamic Assessment Case-Management 21-Item (Serin & Wilson, 2012). AUC = Area Under the Curve.

p* < .05, *p* < .01, ****p* < .001

Comparisons Between New Zealand Māori and European Groups

- LS/CMI total scores were **higher for NZ Māori compared to NZ Europeans** (small difference but statistically significant)
- Despite their lower total scores, general recidivism rates were slightly higher for NZ European (**45.9%**; *n* recidivists = 139) than for NZ Māori (**43.0%**; *n* recidivists = 168)
- For violent recidivism, the rate for NZ Māori (**16.9%**; *n* recidivists = 66) was higher than for NZ Europeans (**10.2%**; *n* recidivists = 31)
- Discriminative accuracy of the LSCMI total score was in or near to the moderate range for NZ Māori and NZ Europeans for both outcomes.
- Successive increases in recidivism rates among the higher risk categories for both subgroups on both recidivism outcomes.
 - For general recidivism rates were similar across the two groups.
 - For violent recidivism, rates were consistently higher for NZ Māori than NZ Europeans. However, chi-square analyses (shown on Figure 1) indicated these differences were not statistically significant.

Table 2: Mean LS/CMI Scores for New Zealand Māori and New Zealand Europeans

LS/CMI Measure	NZ Māori (<i>n</i> = 391)		NZ European (<i>n</i> = 303)		Mean Difference	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>p</i>	<i>d</i>
Criminal history	6.39	1.47	5.96	1.55	< .001	0.28
Education/employment	5.67	2.17	5.09	2.29	< .001	0.26
Family/marital	2.00	1.14	1.73	1.19	.002	0.24
Leisure/recreation	1.21	0.80	1.21	.78	.947	0.05
Companions	2.66	1.15	2.37	1.25	.002	0.25
Alcohol/drug problems	4.71	1.82	4.74	1.98	.831	0.02
Procriminal attitude/orientation	1.10	1.22	1.04	1.16	.470	0.06
Antisocial pattern	1.94	1.15	1.63	1.19	< .001	0.26
Total score	25.67	6.62	23.76	7.04	< .001	0.28

Note. LS/CMI = Level of Service/Case Management Inventory (Andrews et al., 2004)

Table 3

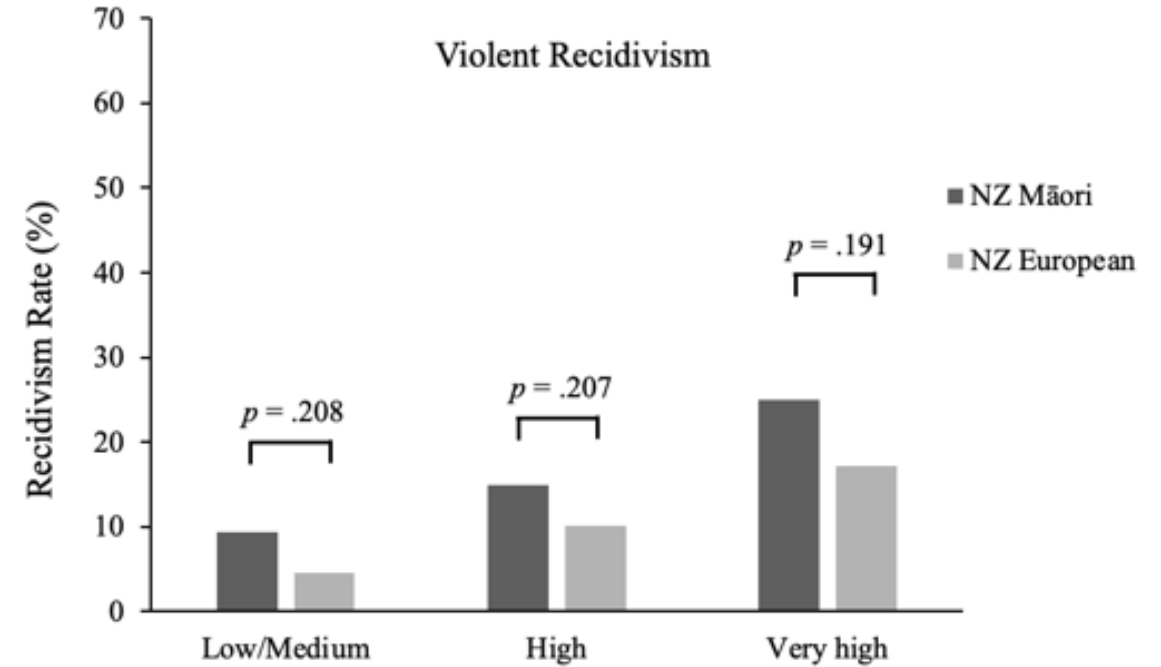
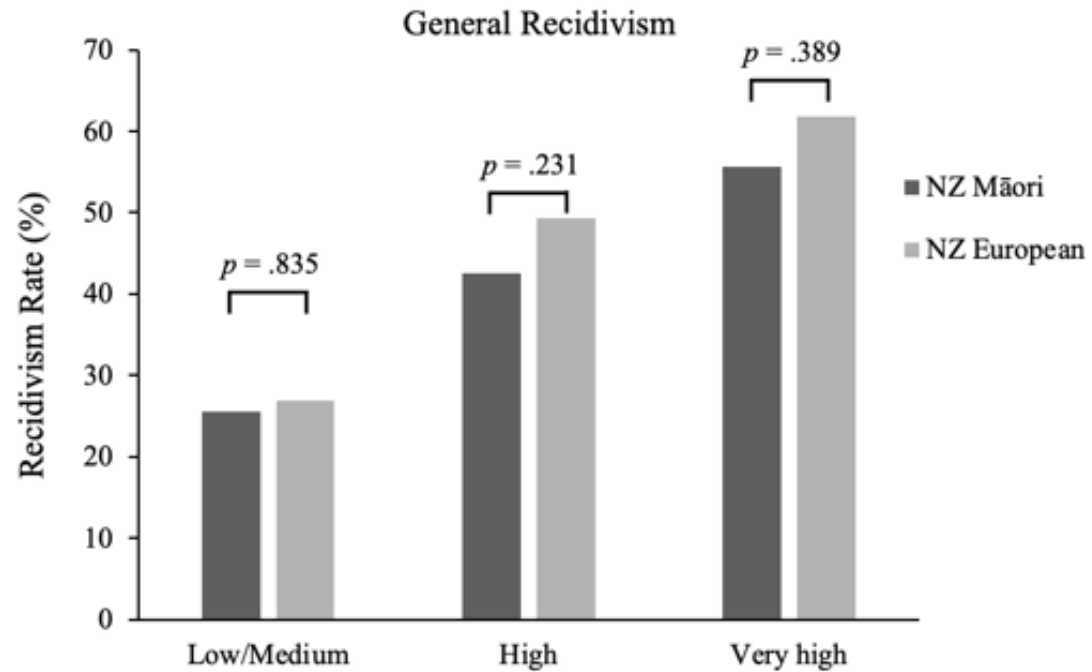
Discriminative Accuracy for General and Violent Recidivism of the LS/CMI Total and Domain Scores Over a 1-Year Fixed Follow-up

LS/CMI Measure	AUC [95% CI]					
	Any recidivism			Violent recidivism		
	NZ Māori (<i>n</i> = 391)	NZ European (<i>n</i> = 303)	AUC Difference (<i>p</i>)	NZ Māori (<i>n</i> = 391)	NZ European (<i>n</i> = 303)	AUC Difference (<i>p</i>)
Criminal history	.61 [.55, .66]	.59 [.52, .65]	.669	.56 [.49, .64]	.54 [.43, .65]	.736
Education/employment	.58 [.52, .64]	.62 [.56, .69]	.319	.60 [.52, .67]	.60 [.51, .70]	.938
Family/marital	.58 [.52, .64]	.56 [.49, .62]	.614	.57 [.50, .64]	.60 [.49, .71]	.688
Leisure/recreation	.55 [.49, .60]	.58 [.52, .65]	.377	.57 [.49, .64]	.63 [.53, .72]	.320
Companions	.59 [.53, .64]	.60 [.53, .66]	.785	.63 [.55, .70]	.55 [.44, .66]	.230
Alcohol/drug problems	.53 [.47, .59]	.56 [.50, .63]	.433	.51 [.43, .58]	.60 [.50, .70]	.155
Procriminal attitude/orientation	.57 [.51, .63]	.57 [.50, .63]	.899	.58 [.51, .66]	.54 [.43, .65]	.553
Antisocial pattern	.63 [.57, .68]	.60 [.53, .66]	.496	.60 [.52, .68]	.64 [.56, .73]	.477
Total score	.63 [.57, .68]	.65 [.58, .71]	.628	.62 [.55, .70]	.65 [.56, .74]	.611

Note. LS/CMI = Level of Service/Case Management Inventory (Andrews et al., 2004). AUC = area under the curve.

Figure 1

One-Year Recidivism Rates for New Zealand Māori and European Subgroups as a Function of LS/CMI Risk Category (N = 772)



Comparisons Between Assessors

- Assessment by psychologists had higher total scores ($M = 27.68$, $SD = 7.75$) than assessments by programme facilitators ($M = 23.96$, $SD = 6.53$). Statistically significant and moderate effect size ($p < .001$, $d = .55$).
- Assessments by psychologists demonstrated a moderate to high level of discriminative accuracy (general: **AUC = .68** [.59, .76]; violent: **AUC = .82** [.73, .91]).
- Assessments by programme facilitators demonstrated significant but low to moderate accuracy (general: **AUC = .60** [.57, .65]; violent: **AUC = .60** [.55, .66]).

Statistically significant for violent recidivism ($p < .001$)

Table 4: Discriminative Accuracy for General and Violent Recidivism of LS/CMI Total Scores Over a 1-Year Fixed Follow-up Across Different Professional Roles

Sample	<i>n</i> Assessments Completed by Psychologists	<i>n</i> Assessments Completed by Programme Facilitators	AUC [95% CI]					
			Any recidivism			Violent recidivism		
			Psychologists	Programme facilitators	AUC Difference (<i>p</i>)	Psychologists	Programme facilitators	AUC Difference (<i>p</i>)
Overall	147	625	.68 [.59, .76]	.60 [.56, .65]	.130	.82 [.73, .91]	.60 [.54, .67]	< .001
Prison assessments	111	172	.66 [.55, .76]	.61 [.52, .70]	.478	.84 [.74, .93]	.63 [.49, .76]	.012
Community assessments	36	453	.78 [.63, .94]	.60 [.55, .65]	.031	.77 [.56, .98]	.60 [.53, .67]	.118
High RoC*RoI	119	261	.67 [.57, .77]	.57 [.50, .64]	.101	.81 [.72, .90]	.60 [.51, .70]	.003

Note. LS/CMI = Level of Service/Case Management Inventory (Andrews et al., 2004). AUC = area under the curve.

Limitations – Future Directions

Skewed high scores

- Calibration differences on LS tools between Indigenous and non-Indigenous samples have previously been observed, particularly among individuals with lower scores. Further research using samples that include a greater proportion of low-risk individuals is warranted.

Male sample:

- Would be beneficial to replicate this study with a female sample to explore the intersectionality of sex and ethnicity.

No information on whether the men had completed any rehabilitative interventions during their sentence.

Data drawn from a period where correctional practice, particularly in prison settings, was heavily impacted by the COVID-19 pandemic.

Official convictions as the outcome measure & restricted results to a 1-year fixed follow-up.

- Bias can occur at multiple stages of the justice process (e.g., arrest, charging). Future research should examine whether outcome differences influence psychometric disparities between Indigenous and non-Indigenous groups and assess effects over longer follow-up.

Conclusion & Implications

- Findings support the use of the LS/CMI with Indigenous people in Aotearoa, aligning with international evidence from other jurisdictions.
- Findings highlight the potential value in involving specialists like psychologists in reviewing assessments (particularly for violence), and regular refresher training could further strengthen practice.

Pātai?

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