Research Bulletin

Evaluation of Custodial Case Management (CCM): The Planning for Adjustment, Responsivity, Reintegration, Criminogenic Needs, and Communication (PARRCC) Assessment Tool

Nhat Le Tran & Mark Howard

Aims

This study aimed to evaluate the PARRCC's psychometric properties and performance in identifying the case management needs of people in custody. We also examined how the PARRCC contributes to processes for allocating people to differing overall levels of service under CCM.

Methods

The study sample included 4292 people in custody who had undergone complete and valid PARRCC assessments between November 2018 and May 2019.

Results

PARRCC total scores indicated low overall service need on average. While people in the sample tended to register some degree of need on the Criminogenic Needs domain, and to a lesser extent on the Reintegration domain, large proportions did not exhibit needs on the Adjustment, Responsivity and Communication domains. PARRCC total and factor scores tended to be correlated with risk of recidivism; an exception to this was the Communication domain, which had weak and often negative associations with other scores.

Confirmatory factor analysis and other reliability testing indicated that a number of PARRCC factors did not adequately represent their respective underlying constructs. In turn, the PARRCC total score was not a reliable indicator of overall severity of need represented by the factors. Poor internal consistency was particularly observed for the Adjustment, Responsivity and Communication factors.

PARRCC total scores were combined with risk assessments to determine overall level of service on the Case Management Delivery Schedule (CMDS). PARRCC total scores showed good evidence of sample distribution across categories of service intensity. However, CMDS thresholds applied to the Custody TRAS risk assessment tool tended to allocate people to categories of lower service priority, relative to previous assessment standards using the Level of Service – Revised (LSI-R) to determine risk.

Conclusion

The PARRCC represents a number of positive developments to custodial case management by systematically assessing people's needs across multiple domains, and applying an understanding of those needs to formulations of service delivery intensity. The utility of this tool to CCM operations may be further improved by ongoing psychometric development, while taking into account theoretical and operational considerations about which needs are important and how relevant indicators inform case management decision making.

INTRODUCTION

As incarceration rates across Australia continue to rise (Bushnell, 2017), there is an increasing need for effective case management that helps people in prison adjust to the custodial system, prepare them to reintegrate back into the community after release, and reduce their likelihood of reoffending. Most people in prison, however, tend to have backgrounds of disadvantage, and are likely to return to disadvantaged environments (Baldry, McDonnell, Maplestone, & Peeters, 2006; Grunseit, Forell, & McCarron, 2008). They commonly exhibit a range of complex and intertwined needs during incarceration (Russo, Woods, Shaffer, & Jackson, 2017), some of which involve pre-existing factors and others arise or are exacerbated during imprisonment (Borzycki, Baldry, & Makkai, 2003).

Custodial interventions often focus on people's needs that have a causal relationship with their likelihood of reoffending, referred to as criminogenic needs or dynamic risk factors. Prominent examples of criminogenic needs include a history of antisocial behaviour, antisocial personality patterns, antisocial cognitions, antisocial associates, family/marital circumstances, school/work, leisure/recreation, and substance abuse (Bonta & Andrews, 2016). In addition, people in prison have high rates of non-criminogenic needs that affect their adaptive and psychosocial functioning in various contexts (Grunseit et al., 2008), including those relating to physical disability, cognitive impairment, low levels of education or literacy, mental health difficulties, limited proficiency in English, and poor access to social capital, such as finance, familial support and employment in the community (Baldry & Sotiri, 2013; Jiang & Winfree Jr, 2006).

Within the custodial environment, criminogenic and non-criminogenic needs can interact in ways that could influence justice outcomes such as reoffending. For example, research indicates that people in custody with unmanaged functional needs may display maladaptive responses, such as aggravated symptoms of emotional disorder, suicidal attempts, acts of self-harm, misconduct, or other noncompliance with prison rules (Adams, 1992; Goncalves, 2014). Such adjustment difficulties are detrimental to personal wellbeing, and can also combine with underlying adaptive functioning problems and other responsivity factors to impact motivation or engagement in custody-based interventions. This has implications that extend beyond the individual; allocating people with unmet adjustment or responsivity needs has been linked to poor intervention outcomes as well as disproportionate expenditure of staff time and other limited program resources (Adams, 1992). In accordance with the risk need responsivity (RNR: Bonta & Andrews, 2016) model of correctional intervention, engagement in custodial programs to address criminogenic needs, as well as other needs such as education, has a key role in the person's successful reintegration into the community and likelihood of reoffending.

In this regard, a central challenge for custodial case management is to account for the complex needs of people in custody to support their safety and wellbeing, while also facilitating their engagement in interventions that promote desistance from reoffending. Reliable identification of needs is therefore critical to ensure that people in custody are allocated to the appropriate level of case management intensity and provided with the appropriate support and interventions to address those needs (Healey, 1999; Tran, Howard, Chong, & Corben, 2020).

For several years Corrective Services NSW (CSNSW) has employed custodial case management models that are predicated on RNR principles, and aim to address people's needs in custody as well as preparing them for reintegration into the community (Tran et al., 2020). Prior to 2017,

development of case plans as well as classification and placement processes were completed in a single process by Custodial and Offender Services and Programs staff during Case Management Team (CMT) meetings. Recent reviews (NSW Auditor-General, 2017; Operational Performance Review Branch, 2014) identified a number of shortcomings of this model, including limited involvement of the person being case managed in the planning process as well as inadequate assessment, identification and inclusion of their needs in case plans.

To improve on the previous model of case management, CSNSW has developed the Improved Custodial Case Management (CCM) model as a key reform in the NSW Department of Justice (now Department of Communities and Justice) Strategies to Reduce Reoffending. The new CCM is founded on an interdisciplinary approach to management and rehabilitation of people in custody. Reforms under the new CCM primarily involve the creation of Case Management Units (CMUs) at each correctional centre, and restructuring of the classification and placement process to allow for greater accommodation of people's case management needs. CMUs consist of teams of dedicated Case Management Officers (CMOs) who play a pivotal coordination role in developing case plans with people in custody, and sequence interventions throughout their custodial episode to support needs of varying nature and priority. CCM commenced operations at NSW correctional centres in December 2017, and has been implemented at all correctional centres as of March 2019.

One major innovation of the CCM model was development of a new assessment tool to assist in identifying people's needs and required intensity of case management, which was originally named the Planning for Adjustment, Responsivity and Reintegration Scale (PARRS). The PARRS consisted of 15 questions that were intended to be discussed with people in custody directly, and assessed their functioning across three domains including Adjustment, Responsivity, and Reintegration.

A related innovation of the CCM was development of a triaging system known as the Case Management Delivery Schedule (CMDS). The CMDS allocates people in custody to differing levels of service according to the severity of their needs and risk of reoffending. Initially, CMDS allocation was defined by total score on the PARRS in addition to total score on the Level of Service Inventory – Revised (LSI-R: Andrews & Bonta, 1995), a widely used risk assessment tool.

In 2018 Corrections Research Evaluation and Statistics (CRES) conducted a Proof of Concept (POC) review of CCM over the first six months of operations. Findings indicated that the original PARRS was not sufficiently calibrated to distribute people in custody to differing levels of service. The majority of assessed people in custody (91%) were categorised as requiring the lowest level of service on the CMDS, and none (0%) were categorised as requiring the highest level of service. The findings illustrated the importance of further development and validation of the PARRS.

Following this review, the PARRS underwent extensive redevelopment, resulting in a revised tool named the Planning for Adjustment, Responsivity, Reintegration, Criminogenic Needs and Strengths (PARRCS). The PARRCS was later further revised and superseded by the Planning for Adjustment, Responsivity, Reintegration, Criminogenic Needs and Communication (PARRCC) tool. Differences between the PARRS and the PARRCC included a) restructuring of the original 15 items; b) addition of 15 new items (giving a total of 30 items); c) revision of the factorial structure to derive 5 domains of needs as represented in the PARRCC title; and d) added capability to use an automated measure of risk known as the Custody Triage Risk Assessment Scale (Custody TRAS: Raudino, Corben, Galouzis, Mahajan, & Howard, 2019) instead of the LSI-R in determining allocation on the CMDS.

The present study

The PARRCC was developed to play a critical role in case planning and management of people in custody. For example, as at the time of evaluation, overall level of service delivered under CCM was determined by placement on the CMDS according to assessment in one of three categories of severity on the PARRCC total score, and assessment in one of three categories of severity on the Custody TRAS. As such, the PARRCC's contribution to categorisation on the CMDS has population-wide implications for which and how many people in custody receive more intensive intervention, with lead-on effects for CMU staffing, workload and resourcing models.

Assessment using the PARRCC also has implications for the types of interventions people in custody receive to meet their needs. Currently, PARRCC factorial scores are used to allocate interventions on a threshold basis, so that for example, people who score 'high' or 'very high' on the Responsivity or Adjustment factors would be required to have at least one 'in custody' casework step in their current case plan to address these needs.

Whereas the PARRCC was developed in reference to psychometric principles, it has not undergone independent validation. Given the importance of this assessment, in addition to its relatively early stage of development, the current study aimed to evaluate the PARRCC's psychometric properties and performance in identifying the needs of people in custody. We also sought to examine how the PARRCC contributes to the CMDS in allocating people in custody to differing levels of service under CCM.

METHODS

Sample

Between the introduction of the PARRCC (5 November 2018) and the study's data censoring date (31 May 2019), a total of 4581 PARRCC assessments were administered. For the purposes of this study, incomplete assessments (24 cases, constituting less than 0.6% of the total extracted dataset) were removed from the sample. Where multiple PARRCC assessments were completed for a given individual, only the most recent complete assessment in the study period was retained. The final sample included 4292 PARRCC assessments for 4292 unique individuals.

Among people in our sample, most were male (n=3798; 88.5%); and more than one in four identified as being Aboriginal and Torres Strait Islander (n=1132; 26.4%). Only a relatively small proportion of people in the sample had a non-English speaking background (NESB) (N=644; 15%).

It is noted that a number of people in the sample (6.2%; n=265) did not have an LSI-R assessment attached to their index custodial episode. To account for this, an adjusted sample of 4027 individuals was used for analyses involving the LSI-R.

Materials

Data source

Data for this study was extracted from the Offender Integrated Management System (OIMS). OIMS is the central operational database maintained by CSNSW for the purposes of managing people under supervision in custody and in the community. For the current study, OIMS provided data on each individual's PARRCC factorial and total scores, in addition to Custody TRAS and LSI-R total and domain scores.

Measures

The Planning for Adjustment, Responsivity, Reintegration, Criminogenic Needs and Communication (PARRCC) tool

The PARRCC is a dynamic assessment tool developed by CSNSW. It is designed to be administered by CMOs as part of a structured face to face interview with people in custody. In accordance with CCM eligibility criteria, it is administered to people who have received a custodial sentence (as compared to being on remand) and have more than 3 months left to serve until their earliest possible date of release.

The PARRCC includes a total of 30 five-point Likert scaled questions (items) assessing five domains (factors) of needs, including Adjustment[1], Responsivity[2], Reintegration[3], Criminogenic Needs[4], and Communication.[5] Each item in the PARRCC is scored so that a value of 0 indicates the individual has 'none' or no needs, and 4 indicates the individual has 'very high' needs in relation to the assessed area of functioning.

Table 1 shows the five factors of the PARRCC, the number of items in each factor, their possible minimum-maximum range, as well as the specific items belonging to each. The score of each factor is computed by summing its items' individual scores. The PARRCC total score (PARRCC total) is computed by summing its factors' individual scores.

[1] An example of items in the Adjustment domain is 'How much does poor mental health affect daily functioning in prison?'

[2] An example of items in the Responsivity domain is 'How much cultural connection support does the Aboriginal and Torres Strait Islander inmate need?'

[3] An example of items in the Reintegration domain is 'How much support does the inmate need because of concerns in the community related to their release?'

[4] An example of items in the Criminogenic Needs domain is 'How much support is required to motivate the inmate to participate in required treatment program now?'

[5] An example of items in the Communication domain is 'How much does the inmate's limited English language lead to miscommunication and affect adjustment?'

Table 1. *Factors and item grouping of the PARRCC*

Factor	Number of items	Range	Items
Adjustment	5	0 – 20	6 – 10
Responsivity	5	0 – 20	4, 5, 11, 13, 27
Reintegration	9	0 – 36	2, 3, 15, 17, 18, 19, 20, 21, 24
Criminogenic Needs	9	0 – 36	14, 16, 22, 23, 25, 26, 28, 29, 30
Communication	2	0 – 8	1, 12
PARRCC Total	30	0–120	1–30

The Level of Service Inventory – Revised (LSI-R)

The LSI-R is an actuarial risk assessment tool designed to identify an individual's criminogenic needs and likelihood of recidivism, originally defined as return to custody within one year (Andrews & Bonta, 1995). The LSI-R has been routinely administered as the primary risk assessment measure by CSNSW since 2001, and has an extensive history of validation, including with CSNSW samples (Watkins, 2011).

The LSI-R assesses 10 domains of risk over a total of 54 items. The first domain assesses static risk factors relating to Criminal History, whereas the remainder assess a range of dynamic risk factors. These include Education/Employment, Family/Marital, Accommodation, Financial, Leisure/Recreation, Companions, Alcohol/Drug Problems, Emotional/Personal, and Attitude/Orientation.

The Custody TRAS

The Custody TRAS is an automated actuarial tool that was designed to measure risk of return to custody among people who have received custodial sentences in NSW (Raudino et al., 2019). It uses a small number of standard OIMS variables to

generate a single weighted score, which can be interpreted as the individual's probability of return to custody with a new sentence within two years. Validation research has indicated that the tool has acceptable predictive validity for recidivism within two years (AUC = .75; Raudino et al., 2019).

While the Custody TRAS was designed to provide a single continuous score indicating absolute probability of recidivism, scores can also be assigned to one of five categories (1–5) reflecting probability quintiles. Using this categorical approach, the likelihood of recidivism is indicated on a scale between 1 (the lowest likelihood of reoffending) and 5 (the highest likelihood of reoffending). For example, an individual in category 1 will have a 0–19% estimated chance of returning to custody, whereas an individual in category 5 will have an 80% or higher estimated chance of returning to custody within two years (Raudino et al., 2019).

Analytical plan

Statistical analyses were conducted in SPSS 26 and AMOS 26. Data visualisation was done using Python.

Confirmatory factor analysis (CFA)

For psychometric assessments such as the PARRCC, factorial structure is often developed by considering the theoretical relationships between items, as well as testing the statistical relationships between items using a procedure called Exploratory Factor Analysis (EFA). EFA assists in identifying clusters of items where scores tend to covary. This process assists development of factorial structure by indicating the presence of potential latent constructs. By comparison, confirmatory factor analysis (CFA) is used to assess the goodness of fit of a specified factorial structure once it has been developed and applied to a psychometric measure.

In accordance with the aims of this study, we conducted a CFA on the PARRCC. We considered the PARRCC to have both a first-order and a higher-order factorial structure. That is, each of the 30 items loads onto one of 5 factors, and scores from each of the 5 factors can be combined to derive a superordinate total score. In this regard, PARRCC total score may be conceptualised as an index of overall service need as represented by all of the factors measured in the tool.

Prior to the CFA, a comprehensive diagnostic examination of data was conducted (Byrne, 2005). While PARRCC data met most of the statistical assumptions of CFA, there was strong evidence of multivariate non-normality (Bentler & Chou, 1987; Lei & Wu, 2007; Shek & Yu, 2014). Given this, the PARRCC's overall model fit was assessed using the Bollen-Stine bootstrap procedure in AMOS (Blunch, 2013). This procedure is supported by the large sample size used in the current study. To obtain robust estimates, 5000 bootstraps were conducted (Krebsbach, 2014; Nevitt & Hancock, 2001).

One challenge of this approach is that the Bollen-Stine bootstrap procedure does not provide robust estimates of the model's individual parameters and their 90% bias-corrected confidence intervals (Walker & Smith, 2017). We therefore derived these estimates through the naïve bootstrapping procedure in AMOS (Blunch, 2013).

To assess the PARRCC model, it was first necessary to test the first-order model whereby each of the 30 items loaded onto one of the 5 PARRCC factors; and the factors were specified to be inter-correlated. A higher-order factorial structure of the PARRCC may be tested if results indicate that the first-order structure of the PARRCC is a good fit for the data, and if there is evidence of strong correlations between first-order factors (Shek & Yu, 2014). In the higher-order model, besides being correlated, PARRCC factors were specified to be explained by a superordinate total factor (Figure 1).

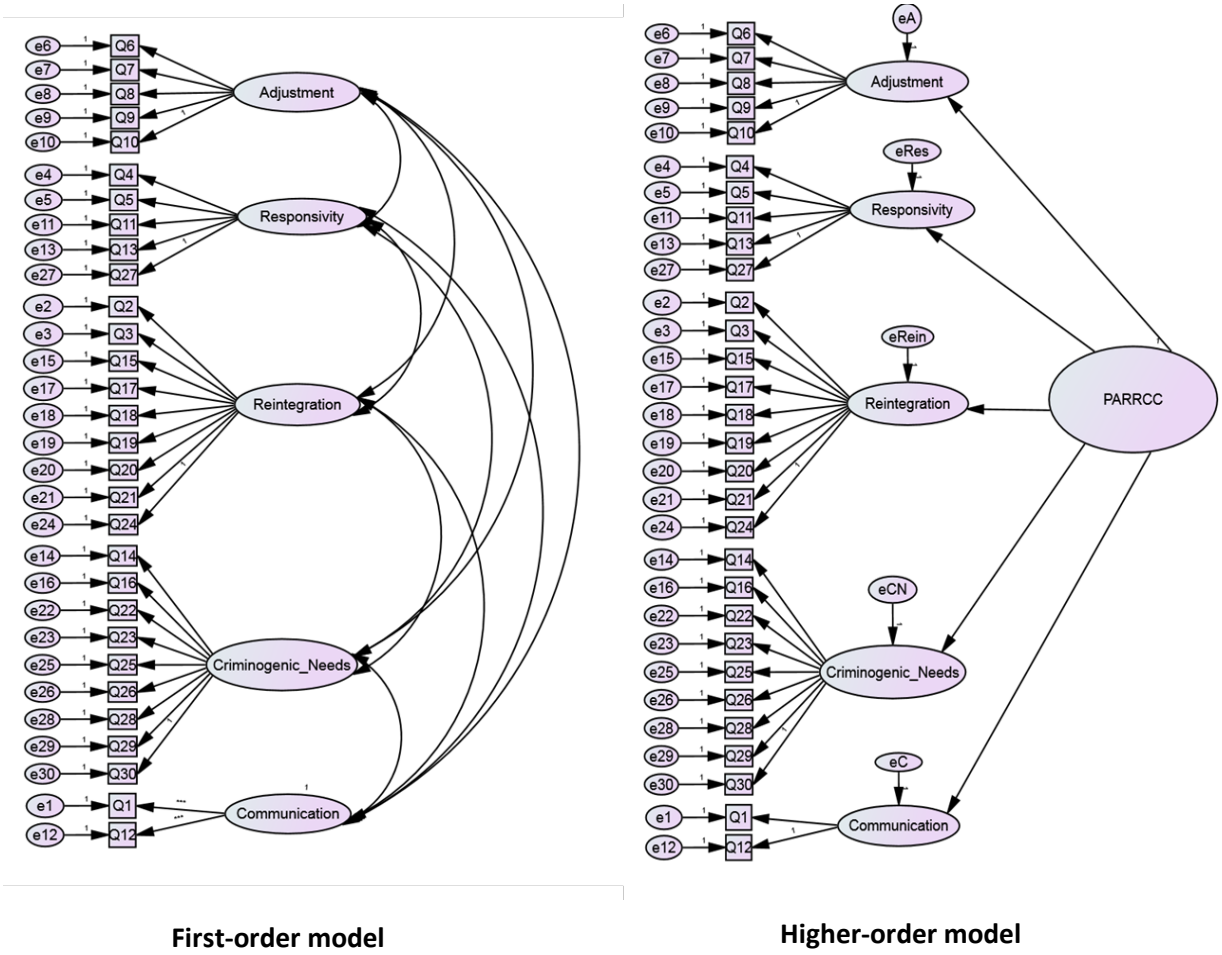

Figure 1. First-order and higher-order factorial structures of the PARRCC specific for Confirmatory Factor Analysis

RESULTS

PARRCC total and factor distributions

Table 2 and Figure 2 provide descriptive statistics about PARRCC factor and total scores in the sample. PARRCC total scores were normally distributed and showed moderate variance across the study sample (SD=14.55). Based on the measurement scale of PARRCC items and possible ranges (Table 1), a mean PARRCC total score of 23.03 generally indicated that on average, people in custody appeared to register low overall needs for support.

Distributions of PARRCC factorial scores were highly right skewed and non-normal in most cases (Shapiro-Wilk p values <0.001). With the exception of the Criminogenic Needs factor, all of the other factors either had skewness and/or kurtosis outside of the normal range.[6]

People in the sample registered some degree of need on average on the Criminogenic Needs factor (mean=11.66; SD=7.39), and to a lesser extent on the Reintegration factor (mean=7.23; SD=6.33). By contrast, the Adjustment, Responsivity, and Communication factors were characterised by low prevalence of need and low variance. For example, 82% of people in the sample returned a score of 0 on the Communication factor. An absence of need, or score of 0, was the most common or mode score for all PARRCC factors with the exception of Criminogenic Needs (mode=9).

[6] The normal range for skewness is (-1, +1), and for kurtosis is (-3, +3) (Arnold, Balakrishnan, Castillo, & Sarabia, 2006).

Table 2. Descriptive statistics for each of the PARRCC factors and total score

Statistic	Adjustment	Responsivity	Reintegration	Criminogenic Needs	Communication	PARRCC Total
Mean	1.69	2.12	7.23	11.66	.34	23.03
Mode	0	0	0	9	0	19
Std. Dev	2.03	2.41	6.33	7.39	.91	14.55
Variance	4.11	5.80	40.10	54.67	.82	211.80
Skewness	1.97	1.39	1.13	.43	3.81	.71
Kurtosis	6.52	1.94	1.00	-.40	17.81	.21
Range	20	17	35	36	8	85
Minimum	0	0	0	0	0	0
Maximum	20	17	35	36	8	85

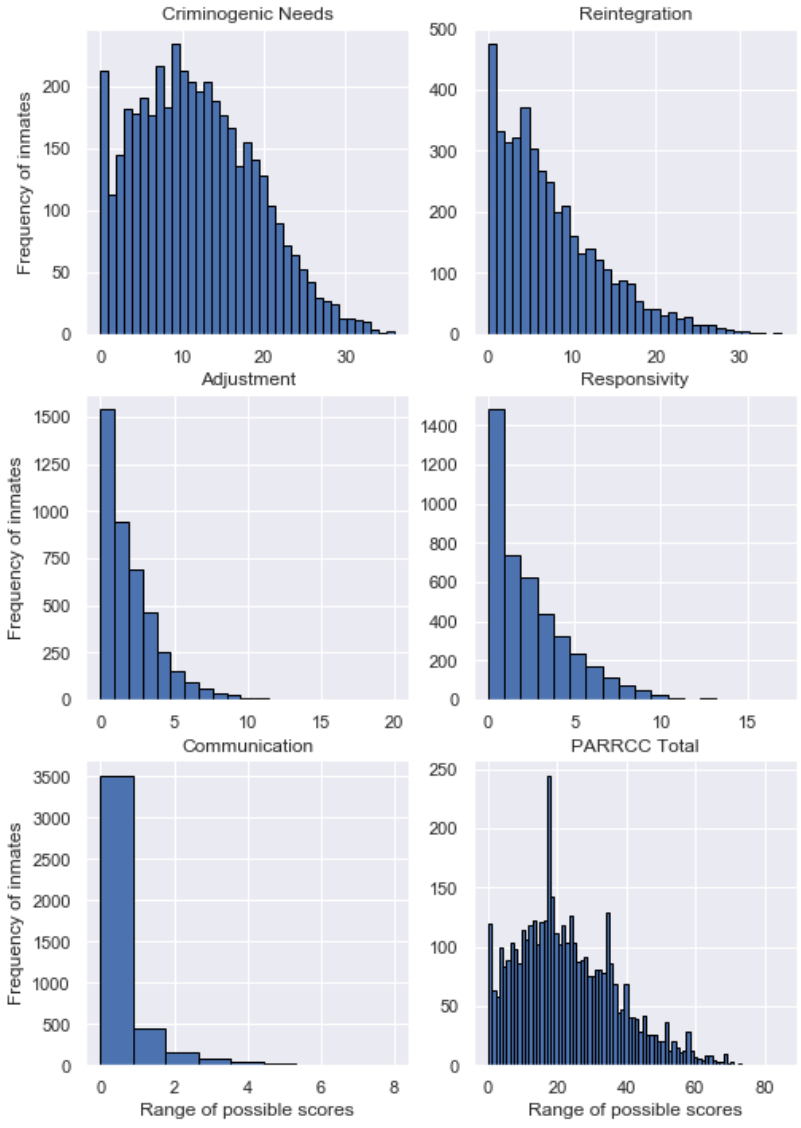

Figure 2. Histograms showing distributions of PARRCC total and factorial scores

PARRCC total and factor correlations

A series of bivariate correlation coefficients were computed to examine the extent to which PARRCC factors were associated with, or covaried with PARRCC total score. Correlations of large effect size[7] were found between PARRCC total and the Criminogenic Needs factor (r=.898), as well as between PARRCC total and the Reintegration factor (r=.846). Moderate to large correlations were also found between PARRCC total and the Adjustment factor (r=.503), and the Responsivity factor (r=.632). There was a low and statistically non-significant correlation between PARRCC total and the Communication factor (r=.015; p>.05).

A series of bivariate correlations were also conducted to examine inter-factor associations between PARRCC factors (Table 3). Results showed that Communication consistently had the weakest correlations with all other PARRCC factors (all |r|<.11). With the exception of Responsivity, correlations between Communication and other factors were also in a negative direction, so that as Communication needs increased, scores on other factors decreased.

All other inter-factor correlations were positive with effect sizes ranging from small to large (r = .103 to .604). The largest inter-factor correlation was between the Criminogenic Needs and Reintegration factors (r=.604). This indicated that these factors assessed similar or highly covarying constructs.

Construct validity

A series of bivariate correlations were conducted to examine whether the PARRCC had construct validity, or measured the constructs it was intended to measure. Given the limited available data on relevant constructs, comparisons were limited to total and domain scores on the LSI-R, in addition to scores on the Custody TRAS. Table 4 summarises the correlation coefficients computed.

Results showed that except for the Communication factor, PARRCC total and factorial scores tended to have positive correlations with LSI-R total and domain scores, in addition to the Custody TRAS. In particular, PARRCC total score was found to have moderate to large associations with the Custody TRAS (r=.414) and LSI-R total score (r=.514). This suggests that there is an association between overall severity of needs as assessed by the PARRCC and risk of recidivism.

Similarly, moderate to large correlations were observed between the Criminogenic Needs and Reintegration factors and the LSI-R and Custody TRAS measures of risk. Correlation coefficients between Criminogenic Needs and LSI-R total (r=.526) and Custody TRAS (r=.420) scores were even larger than that of PARRCC total and LSI-R total, or of PARRCC total and the Custody TRAS.

We note that the Communication factor had a weak and negative association with other measures of overall recidivism risk and extent of criminogenic needs, including the LSI-R total and domain scores, as well as the Custody TRAS (all |r|s<.25). This implied that as needs associated with Communication increased, global risk of recidivism tended to decrease.

[7] For measures of association such as Pearson's product-moment correlations, a recommended convention for interpreting effect size r is 0-.29 = weak or small correlation; .30-.49 = moderate correlation; .50+ = strong or large correlation (Cohen, 1988).

Table 3. Correlation matrix for PARRCC total and factor scores (N=4292)

	Adjustment	Responsivity	Reintegra-tion	Crim. Needs	Communi-cation	PARRCC Total
Adjustment	1					
Responsivity	.297**	1				
Reintegration	.307**	.387**	1			
Crim. Needs	.361**	.494**	.604**	1		
Communication	-.051**	.103**	-.045**	-.074**	1	
PARRCC Total	.503**	.632**	.846**	.898**	.015	1

Note. ** Correlation significant at the 0.01 level (2-tailed).

Table 4. Correlations between PARRCC scores and scores derived from the Custody TRAS and LSI-R

Measure	PARRCC Total	Criminogenic Needs	Reintegra-tion	Responsivity	Adjustment	Communi-cation
Custody TRAS	.414	.420	.333	.286	.134	-.168
LSI-R Total	.514	.526	.402	.341	.212	-.223
Criminal History	.404	.441	.310	.257	.122	-.222
Education/Employment	.414	.423	.329	.289	.132	-.154
Financial	.367	.343	.317	.263	.134	-.117
Family/Marital	.306	.281	.262	.233	.132	-.112
Accommodation	.313	.293	.269	.201	.132	-.061
Leisure/Recreation	.280	.288	.214	.197	.086	-.065
Companions	.248	.257	.193	.169	.066	-.055
Alcohol/Drugs Problems	.347	.378	.277	.198	.105	-.206
Emotional/Personal	.201	.164	.142	.127	.316	-.149
Attitudes/Orientation	.256	.285	.162	.180	.117	-.074

Note. All correlations significant at the .01 level (two-tailed).

Internal consistency

Reliability testing was conducted to understand the internal consistency of PARRCC factors, or the extent to which each item in a factor correlates with and therefore measures a similar construct as all other items in the factor. Internal consistency was assessed using Cronbach's alpha statistics. Results are given in Table 5.

The Reintegration and Criminogenic Needs factors were found to have good internal consistency (Cronbach's Alpha=.835 and .866 respectively).[8] The remaining factors had poor internal consistency, with alpha coefficients ranging from .596 to .631 (Cortina, 1993; Panayides, 2013). This provides an indication that the Adjustment, Responsivity, and Communication factors contain items that may not reliably assess a single construct of interest.

Table 5. Internal consistency statistics for each of the PARRCC factors

PARRCC factor	Cronbach's Alpha (reliability coefficient)
Criminogenic Needs	.866
Reintegration	.835
Responsivity	.621
Adjustment	.596
Communication	.631

[8] Common guidelines for interpreting Cronbach's alpha statistics recommend alpha .50-69 = poor; .70-.79 = acceptable; .80-.89 = good; and .90-.99 = excellent (Cronbach & Meehl, 1955).

Additional diagnostic analysis identified a number of items with poor corrected item-total correlations, indicating that they may not represent the factor they were currently assigned to. For example, internal consistency of PARRCC factors was found to increase if removing (see also Appendix 1):

- Items 5 and 11 from the Responsivity factor

Item 5: *How much support does the inmate with an Acquired Brain Injury and/or Dementia need in coping with prison?*

Item 11*: How much cultural connection support does the Aboriginal and Torres Strait Islander inmate need?*

- Items 7 and 8 from the Adjustment factor

Item 7*: How much is the inmate at risk of harm from other inmates?*

Item 8*: How much of a risk to other inmates and staff is the inmate now?*

- Items 2 and 3 from the Reintegration factor.

Item 2*: How much support does the inmate need because of current concerns for matters in the community?*

Item 3*: How much support does the inmate need because of concerns in the community related to their release?*

First-order factorial structure

Results of earlier sections indicated that PARRCC factors may have less than optimal reliability, in that items within some factors did not consistently covary or show signs of measuring a single construct. To further assess this, and examine how well the hypothesised structure of the PARRCC fit or adequately described the observed data, we conducted CFA modelling on the PARRCC (Shek & Yu, 2014). The first step to the CFA procedure was to evaluate PARRCC's first-order five-factor structure.

Initial fitting of the hypothesised five-factor structure model of the PARRCC to data indicated an improper solution. This was due to item 1[9] of the Communication factor having statistically non-significant and negative variance (estimate=-.024)[10], and a standardised regression weight larger than 1 (estimate=1.044). Theoretically, these out-of-range estimates are not possible. When they occur, they demonstrate an example of Heywood cases (McDonald, 1985).

Examination of the PARRCC's currently specified model and data indicated that causes of the Heywood cases included both structural misspecification and empirical misspecification (Ding, Velicer, & Harlow, 1995; McDonald, 1985). These specification issues were represented by the Communication factor in particular, which has only two items[11] and showed factor variance that neared zero (see Table 2). After correcting for the Heywood cases through model respecification in AMOS, the hypothesised first-order five-factor structure model of the PARRCC was refit to the data.

Model fit for the PARRCC was evaluated both from the adequacy of the model as a whole (overall model fit), and adequacy of its individual parameters to allow for comprehensive model assessment (Shek & Yu, 2014).

[9] Item 1: How much does the inmate's limited English language lead to miscommunication and affect adjustment?

[10] Variance estimate of item 1 had a 90% bias-corrected confidence interval including zero, 90% CI= -.124 - .027 (Kolenikov & Bollen, 2012). This was interpreted as evidence that the population variance was positive but near zero, which then led to the negative estimate for item 1 (Van Driel, 1978). Indeed, as reported earlier, the Communication factor had very low variance (estimate=.82) (see Table 2).

[11] Theoretically it is possible for a factor to be comprised of only two items. Empirically however, when a factor has less than 3 indicators, this would likely result in improper solutions (Ding et al., 1995, p.139).

Overall model fit

The PARRCC's overall model fit was assessed using a number of goodness-of-fit statistics recommended as best practice in CFA, including the bootstrapped p value and global fit indices (Hu & Bentler, 1999; Schreiber, Stage, King, Nora, & Barlow, 2006).[12]

Results indicated that the hypothesised first-order five-factor structure of the PARRCC was not a good fit to the observed data. That is, the results did not support the hypothesis that items within each of the factors robustly measured a single latent construct. This was evidenced by, first, a significant Bollen-Stine bootstrapped p value ($p<.001$). This p value was associated with the test of exact fit which tested the null hypothesis that the tested PARRCC model was correct. Also, estimates of all global fit indices assessed in the model, including the CFI, TLI, NFI, IFI as well as RMSEA[13], were outside of the thresholds for a good fit (Table 6).

Individual model parameters

Assessment of the PARRCC model's individual parameters identified a number of sources of poor model fit. First, some PARRCC items had poor factor loadings (standardised regression weights<.30) and/or poor squared multiple correlations (<.30) (Appendix 2a and 2b).[14] Factor loadings indicate the extent to which an item loads onto its respective factor, and squared multiple correlations indicate the estimated reliability of an indicator towards its respective factor. Higher values indicate higher loading and reliability respectively (Bian, 2012). The results therefore indicate that some items were not reliable indicators of their respective factors.

Similar to the results of internal consistency analysis, items with particularly poor factor loadings and reliability were identified to include:

- Items 4, 5, and 11 of the Responsivity factor

***Item 4**: How much support does the inmate with a disability need in adjusting to prison?*

***Item 5**: How much support does the inmate with an Acquired Brain Injury and/or Dementia need in coping with prison?*

***Item 11**: How much cultural connection support does the Aboriginal and Torres Strait Islander inmate need?*

- Items 6, 7, and 8 of the Adjustment factor

***Item 6:** How much distress is the inmate experiencing now?*

***Item 7:** How much is the inmate at risk of harm from other inmates?*

***Item 8:** How much of a risk to other inmates and staff is the inmate now?*

- Items 2 and 3 of the Reintegration factor

***Item 2:** How much support does the inmate need because of current concerns for matters in the community?*

***Item 3:** How much support does the inmate need because of concerns in the community related to their release?*

- Item 14 of the Criminogenic Needs factor.

***Item 14:** How much support is required to motivate the inmate to participate in required treatment programs now?*

[12] According to Hu and Bentler (1999), a combination of goodness-of-fit statistics should be used in model assessment to minimise Type 1 and Type II errors under various conditions.

[13] While it may vary, global cut-points generally recommended for RMSEA are: <.05 for a close fit; .05 to .08 for a fair fit; .08 to .10 for poor fit; and >.10 for unacceptable fit. For other global fit indices including CFI, TLI, NFI, and IFI: >.95 for a good fit (Kim & Millsap, 2014; Newsom, 2018).

[14] From a structural equation modelling perspective, items with factor loadings <.30 and/or squared multiple correlations <.30 are considered poor indicators, and should be considered removing from their respective factor to improve the overall model fit (Shek & Yu, 2014).

Second, several items were found to have substantial cross-loadings across multiple factors. Cross-loadings were detected by evaluating modification indices (MIs) for regression weights and the expected parameter change values (EPCVs) associated with these items (Appendix 2c).[15] These are important fit diagnostics to help detect discrepancies between the hypothesised and estimated models, or sources of poor model fit (Shek & Yu, 2014).

Examples of items with cross-loadings included item 11 in the Responsivity factor. This item was found to also load onto the Reintegration, Communication and Criminogenic Needs factors. Similarly, item 13 (currently in the Responsivity factor) cross-loaded onto the Communication, Adjustment and Criminogenic Needs factors. This indicated that these items not only measured support needs in the Responsivity domain, but also support needs associated with other domains.

Item 13: *How much support does the inmate need because of low literacy and/numeracy skills?*

Third, a number of items in the PARRCC appeared to have poor psychometric properties with substantial measurement error. This was detected by evaluating their modification indices (MIs) for covariances (Appendix 2d). MIs for covariances represent error covariances which could be due to systematic measurement error in the item responses, characteristics specific to the questions, or characteristics of the assessed offenders (Joreskog & Aish, 1990).[16]

In summary, review of the overall model fit statistics together with individual parameters indicate that the hypothesised first-order five-factor structure of the PARRCC was a poor fit to the data. Several sources of model misspecification and misfit were identified, and a number of items with poor psychometric properties were noted. These particularly included items 2, 3, 5, and 7. This suggests that the hypothesised first-order structure of the PARRCC and some of its items require modification to improve the overall psychometric properties of the tool. For example, follow-up modification modelling indicated that the overall goodness-of-fit of the PARRCC was improved significantly when items 2, 3, 5 and 7 were removed from the tool (corresponding estimates for CFI, TLI, NFI, IFI $>.95$, and RMSEA $<.05$).

Higher-order factorial structure

As discussed earlier, a higher-order factorial structure of the PARRCC can be tested on the precondition that CFA modelling supported good fit for the first-order structure of the tool, and if there was evidence of strong correlations between its first-order factors (Shek & Yu, 2014b). In this higher-order model, PARRCC factors would be specified to contribute to a superordinate total need factor (Figure 1).

However, the previously reported results indicated that the hypothesised structure of the PARRCC suffered both from structural and empirical misspecifications as evidenced by the Heywood cases. Even after the Heywood cases were corrected for through model respecification, the first-order five-factor structure model of the PARRCC was a poor fit to the observed data. Also, there were almost no factor correlations between Communication and the other factors. This precluded the examination of a higher-order factorial structure of the PARRCC.

[15] While there are different criteria as to what value indicates significant specification error, regression weights with MIs>50 are especially considered as indication of substantial misspecification. It is also noted that even when MIs for regression weights are <50, depending on the model being tested and other model statistics, MIs are still valuable sources to identify possible sources of model misspecification (Shek & Yu, 2014).

[16] While criteria may vary, items with MIs for covariances >80 are generally considered significant sources of substantial misspecification and require attention (Shek & Yu, 2014).

Table 6. Goodness-of-fit statistics of the hypothesised five-factor structure of the PARRCC

Goodness-of-fit statistics	χ2	df	CFI	TLI	NFI	IFI	RMSEA (90% CI)
	9247.49	396	.793	.773	.786	.793	.07 (.071 - .073)
Criterion for goodness-of-fit	-	-	≥ .95	≥ .95	≥ .95	≥ .95	≤ .05

Note. CFI, comparative fit index; TLI, Tucker and Lewis fit index; NFI, normed fit index; IFI, incremental fit index; RMSEA (90% CI), root mean square error of approximation and the associated 90% confidence interval.

Follow-up analyses indicated that attempts to fit a higher-order model to the PARRCC returned improper solutions. Given these observations, we concluded that there was not a superordinate factor that robustly underlined the first-order five factors of the PARRCC. That is, the PARRCC's five factors did not appear to form a valid and interpretable total score index of global severity of needs or level of service required to address needs.

PARRCC and performance of the CMDS

As at the time of this evaluation, CCM policy specifies that individuals are allocated to a category of the CMDS based on their total scores on the PARRCC and the Custody TRAS, which then determines overall level of service. The PARRCC serves as an assessment of the individual's severity of needs on one axis, and the Custody TRAS serves as an assessment of their risk of recidivism on the second axis. This section examines how the PARRCC performs in allocating individuals to levels of service on the CMDS.

Prior to the use of the Custody TRAS, the LSI-R had been used to assess risk of recidivism for the purposes of assigning individuals to CMDS categories. Given the recent transition from the LSI-R to the Custody TRAS, we also compared CMDS distributions derived when using either of these assessments to determine risk

For use on the CMDS, PARRCC scores are classified into three levels to reflect severity of overall needs, being Level 1 (low needs, range 0-20), Level 2 (medium needs, range 21-32), and Level 3 (high needs, range 33-120). Risk of recidivism is also classified into three levels of low, medium or high. When the LSI-R was used as a risk assessment in conjunction with the PARRCC, its categories were combined to derive Low (by combining the original Low and Medium/Low categories), Medium (Medium), and High (combining Medium/High and High) levels of risk. Similarly, when applied to the CMDS, Custody TRAS categories are combined to derive Low (by combining the original categories 1 and 2), Medium (category 3), and High (by combining categories 4 and 5) levels of risk.

The distribution of CMDS allocations for the study sample using the PARRCC and Custody TRAS is given in Table 8a; and using the PARRCC and LSI-R in Table 8b. Row totals for the PARRCC (far right column) indicated that around half of people in the sample were assessed as having the lowest level of needs (48.3%; n=1944). Of the remainder, approximately half were categorised as having a moderate level of needs (26.6%; n=1070), and the other half were categorised as having the highest level of needs according to the PARRCC (25.1%; n=1013).

Distribution of the CMDS according to Custody TRAS categories showed substantial skew towards lower service requirements (Table 7a). Around 3 in 5 people in the sample were categorised as having the lowest level of risk (60.5%; n=2438); and a further 1 in 4 were categorised as having medium risk (24.5%; n=988). Only 14.9% (n=601) of people in the sample were categorised in the highest risk band according to the Custody TRAS.

Table 7a. Distribution of inmates on the CMDS using the PARRCC and the Custody TRAS

		Custody TRAS (n/%)			
		LOW *Low/Medium-Low*	MEDIUM *Medium*	HIGH *Medium-High/High*	Total (%)
PARRCC	Level 3	362 (9%)	369 (9.2%)	282 (7%)	1013 (25.1%)
	Level 2	594 (14.8%)	301 (7.5%)	175 (4.3%)	1070 (26.6%)
	Level 1	1482 (36.8%)	318 (7.9%)	144 (3.6%)	1944 (48.3%)
	Total (%)	2438 (60.5%)	988 (24.5%)	601 (14.9%)	4027 (100%)

Table 7b. Distribution of inmates on the CMDS using the PARRCC and the LSI-R

		LSI-R (n/%)			
		LOW *Low/Medium-Low*	MEDIUM *Medium*	HIGH *Medium-High/High*	Total (%)
PARRCC	Level 3	64 (1.6%)	295 (7.3%)	654 (16.2%)	1013 (25.1%)
	Level 2	185 (4.6%)	400 (9.9%)	485 (12%)	1070 (26.6%)
	Level 1	880 (21.9%)	645 (16%)	419 (10.4%)	1944 (48.3%)
	Total (%)	1129 (28%)	1340 (33.3%)	1558 (38.7%)	4027 (100%)

By comparison, the LSI-R categorised more people in the high risk category (38.7%; n=1558). Placements in the low and medium categories of the LSI-R were 28% (n=1129) and 33.3% (n=1340) of the sample respectively (Table 7b).

At the time of evaluation, CCM policy specified that individuals in the CMDS tiers Level 1/Low and Level 2/Low would be supervised at the same (lowest) level of intensity. Using the PARRCC in conjunction with the Custody TRAS categorised more than half of people in the sample into these tiers (51.6%; n=2076) (Table 7a). Meanwhile, using PARRCC in combination with the LSI-R categorised about a quarter of the assessed individuals in tiers Level 1/Low and Level 2/Low (26.5%; n=1065) (Table 7b).

On the other hand, using the PARRCC and Custody TRAS placed only 7% (n=282) of the sample into CMDS tier Level 3/High, where the highest level of supervision intensity is required (Table 7a). When using the PARRCC and the LSI-R, this was 16.2% (n=654) (Table 7b). This indicates that more than twice as many people were classified as requiring the highest level of service when using the PARRCC and LSI-R to determine CMDS tier, compared to when using the PARRCC and Custody TRAS.

CONCLUSIONS

The PARRCC and its earlier iterations represent a key feature of the CCM model and innovation in how people in custody are managed by CSNSW. The tool has been developed to assess a range of case management needs, including domains that previously received little formal assessment, such as adjustment to the custodial environment and responsivity issues. Recent CCM policy has also aligned use of the tool with automated assessments of risk (the Custody TRAS) when assigning people to intensity of case management intervention, as represented by tiers of the CMDS. This has allowed for efficiency gains relative to manualised risk assessment such as the LSI-R.

Since its development, the PARRCC has undergone large scale implementation at the population level. For example, over the study period of approximately 6 months, more than 4500 PARRCC assessments were administered. Given the critical importance of the PARRCC to CCM operations, this study set out to examine its psychometric properties and implications for allocating people in

custody to different case management intensity through the CMDS.

The results of this study indicate that the PARRCC exhibits some psychometric limitations that may affect its application to the CMDS, and CCM operations more generally. A relatively consistent pattern of findings emerged to suggest that PARRCC total scores may not be a strong overall index of an individual's needs, as assessed by items in the tool. PARRCC total scores tended to be most strongly associated with the Criminogenic Needs and Reintegration factors, which in turn were also highly correlated. When considered in conjunction with distributions of scores on these factors, as well as the disproportionately large number of PARRCC items in these factors, there is the implication that these domains account for the majority of variance in PARRCC total scores.

In contrast, other factors tended to make relatively small contributions to the distribution of total scores. Scores on the Adjustment, Responsivity and Communication domains were highly skewed and non-normal, with large proportions of individuals scored as having low needs in these areas. In addition, the Communication factor had a non-significant association with PARRCC total scores as well as very weak and negative associations with most of the other factor scores. One potential explanation for this is that people in custody who have communication needs also tend to exhibit relatively low recidivism risk or needs in other domains; similar patterns have previously been observed in relation to Culturally and Linguistically Diverse (CALD) offenders in NSW (Howard & Lobo, 2020). Alternatively, communication needs could serve to impede accurate assessment of the individual's other needs. In any case, the results of this study indicate that increasing need on the Communication domain of the PARRCC may coincide with no change or potentially reductions in global measures of need.

An implication is that allocation to overall intensity of service delivery according to CMDS category is likely to be largely determined by specific clusters of needs, especially those represented in the Criminogenic Needs and Reintegration factors, rather than others. For example, there is a low statistical probability that someone with severe adjustment and responsivity needs, but relatively low criminogenic needs, would be assessed by the PARRCC as having high global needs. In this case, they may be considered a low priority for case management and potentially miss out on interventions that are suitable to these domain-specific needs.

A related observation is that PARRCC total scores showed substantial covariance with measures of recidivism risk, including the Custody TRAS and the LSI-R. This is not necessarily problematic in isolation, given that a central principle of the RNR model is to prioritise higher risk offenders for more intensive intervention (e.g., Andrews & Bonta, 2010). However, a consequence is that both measures currently used to assign people in custody to intensity of service delivery on the CMDS, being PARRCC total and the Custody TRAS, are highly correlated. While these measures tap into different constructs of needs and risk, the correspondence between them introduces a degree of redundancy into the two-factor structure of the CMDS, and suggests that any given individual's allocation on the CMDS is largely determined by a single dimension of risk.

It is consistent with the above findings that CFA modelling and other reliability analyses showed the current factorial structure of the PARRCC may not adequately represent the constructs that are assessed by the tool. Low internal consistency was especially observed among the Adjustment, Responsivity and Communication factors. The Criminogenic Needs and Reintegration factors appeared to have better internal consistency, which could have been due to a higher number of items

representing these factors compared to that of the other factors. In addition, a number of items from all PARRCC factors showed issues relating to weak item-factor loadings (i.e., items were not reliable indicators of their respective factor), cross-loading across factors (i.e., items measure more than one construct they were supposed to measure), and poor psychometric properties.

As a result, some of the PARRCC factors may be better conceptualised as clusters of individual needs as opposed to a single and coherent construct of need. This may have unintended consequences when scores for specific PARRCC factors are used for distinct case management phases or activities. For example, reserving all needs currently represented in the Reintegration factor for pre-release interventions may impede other case management processes, if those needs better reflect adjustment or responsivity factors that require more immediate support.

With regards to the CMDS, our results suggest that the PARRCC constitutes an improvement in how people in custody are triaged to overall intensity of service delivery relative to the PARRS. Distribution of the study sample across PARRCC categories in the CMDS showed substantially greater variance compared to those observed for the PARRS in previous operational reviews.

This improvement to CMDS distribution has been somewhat offset by new definitions of risk according to the Custody TRAS, which tends to assign people to lower priority categories. We found that using the PARRCC in conjunction with the Custody TRAS to determine CMDS allocation resulted in larger proportions of the sample being assigned to the lowest intensity supervision, and substantially fewer being assigned to high intensity supervision, compared to using the PARRCC in conjunction with the LSI-R. It is noted that unlike the LSI-R, the predicted probability of returning to custody assessed by the Custody-TRAS is not normally distributed. As a result, it may not be statistically or conceptually valid to assign relative risk indices such as 'medium' or average risk of recidivism to central points in the range of scores on the Custody-TRAS. Further calibration of how ranges of Custody-TRAS scores correspond to CMDS tiers has important implications for which individuals are prioritised for case management, in addition to CCM caseload and population demand for programs and services more broadly.

We note that the current study is limited, in that it evaluates the PARRCC as it pertained to CCM policy and procedures that were current at the time of commencing the study (June 2019). As such the results do not account for changes to the PARRCC and CCM operations occurring subsequent to this time. We also acknowledge that this study assesses the performance and reliability of the PARRCC from a primarily statistical standpoint. Of course, it is necessary that such statistical findings are balanced by theoretical and operational considerations about which service needs are important and how they correspond with other needs and intervention pathways.

Notwithstanding the observed limitations, the PARRCC represents a number of positive developments in case management of people in custody by systematically assessing their needs across multiple domains, and applying an understanding of these needs to formulations of service delivery intensity. The contribution of this tool to CCM operations may be further improved by ongoing psychometric development, as well as clear conceptual frameworks surrounding which items are included in the tool and how PARRCC total and factorial scores are applied to case management decision making.

REFERENCES

Adams, K. (1992). Adjusting to prison life. *Crime and Justice: Review of Research*, *16*, 275–360.

Andrews, D. A., & Bonta, J. (1995). *Level of Supervision Revised (LSI-R): An offender assessment system. User's guide.* Toronto, ON: Multi-Health Systems.

Andrews, D. A., & Bonta, J. (2010). *The psychology of criminal conduct* (5th edition). New Providence, NJ: Matthew Benmder & Company.

Arnold, B. C., Balakrishnan, N., Castillo, E., & Sarabia, J. M. (2006). *Advances in distribution theory, order statistics, and inference (online book)*. Birkhäuser Boston.

Baldry, E., McDonnell, D., Maplestone, P., & Peeters, M. (2006). Ex-prisoners, homelessness and the state in Australia. *Australian & New Zealand Journal of Criminology*, *39*(1), 20–33.

Baldry, E., & Sotiri, M. (2013). Social Work and Prisons. In R. S & A. Day (Eds.), *Social Work in the Shadow of the Law* (4th edition, pp. 80–95). Leichhardt: Federation Press.

Bentler, P. M., & Chou, C. (1987). Practical issues in structrural modelling. *Sociological Methods and Research*, *16*(1), 78–117.

Bian, H. (2012). *Structural equation modelling using AMOS*. Office for Faculty Excellence, University of Technology of Sydney.

Blunch, N. J. (2013). *Introduction to structural equation modelling using IBM SPSS Statistics and AMOS*. Los Angeles: Sage.

Bonta, J., & Andrews, D. A. (2016). *The psychology of criminal conduct* (6th edition). Routledge, Taylor & Francis Group.

Borzycki, M., Baldry, E., & Makkai, T. (2003). *Promoting integration: The provision of prisoner post-release services*. *Trends & Issues in Crime and Criminal Justice*. Australian Institute of Criminology.

Bushnell, A. (2017). *Australia's criminal justice costs: An international comparison*. Melbourne, VIC.

Byrne, B. (2005). Factor analytic models: Viewing the structure of an assessment instrument from three perspectives. *Journal of Personality Assessment*, *85*(1), 17–32.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd edition). Hillside, NJ: Lawrence Earlbaum Associates.

Cortina, J. M. (1993). What is Coefficient Alpha? An examination of theory and applications. *Journal of Applied Psychology*, *78*(1), 98–104.

Cronbach, L. J., & Meehl, P. E. (1955). Construct validity in psychological tests. *Psychological Bulletin*, *52*(4), 281.

Ding, L., Velicer, W. F., & Harlow, L. L. (1995). Effects of estimation methods, number of indicators per factor and improper solutions on structural equation modelling fit indices. *Structural Equation Modelling*, *2*(2), 119–144.

Goncalves, L. C. (2014). *Inmate adjustment to prison and correctional practices: Explaining institutional infractions , health care utilization, and coping strategies.* Unpublished Doctoral Thesis. Portugal: Universidade do Minho.

Grunseit, A., Forell, S., & McCarron, E. (2008). *Taking justice into custody: The legal needs of prisonerse*. Sydney, NSW: Law and Justice Foundation of New South Wales.

Healey, K. M. (1999). *Case management in the criminal justice system*. U.S. Department of Justice, Office of Justice Programs, National Institute of Justice.

Howard, M., & Lobo, J. (2020). *Access to programs and services among Culturally and Linguistically Diverse (CALD) offenders: The case of EQUIPS*. Sydney, NSW: Corrective Services NSW.

¶Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, *6*, 1–55.

Jiang, S., & Winfree Jr, L. T. (2006). Social support, gender, and inmate adjustment to prison life. *The Prison Journal*, *86*(1), 32–55.

Joreskog, K. G., & Aish, A. M. (1990). Structural modelling by example: Application in educational, sociological and behavioural research. *Contemporary Psychology*, *35*, 687–688.

Kim, H., & Millsap, R. (2014). Using the Bollen-Stine bootstrapping method for evaluating approximate fit indices. *Multivariate Behaviour Research*, *49*(6), 581–596.

Kolenikov, S., & Bollen, K. A. (2012). Testing negative error variances: Is a Heywood case a symptom of misspecification? *Sociological Methods & Research*, *41*(1), 124–167

Krebsbach, C. M. (2014). *Bootstrapping with small samples in structural equation modelling: Goodness of fit and confidence intervals*. Unpublished Master Thesis. The United States: University of Rhode Island.

Lei, P., & Wu, Q. (2007). Introduction to structural equation modeling: Issues and practical considerations. *Instructional Topics in Educational Measurement*, (Fall), 33–43.

McDonald, R. P. (1985). *Factor analysis and related methods.* NJ.: Lawrence Erlbaum.

Nevitt, J., & Hancock, G. R. (2001). Performance of bootstrapping approaches to model test statistics and parameter standard error estimation in structural equation modeling. *Structural Equation Modeling*, *8*(3), 353–377.

Newsom, J. (2018). Some clarifications and recommendations on fit indices. *Structural Equation Modelling*, (Spring), 1–4.

NSW Auditor-General. (2017). *Performance Audit: Therapeutic prgorams in prisons*. Sydney, NSW.

Operational Performance Review Branch. (2014). *Gaol based case management: Thematic review*. Sydney, NSW: Corrective Services NSW.

Panayides, P. (2013). Coefficient Alpha: Interpret with caution. *Europe Journal of Psychology*, *9*(4), 687–696.

Raudino, A., Corben, S., Galouzis, J., Mahajan, Y., & Howard, M. (2019). The Custody Triage Risk Assessment Scale (Custody TRAS): An updated statistical model for predicting risk of return to custody. Sydney, NSW: Corrective Services NSW.

Russo, J., Woods, D., Shaffer, J. S., & Jackson, B. A. (2017). *Caring for those in custody: Identifying high-priority needs to reduce mortality in correctional facilities*. Santa Monica, CA: RAND Corporation.

Schreiber, J. B., Stage, F. K., King, J., Nora, A., & Barlow, E. A. (2006). Reporting structural equation modelling and confirmatory factor analysis results: A review. *Journal of Education Research*, *99*(6), 323–337.

Shek, D. T. L., & Yu, L. (2014). Use of structural equation modeling in human development research. *International Journal on Disability and Human Development*, *13*(2), 157–167.

Tran, N. L., Howard, M., Chong, C. S., & Corben, S. (2020). *Process evaluation of custodial case management: Case plans*. Sydney, NSW: Corrective Services NSW.

Van Driel, O. P. (1978). On various causes of improper solutions in maximum likelihood factor analysis. *Psychometrika*, *43*(2), 225–243.

Walker, D. A., & Smith, T. J. (2017). Computing robust , bootstrap-adjusted fit indices for use with nonnormal data. *Measurement and Evaluation in Counseling and Development*, *50*(1–2), 131–137.

Watkins, I. (2011). *The utility of Level of Service Inventory-Revised (LSI-R) assessments within NSW correctional environments*. Sydney, NSW: Corrective Services NSW.

APPENDIX 1

Internal consistency of PARRCC factors

Adjustment: Cronbach's Alpha = .596

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Item 6	1.25	2.61	.37	.16	.533
Item 7	1.43	3.09	.26	.08	.590
Item 8	1.56	3.36	.32	.12	.565
Item 9	1.08	2.35	.46	.25	.478
Item 10	1.45	3.05	.41	.19	.522

Responsivity: Cronbach's Alpha =.621

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Item 4	1.90	4.68	.34	.199	.587
Item 5	2.02	5.22	.27	.154	.622
Item 11	1.82	4.69	.23	.053	.631
Item 13	1.36	2.95	.53	.367	.471
Item 27	1.37	2.77	.59	.40	.422

Reintegration: Cronbach's Alpha = .835

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Item 2	6.85	36.54	.32	.24	.839
Item 3	6.71	33.84	.52	.39	.822
Item 15	6.49	30.68	.61	.40	.811
Item 17	6.12	31.12	.55	.33	.819
Item 18	6.50	32.97	.58	.67	.815
Item 19	6.55	32.74	.63	.68	.811
Item 20	6.14	30.39	.59	.39	.814
Item 21	6.40	31.46	.56	.35	.816
Item 24	6.06	31.29	.57	.35	.816

Criminogenic Needs: Cronbach's Alpha = .866

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Item 14	10.76	46.08	.48	.24	.863
Item 16	10.43	43.95	.64	.45	.848
Item 22	10.09	44.01	.54	.36	.858
Item 23	9.81	42.06	.65	.44	.847
Item 25	10.31	44.55	.52	.36	.860
Item 26	10.44	43.14	.69	.53	.843
Item 28	10.10	42.74	.59	.38	.853
Item 29	10.76	45.77	.60	.47	.853
Item 30	10.56	42.996	.71	.58	.842

Communication: Cronbach's Alpha =.631

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Item 1	.20	.29	.46	.213	.
Item 12	.14	.27	.46	.213	.

APPENDIX 2

Individual parameters of the estimated PARRCC model

Below are the individual parameters of the estimated PARRCC model together with their corresponding 90% bias-corrected confidence interval. The traditional corresponding p-values of the two-sided tests are also included and all significant at .001 level. All statistics were obtained from 5000 bootstrapped replications through naïve bootstrap procedure in AMOS.

2a. Factor loadings (standardised regression weights)

Item		Factor	Value	Lower	Upper	p
5	<---	Responsivity	0.27*	0.23	0.31	0.00
11	<---	Responsivity	0.27*	0.24	0.30	0.00
7	<---	Adjustment	0.30	0.26	0.35	0.00
2	<---	Reintegration	0.32	0.28	0.35	0.00
4	<---	Responsivity	0.37	0.33	0.40	0.00
8	<---	Adjustment	0.42	0.38	0.47	0.00
6	<---	Adjustment	0.48	0.44	0.51	0.00
14	<---	Crim. Needs	0.51	0.49	0.53	0.00
3	<---	Reintegration	0.51	0.48	0.54	0.00
25	<---	Crim. Needs	0.55	0.53	0.57	0.00
10	<---	Adjustment	0.56	0.52	0.59	0.00
17	<---	Reintegration	0.58	0.56	0.61	0.00
21	<---	Reintegration	0.59	0.56	0.61	0.00
22	<---	Crim. Needs	0.59	0.57	0.61	0.00
24	<---	Reintegration	0.60	0.58	0.62	0.00
15	<---	Reintegration	0.62	0.59	0.64	0.00
28	<---	Crim. Needs	0.65	0.64	0.67	0.00
12	<---	Comm.	0.66	0.61	0.69	0.00
9	<---	Adjustment	0.66	0.63	0.69	0.00
23	<---	Crim. Needs	0.67	0.66	0.69	0.00
29	<---	Crim. Needs	0.68	0.66	0.69	0.00
13	<---	Responsivity	0.69	0.67	0.71	0.00
20	<---	Reintegration	0.69	0.68	0.71	0.00
1	<---	Comm.	0.71	0.67	0.75	0.00
16	<---	Crim. Needs	0.71	0.69	0.73	0.00
18	<---	Reintegration	0.72	0.69	0.75	0.00
26	<---	Crim. Needs	0.72	0.70	0.74	0.00
19	<---	Reintegration	0.75	0.72	0.78	0.00
30	<---	Crim. Needs	0.79	0.77	0.80	0.00
27	<---	Responsivity	0.85	0.84	0.87	0.00

Note. * Items with particularly poor factor loading (<.30).

2b. Squared multiple correlations

Item	Estimate	Lower	Upper	p
5	0.07*	0.05	0.09	0.00
11	0.07*	0.06	0.09	0.00
7	0.09*	0.07	0.12	0.00
2	0.10*	0.08	0.12	0.00
4	0.14*	0.11	0.16	0.00
8	0.18*	0.14	0.22	0.00
6	0.23*	0.19	0.26	0.00
14	0.26*	0.24	0.28	0.00
3	0.26*	0.23	0.29	0.00
25	0.30	0.28	0.33	0.00
10	0.31	0.27	0.35	0.00
17	0.34	0.31	0.37	0.00
21	0.34	0.32	0.37	0.00
22	0.35	0.33	0.38	0.00
24	0.36	0.33	0.39	0.00
15	0.38	0.36	0.41	0.00
28	0.43	0.40	0.45	0.00
12	0.43	0.38	0.48	0.00
9	0.44	0.39	0.48	0.00
23	0.45	0.43	0.48	0.00
29	0.46	0.43	0.49	0.00
13	0.48	0.45	0.51	0.00
20	0.48	0.46	0.51	0.00
1	0.50	0.45	0.55	0.00
16	0.51	0.48	0.53	0.00
26	0.52	0.49	0.54	0.00
18	0.52	0.47	0.57	0.00
19	0.56	0.51	0.60	0.00
30	0.62	0.59	0.64	0.00
27	0.73	0.69	0.76	0.00

Note. * Items with particularly poor squared multiple correlation (<.30).

2c. Modification indices for regression weights

Item	Original factor	Factor cross-loaded on	MI	EPCV
5	Responsivity	Adjustment	20.17	0.09
13	Responsivity	Adjustment	24.49	−0.24
2	Reintegration	Adjustment	54.19*	0.33
4	Responsivity	Adjustment	66.60*	0.26
13	Responsivity	Crim. Needs	24.42	−0.07
19	Reintegration	Crim. Needs	29.05	−0.07
8	Adjustment	Crim. Needs	37.54	0.05
11	Responsivity	Crim. Needs	44.09	0.08
20	Reintegration	Crim. Needs	63.11*	0.14
16	Crim. Needs	Responsivity	20.70	0.07
15	Reintegration	Responsivity	26.87	−0.09
20	Reintegration	Responsivity	30.82	0.11
26	Crim. Needs	Comm.	21.00	−0.07
18	Reintegration	Comm.	22.54	0.06
29	Crim. Needs	Comm.	23.39	0.07
23	Crim. Needs	Comm.	32.81	−0.11
4	Responsivity	Comm.	34.10	−0.06
27	Responsivity	Comm.	41.21	−0.09
16	Crim. Needs	Comm.	43.60	0.10
22	Crim. Needs	Comm.	61.06*	−0.16
11	Responsivity	Comm.	64.73*	−0.09
13	Responsivity	Comm.	221.43*	0.23
22	Crim. Needs	Reintegration	32.26	0.14
11	Responsivity	Reintegration	65.66*	0.12

Note. * Items with particularly high modification index for regression weight (>50), and thus possible sources of model misspecification.

2d. Modification indices for covariances

Indicators		Indicators	MI	EPCV
e29	<-->	e16	81.73	0.09
e24	<-->	e17	83.87	0.14
e29	<-->	e22	91.45	−0.12
e20	<-->	e28	97.23	0.15
e21	<-->	e19	110.30	−0.10
e21	<-->	e17	112.82	0.16
e24	<-->	e21	117.59	0.16
e3	<-->	e6	125.05	0.09
e18	<-->	e17	130.79	−0.13
e25	<-->	e22	135.60	−0.19
e24	<-->	e19	139.21	−0.12
e26	<-->	e23	141.16	0.15
e29	<-->	e26	149.14	−0.12
e21	<-->	e22	152.18	0.19
e24	<-->	e18	153.65	−0.13
e19	<-->	e17	164.18	−0.13
e1	<-->	e13	208.19	0.08
e21	<-->	e18	288.64	−0.18
e15	<-->	e3	292.11	0.20
e26	<-->	e25	302.32	0.23
e30	<-->	e29	311.14	0.15
e2	<-->	e6	318.87	0.14
e5	<-->	e4	433.11	0.06
e3	<-->	e2	715.50	0.24
e19	<-->	e18	1995.63	0.31

Other CRES Research Titles

March 2021	Evaluation of High Intensity Programs Units (HIPUs): Implementation of an innovative intervention model for offenders with short custodial sentences
March 2021	Women in prison: An examination of the support needs of women in custody with children
Feb 2021	The Initial Transitional Support (ITS) program: A profile of offender participation and service delivery
Oct 2020	Automated assessment of sexual recidivism risk for custody-based sex offenders
Oct 2020	The predictive validity of general risk assessment tools for offence-specific recidivism among domestic violence offenders
Oct 2020	Access to programs and services among Culturally and Linguistically Diverse (CALD) offenders: The case of EQUIPS
Oct 2020	Process evaluation of Custodial Case Management: Case plans
Aug 2020	Understanding the spectrum of domestic violence: Risk factors, treatment pathways and recidivism among offenders who commit intimate partner or non-intimate partner violence
Aug 2020	Process evaluation of the High Intensity Program Units (HIPUs): Within-treatment change
Aug 2020	Evaluation of the Practice Guide for Intervention (PGI): Relationship between offender needs and PGI use in case planning and supervision practice
Dec 2019	Effectiveness of the Initial Transitional Support (ITS) Service 2014-2017
Sept 2019	Evaluation of EQUIPS treatment pathways for domestic violence offenders in New South Wales
Sept 2019	Process evaluation of the Practice Guide for Intervention (PGI): Staff experiences of implementation and continuing service delivery
Sept 2019	Desistance in an ageing inmate population: An examination of trends in age, assessed risk of recidivism and criminogenic needs
Aug 2019	The Custody Triage Risk Assessment Scale (Custody TRAS): An updated statistical model for predicting risk of return to custody
May 2019	Effects of the Practice Guide for Intervention (PGI) on behaviour change intervention dosage among community-based offenders
May 2019	Blending care and control in delivery of the Practice Guide for Intervention (PGI): An assessment of the quality of dual role relationships between offenders and supervising officers in the community
Feb 2019	Process evaluation of the Practice Guide for Intervention (PGI): Staff perceptions of community supervision in the context of change
Oct 2018	The Community Triage Risk Assessment Scale: A Statistical model for predicting recidivism among community-based offenders
Aug 2018	Assessing offender change over treatment: The influence of treatment context on self-reported antisocial attitudes
Aug 2018	Forty is the new thirty (for recidivism): Trends in offender age, reimprisonment, and time to desistance among NSW custodial population
Aug 2018	The Criminal Reimprisonment Estimate Scale (CRES): A Statistical model for predicting risk of reimprisonment
Aug 2017	Evaluation of vocational training in custody: Offenders' experiences of training and pathways to post-release employment
Aug 2017	Evaluation of vocational training in custody: Relationships between Training, Post-Release Employment and Recidivism
Dec 2017	The Case Quantify and Search Tool (C-QST)

Research Bulletin No.49
ISSN 2207 0850

Corrections Research, Evaluation & Statistics
Governance & Continuous Improvement
Corrective Services NSW
GPO Box 31
Sydney NSW Australia
Telephone: (02) 8346 1556
Email: research.enquiries@justice.nsw.gov.au