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**Version** Post-print/Accepted Manuscript


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The Relationship between Risk, Criminogenic Need, and Recidivism for Indigenous Justice-Involved Youth

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Authors’ Note: This article is based on Ilana Lockwood’s master’s thesis. The research was conducted at the Children’s Centre Thunder Bay and the Ontario Institute for Studies in Education, University of Toronto. This research was supported by a grant from the Aboriginal Justice Directorate, Department of Justice Canada to the first and second authors. The authors would like to express their deep appreciation to Kathy Underhill of the Program Effectiveness, Statistics and Applied Research Unit of the Ontario Ministry of Community Safety and Correctional Services and Mr. Justice Brian Weagant of the Ontario Court of Justice for their contributions to this study. Correspondence concerning this article should be addressed to Michele Peterson-Badali, Department of Applied Psychology & Human Development, Ontario Institute for Studies in Education, University of Toronto, 252 Bloor Street West, 12th floor, Toronto, Ontario, Canada M5S 1V6; e-mail: m.petersonbadali@utoronto.ca.

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Abstract

The Risk-Need-Responsivity framework is widely used to guide the case management of justice-involved youth, but little research is available on its applicability to Indigenous populations. In the present study, we examined how standardized risk assessment, identification of criminogenic needs, and receipt of need-targeted programming related to recidivism in a sample of 70 Indigenous and non-Indigenous youth. The two groups did not differ on overall level of risk, number of needs, match to services, or recidivism rates. However, Indigenous youth were evaluated as higher risk in peer and leisure functioning, more likely to have needs related to education and leisure, and less likely to receive adequate peer-specific intervention. In both groups, risk assessment predicted recidivism, while match to services predicted days to reoffense. High rates of mental health issues and associated services were observed in both groups. Implications of these findings for research and practice with Indigenous youth are discussed.

Key Words: Indigenous, Youth, Recidivism, Justice, Rehabilitation, Risk-Need-Responsivity
The Relationship between Risk, Criminogenic Need, and Recidivism for Indigenous Justice-Involved Youth

The overrepresentation of Indigenous people in the criminal justice system is a longstanding and ongoing issue in Canada (Jeffries & Stenning, 2014; La Prairie, 2002; RCAP, 1996; Rudin, 2005) and elsewhere in the world (e.g., Australia - Trotter, Baidawi, & Evans, 2015; New Zealand - Department of Corrections, 2007). While the situation appears less acute in the United States, federal sentencing of Indigenous individuals rose by more than 25% from 2009 to 2013 and in some regions Indigenous adults represent over half of federal offender caseloads (United States Sentencing Commission, 2013). This pattern of overrepresentation applies to the juvenile justice systems in these countries as well (Duncan, 2009; Hartney, 2008; Milligan, 2008). In Canada in 2015-2016, Indigenous youth constituted 35% of youth admitted to the correctional system, despite representing only 7% of youth in the nine reporting jurisdictions (Malakieh, 2017). Similarly, over the same period in Australia, Indigenous youth represented roughly 6% of the population, but constituted 48% of youth under justice supervision (Schlumpp & Ivanovici, 2017).

The cause of this overrepresentation is multifaceted and complex. Research has examined societal variables, such as access to social services and social disadvantage (Department of Corrections, 2007), systemic variables, such as policing practices (Comack, 2012; Linden, 2005) and sentencing decisions (Rudin & Zimmerman, 2014; Welsh & Ogloff, 2008), and individual or family circumstances (Corrado, Kuehn, & Margaritescu, 2014) as potential contributing factors. All of these variables, in turn, can be linked to the legacy of colonization and the attendant confiscation of Indigenous lands, devastation of Indigenous economies and political structures, fragmentation of Indigenous families, and suppression of Indigenous worldviews and traditions.
While this line of investigation is critical in preventing justice system involvement, it is equally vital to provide effective and equitable services to the consistently and disproportionately high number of Indigenous individuals already caught in the system. In Canada, where 89% of all justice-involved youth in 2015-2016 were under community supervision (Malakieh, 2017), probation is the most widely impactful context for rehabilitation.

The rehabilitation that both Indigenous and non-Indigenous youth receive follows the well-researched Risk-Need-Responsivity (RNR) model, developed by Andrews, Bonta and Hoge (1990), which provides an evidence-based and effective framework for preventing recidivism. The risk principle states that as risk to reoffend increases, so should intensity of intervention. The need principle asserts that interventions should target individual-level characteristics that are related to offending. These criminogenic needs (strong and direct predictors of reoffending) should be the intermediate targets of change, as opposed to noncriminogenic needs (weak and/or indirect predictors of reoffending; Andrews & Bonta, 2010). Eight criminogenic needs have been established as strong predictors of recidivism within the RNR model: Criminal History, Family Circumstances/Parenting, Education/Employment, Peer Relations, Substance Abuse, Leisure/Recreation, Personality/Behavior, and Attitudes/Orientation. Of the eight domains, seven represent dynamic criminogenic needs while one (history of criminal conduct) is static. Dynamic needs are amenable to change and therefore potential targets of intervention; by contrast, criminal history cannot alter or be addressed through treatment (Andrews & Bonta, 2010). Finally, the responsivity principle holds that, in order to optimize effectiveness of services directed at criminogenic needs, interventions should be evidence-based (general responsivity principle) and tailored to individual traits and circumstances (specific responsivity principle; Bonta, 1995).
Although the RNR framework has considerable empirical support (Andrews & Bonta, 2010), research on the applicability of RNR-based risk assessment tools to Indigenous youth is scarce. Most of the research that has been conducted primarily involves the Level of Service (LS) series of risk/need scales (Andrews & Bonta, 2010), including the Level of Service – Revised (LSI-R; Andrews & Bonta, 1995), Level of Service – Ontario Revision (LSI-OR; Andrews, Bonta, & Wormith, 1995), Level of Service/Case Management Inventory (LS/CMI; Andrews, Bonta, & Wormith, 2004), the Youth Level of Service/Case Management Inventory (YLS/CMI; Hoge & Andrews, 2011), the Level of Service Inventory – Saskatchewan Youth Edition (LSI-SK; Andrews, Bonta, & Wormith, 2001), and the Australian Adaptation of the Youth Level of Service/Case Management Inventory (YLS/CMI-AA; Hoge & Andrews, 1995).

The few studies conducted to date on the YLS/CMI and its derivatives in Canada indicate that Indigenous youth have significantly higher total risk scores (Jung & Rawana, 1999; Luong & Wormith, 2011; Olver, Stockdale, & Wong, 2012) and higher recidivism rates (Jung & Rawana, 1999; Luong & Wormith, 2011; Rojas & Gretton, 2007) than non-Indigenous youth. Compared to their non-Indigenous peers, Indigenous youth have been found to score higher on the specific risk domains of Substance Abuse, Leisure/Recreation, and Peer Relations (Jung & Rawana, 1999; Olver et al., 2012), as well as Criminal History and Education/Employment (Olver et al., 2012). Australian research has yielded similar findings, with significantly higher total risk scores and differences in domain-specific risk for Indigenous youth (Shepherd, Sing, & Fullam, 2015; Thompson & McGrath, 2012).

With respect to predictive validity, research from both Canada and Australia indicates that LS youth instruments significantly predict recidivism for Indigenous justice-involved youth (Jung & Rawana, 1999; Luong & Wormith, 2011; Olver et al., 2012; Olver, Stockdale, &
Wormith, 2009; Shepherd, et al., 2015; Thompson & McGrath, 2012), although there is some evidence that they may be less predictive for Indigenous youth than non-Indigenous youth (Luong & Wormith, 2011). Indeed, one recent Canadian study reported that the YLS/CMI underestimated reoffending in low and moderate risk Indigenous youth (Wilson, 2016). Other studies of Canadian Indigenous adults and youth in which the LSI series (i.e., LSI-R, LSI-OR, LS/CMI) significantly predicted recidivism had some subscales – including Criminal History, Attitudes/Orientation, and Substance Abuse – demonstrating lower predictive validity for Indigenous individuals (Gutierrez, Wilson, Rugge, & Bonta, 2013) and aggregate risk scores underestimating recidivism for Indigenous individuals classified as low risk (Wilson & Gutierrez, 2014; Wormith, Hogg, & Guzzo, 2015).

The use of risk assessment instruments that may not fully reflect the risk profile and treatment needs of Indigenous youth has serious implications. Critical criminologists argue that the higher risk scores reported for Indigenous youth (and adults) reflect the correctional justice system’s tendency to ‘responsibilize’ individuals (e.g., Hannah-Moffat, 2016) for systemic social problems and disadvantage (e.g., lack of educational opportunities and supports for healthy development). The argument continues that ‘standard’ risk instruments, which are developed and normed largely with Caucasian males, are products of – and therefore perpetuate – systemic oppression (Hannah-Moffat, 2013; Martel, Brassard, & Jacoud, 2011), while disregarding crucial cultural differences in how ‘deviance’ and distress is manifested (Shepherd, 2016). As a result, Indigenous individuals can be subjected to lengthier and more stringent sentencing conditions than their non-Indigenous counterparts. For these reasons, it is imperative to examine the extent to which risk factors identified in the RNR model apply to Indigenous youth.
There is preliminary evidence that factors outside the RNR model are important to consider for Indigenous individuals. In an Australian sample of Indigenous adults, a strong sense of cultural identity combined with cultural engagement (i.e., participation in traditional activities) predicted violent recidivism (Shepherd, Delgado, Sherwood, & Paradies, 2018). In a Canadian sample of Indigenous adults and youth, history of victimization and emotional problems were significant predictors of recidivism (Gutierrez et al., 2013). In another Canadian sample of Indigenous youth, spiritual support from a family member or Elder significantly predicted general recidivism, while spiritual support along with residence on reserve and low community-wellbeing predicted violent recidivism (Wilson, 2016). While the variables listed above are not unique to Indigenous justice-involved youth, they can be understood as uniquely related to the history of colonization that Indigenous peoples have experienced. At this early stage in the research, it is not certain whether they function as criminogenic needs or responsivity factors within a colonization-informed framework.¹

From this small body of literature, it is not clear whether risk assessment measures have equal predictive validity for Indigenous and non-Indigenous youth. Moreover, while it has been demonstrated that receiving intervention targeted at criminogenic needs predicts and reduces recidivism (Peterson-Badali, Skilling, & Haqanee, 2015; Vieira, Skilling, & Peterson-Badali, 2009), providing strong support for the rehabilitative efficacy of the RNR model, there is no research to date on whether this relationship holds for Indigenous youth. The present study aimed to attenuate the knowledge gaps around these important questions by examining 1) whether Indigenous and non-Indigenous youth differ significantly in terms of risk, number or type of criminogenic needs, extent to which identified needs are addressed through probation-
coordinated services (‘service match’), and rates of recidivism; and 2) whether risk scores and service match differentially predict recidivism for Indigenous and non-Indigenous youth.

In light of the research cited above, we predicted that Indigenous youth would score significantly higher on measures of overall risk on the YLS/CMI (Jung & Rawana, 1999; Luong & Wormith, 2011; Olver et al., 2012), as well as in the risk domains of Peer Relations, Substance Abuse, and Leisure/Recreation (Jung & Rawana, 1999; Olver et al., 2012); that they would have a greater number of criminogenic needs identified as requiring intervention, reflecting their greater social disadvantage (Hannah-Moffat, 2016); and that they would reoffend at significantly higher rates than non-Indigenous youth (Jung & Rawana, 1999; Luong & Wormith, 2011; Rojas & Gretton, 2007). We did not make a hypothesis about group differences in predictive accuracy of the YLS/CMI total risk score given the inconsistent findings of previous studies. (Jung & Rawana, 1999; Luong & Wormith, 2011; Olver et al., 2012; Olver et al., 2009; Wilson, 2016). However, across groups, we expected that higher total risk scores on the YLS/CMI would be associated with shorter time to reoffense, while a higher proportion of criminogenic needs addressed through service would be associated with longer time to reoffense.

Method

Participants

Data were obtained from the records of 70 youth (37 Indigenous, 33 non-Indigenous) who underwent a court-ordered assessment for sentencing purposes at a children’s mental health center in a city in northern Ontario, Canada, between 2005 and 2012; the sample comprised all court referrals received over this period (with the exception of 19 youth for whom data were missing), and is therefore representative of the justice-involved youth referred to the facility. The present study focused on the portion of youths’ sentences when they were under the case
management of a probation officer, including time spent in open custody and on probation.

Demographic and offense information, broken down by Indigenous and non-Indigenous status, is presented in Table 1. Consistent with overall gender differences in the youth justice system, there were more males than females in the sample, although the proportions did not differ significantly between the Indigenous and non-Indigenous groups. Because scarcity of services in remote areas has been well documented (Nuffield, 2003), information on place of residence was also gathered, which was overwhelmingly urban for the non-Indigenous group, while almost half of the Indigenous youth lived in rural areas (including isolated reserves). Rates of index offense type (based on the most serious offense for which youths were convicted at the sentencing relating to the assessment) did not differ between groups. As Table 1 shows, offenses were classified as administration of justice (e.g. failure to comply, escape from custody), nonviolent (e.g. damage to property, underage consumption of alcohol), violent nonsexual (e.g. robbery, assault), and sexual (e.g. sexual interference, sexual assault).

**Procedure**

Demographic (age, gender, ethnicity, rural residence, offense type, etc.), risk (total and domain scores from the Youth Level of Service/Case Management Inventory, described below), and criminogenic need information was obtained from youths’ court-ordered assessments. Assessments were conducted by a multidisciplinary team of social workers, psychologists, and psychiatrists using information from semi-structured interviews and standardized tests and questionnaires administered by team members, as well as existing records and reports. Assessment reports described each youth’s personal history (including family situation and educational context), current psychosocial functioning, risk to reoffend, criminogenic profile, and intervention needs. Clinicians formulated recommendations based on the totality of
assessment information. Thus, while the actuarial risk assessment (described below) was an important basis for recommendations, a risk score in a given domain did not automatically determine the presence or content of recommendations (e.g., despite a low score, the assessing clinician could consider a particular issue in this domain to be a critical point of intervention and make a recommendation accordingly).

Information about services received for treatment of identified criminogenic needs (i.e., the ‘service match’ variable) was obtained from probation case notes. Case notes are created by probation officers to document every contact with a youth or anyone connected to the youth (e.g., family, peers, educators, service providers, etc.), monitor a youth’s adherence to the conditions of his or her sentence, and track progress towards rehabilitation goals. Sentencing and recidivism data were also extracted from case notes and cross referenced with national police criminal records. The police records listed all convictions, in both the juvenile and adult systems, for each individual up to early 2016, while the case notes extended to the end of 2015, to provide information at least three years beyond the assessment dates.

**Measures and Coding**

**Youth Level of Service/ Case Management Inventory (YLS/CMI).** Risk to reoffend was assessed with the Youth Level of Service/Case Management Inventory (YLS/CMI; Hoge & Andrews, 2011), which has moderate to strong internal consistency and interrater reliability (Schmidt, Hoge, & Gomes, 2005). Parts I and II consist of a detailed 42-item survey of criminogenic needs according to the eight domains identified in the RNR framework. Each item is coded present or absent based on the assessment of a professional practitioner. Criminogenic need items within each of the eight domains are combined to provide a total risk score, which is categorized as low, moderate, high, or very high based on score ranges established in the
YLS/CMI manual (Hoge & Andrews, 2011). Responsivity variables (e.g., cognitive functioning, cultural and/or language issues) are coded from Part III of the YLS/CMI. One youth was missing the YLS/CMI score generated by the court ordered assessment, leaving a total sample of $n = 69$ for analyses involving risk variables.

**Criminogenic Need.** Each assessment report concluded with a summary and list of recommendations highlighting the youth’s needs and targets for intervention. In each of the seven dynamic criminogenic need domains, a need was coded as ‘present’ if it was mentioned anywhere in the conclusion section of the report or ‘absent’ if it was not mentioned anywhere in the summary or recommendations. Clinician-identified criminogenic need was explored separately from YLS/CMI scores in this way because, from a practical point of view, probation officers at the study site use the reports to guide their case management, and because, from a theoretical perspective, research has shown that offenders with similar risk scores can have very different need profiles (Taxman & Caudy, 2015). Interrater agreement for coding criminogenic needs was almost perfect (McHugh, 2012), with a Cohen’s Kappa of .96 ($p < .001$).

**Service Match.** ‘Service matching’ refers to the extent to which youths’ identified criminogenic needs were addressed (e.g., via specific programs, agencies, or probation case management). For each youth, each criminogenic need domain coded as ‘present’ was coded as ‘matched’ or ‘not matched’ based on information provided in probation officer case notes and following an established coding procedure (e.g., Peterson-Badali et al., 2015; Vieira et al., 2009; Vitopoulos, Peterson-Badali, & Skilling, 2012). This entailed a holistic assessment of service quantity (e.g., intensity of the treatment program, consistency of youths’ attendance) and quality (e.g., evidence-based, conducted by trained personnel). An identified need was coded as ‘not matched’ if there was no mention of intervention or case management activity, if intervention
was attempted but the youth attended few sessions, or if a youth had some case management or treatment that was not evidence-based. An identified need was coded as ‘matched’ if a youth participated consistently in programming (even if it was not considered ‘high quality’ – e.g., evidence based) or if a youth participated (even moderately) in evidence-based programming or case management. An ‘overall proportion match’ variable was also computed by dividing the number of matched domains by the total number of need domains identified as requiring service. For example, if a youth had four criminogenic need domains identified as requiring service and was coded as ‘matched’ for service in two of those domains, the overall service match score would be .50. Match data were missing for one youth, resulting in a sample of \( n = 69 \) for analysis with this variable. Interrater agreement for coding of service match was moderate (McHugh, 2012), with a Cohen’s Kappa value of .76 (\( p < .001 \)).

**Responsivity.** The high prevalence of traumatic experiences and PTSD among justice-involved youth (Abram, Teplin, Charles, Longworth, McClelland, & Dulcan, 2004; Moore, Gaskin, & Indig, 2013), along with their elevated rates of psychological disorders relative to the general population (Chitsabesan & Bailey, 2006; Vermeiren, 2003), make these critical considerations in an examination of juvenile offending and rehabilitation. Moreover, the high incidence of historical and ongoing trauma among Indigenous peoples relative to the general population (Bellamy & Hardy, 2015) makes this an especially significant variable. ‘Trauma’ and ‘other mental health issues’ were therefore included as separate responsivity factors. A responsivity factor was coded as ‘present’ if it was mentioned in the summary or recommendations of the assessment report and ‘absent’ if it did not appear. Trauma was deemed to have occurred if there was a) exposure to a traumatic event (i.e., specific mention of neglect, maltreatment, or abuse, including exposure to domestic violence and suicide of close family
members), or b) any reference to post-traumatic symptomatology (to capture the broad array of post-traumatic responses, including Complex PTSD, not captured by strict PTSD criteria; Herman, 1992). The ‘other mental health’ variable captured symptoms or diagnoses of depressive and anxiety disorders, eating disorders, neurodevelopmental disorders, schizophrenia spectrum and other psychotic disorders, as well as less severe but clinician-emphasized indicators of psychological distress (e.g., low self-esteem, feelings of shame/unworthiness, and numbing/suppression of emotion deemed to contribute to the youth’s pattern of behavior). Because the Personality/Behavior criminogenic need domain of the RNR model does encapsulate certain elements of mental health (including issues with attention, aggression, and self-regulation), any references to Attention-Deficit Hyperactivity Disorder (ADHD), Conduct Disorder (CD), Oppositional-Defiant Disorder (ODD), and related symptoms were coded there and not under responsivity. Determining match to services for both responsivity variables followed the same coding scheme outlined above (i.e., a binary match/no match designation based on the quantity and quality of services provided). Interrater agreement for coding of responsivity was moderate to strong (McHugh, 2012), with a Cohen’s Kappa value of .78 ($p < .001$) for recommendations and .82 ($p < .001$) for service match.

**Recidivism.** Recidivism data were extracted from a national police criminal records database and corroborated by probation case notes. A youth was considered to have reoffended if he/she was convicted within two years of the release date following the offense for which the court-ordered assessment was completed. For youth sentenced to secure custody, the release date was the date the youth completed his/her secure custody term. For all other youth, the release date was the date of sentencing. In addition, for youth who reoffended, a ‘days to reoffense’
variable was calculated by subtracting the release date from the reoffense date. Whether a youth reoffended and how long a youth took to reoffend were thus the dependent variables of interest.

**Analytic Strategies**

All analyses were conducted using IBM SPSS Statistics 24. We used independent samples t-tests and Chi-square tests to compare groups on demographic and offense characteristics. For Chi-square results where the cell count was below five, Fisher’s Exact test was reported. Independent t-tests were also used for comparisons of risk scores and service match between groups, while Chi-squares allowed us to calculate between-group differences on clinician-identified needs and responsivity factors. For more fine-grained analysis of group differences, two-way ANOVAs were run to examine the interaction between Indigenous status and place of residence on risk scores. Similarly, to rule out possible effects of rural/urban residence and Indigenous status on clinician-identified needs and service match, loglinear analyses were employed. To establish the relationship between our predictors of interest (risk level and service match) and recidivism, we used a Receiver Operating Characteristic analysis and hierarchical logistic regressions. When investigating whether risk level or service match predicted days to reoffense, preliminary analyses via Spearman’s rank correlations were followed by Cox regressions.

**Results**

**Comparing Indigenous and non-Indigenous Youth on Risk Variables and Recidivism**

As shown in Table 1, the recidivism (i.e., reconviction) rate for the entire sample was 68.6%, with 70.3% of Indigenous youth and 66.7% of non-Indigenous youth reoffending. For those youth who did reoffend, time to reoffense did not significantly differ by Indigenous status.

There was no significant difference between Indigenous and non-Indigenous youths’ total
risk score on the YLS/CMI (see Table 2), which fell in the moderate range for both groups and the sample as a whole. However, risk scores in the Peer Relations and Leisure/Recreation domains were significantly higher for Indigenous youth than for non-Indigenous youth and there was a trend in the same direction in the Substance Abuse domain. To test whether this effect was a function of – or interacted with – residency type (urban/rural), two-way ANOVAs, with Indigenous status and residency type as independent variables and Peer Relations and Leisure/Recreation domain scores as dependent variables, were run; there were no main effects of residency type and no significant residency x Indigenous status interactions for Peer Relations, \( F(1, 65) = 0.03, p = .86 \), or Leisure/Recreation, \( F(1, 65) = 0.09, p = .76 \). Since the group difference in the Substance Abuse domain approached significance, the same Indigenous status by residency type analysis was conducted for this variable; again, the interaction term was not significant, \( F(1, 65) = 0.06, p = .82 \).

**Addressing Criminogenic Needs (‘Service Match’)**

Of seven possible dynamic criminogenic need domains that could be identified as requiring service, Indigenous youth had close to six identified needs (\( M = 5.70, SD = 1.15 \)), whereas non-Indigenous youth had roughly five domains identified (\( M = 5.09, SD = 1.47 \)), \( t(68) = -1.95, p = .06 \). In terms of specific criminogenic need domains, a greater percentage of Indigenous youth than non-Indigenous youth had needs identified in the Education/Employment and Leisure/Recreation domains (see Table 3). Residency type was again examined alongside Indigenous status, given the disproportionately higher number of Indigenous youth from rural areas. Loglinear analyses revealed no significant interaction between Indigenous status, rural residence, and Education/Employment need, \( \chi^2(1) = 0.00, p = .96 \), and no significant interaction between Indigenous status, rural residence, and Leisure/Recreation need, \( \chi^2(1) = 1.12, p = .29 \).
Indigenous and non-Indigenous youth did not differ on number of needs addressed during probation, \( t(67) = 1.04, p = .30 \), with Indigenous youth \((M = 1.39, SD = 1.27)\) and non-Indigenous youth \((M = 1.73, SD = 1.42)\) having, on average, between one and two domains addressed through adequate intervention. Similarly, both groups had comparable overall proportions of identified needs matched, \( t(61) = 1.63, p = .11 \), with Indigenous youth getting about one quarter of their needs met \((M = 0.26, SD = .25)\) and non-Indigenous youth getting roughly one-third of their needs met \((M = 0.37, SD = .32)\). When service match was examined at the domain level, the only significant difference was in the Peer Relations domain, with a smaller proportion of Indigenous youth having their needs matched in this area than non-Indigenous youth, \( \chi^2 (1, N = 61) = 4.00, p = .05 \). Of the 34 Indigenous youth with an identified need in this domain, 27 did not receive sufficient services to address this need. Rural residency was not a contributing factor to this match disparity, with loglinear analysis revealing no significant interaction between Indigenous status, rural location, and Peer Relations match, \( \chi^2 (1) = 0.19, p = .66 \).

**Comparing Indigenous and non-Indigenous Youth on Responsivity Variables**

The two groups did not significantly differ in the proportion of youth with identified needs in trauma \( \chi^2 (1, N = 70) = 0.88, p = .35 \) or other areas of mental health \( \chi^2 (1, N = 70) = 1.22, p = .27 \), nor did they differ in the proportion of youth receiving services to address these factors (trauma: \( \chi^2 (1, N = 22) = 0.65, p = .42 \); mental health: \( \chi^2 (1, N = 44) = 0.70, p = .41 \)). It is important to highlight that, in keeping with the literature on justice system involvement and mental health, youth had high rates of traumatic experiences and psychological distress. Thirty-eight percent of the Indigenous youth and 27% of the non-Indigenous youth had trauma exposure
and/or symptomatology; 70% of the Indigenous youth and 58% of the non-Indigenous youth had diagnoses or symptoms of other psychological disorders.

Also of note is that other mental health needs received one of the highest rates of service matching: 54.5% of youth received treatment in this area. When compared to the proportion of youth who received services targeted at criminogenic needs, this is second only to the Personality/Behavior domain, where 56.9% of youth received intervention. In addition, there was a strong positive correlation between proportion of criminogenic needs matched and proportion of responsivity variables matched, \( r_s = .70, n = 48, p < .001 \).

**Predictors of Recidivism**

**Risk.**\(^5\) YLS/CMI total risk scores were higher for youth who reoffended \((M = 20.52, SD = 6.63)\) than for those who did not \((M = 15.38, SD = 8.28)\), \(t(67) = 2.74, p = .01\). To test the YLS/CMI’s predictive validity for the sample as a whole, a Receiver Operating Characteristic (ROC) analysis was conducted. The area under the curve (AUC) statistic was significant \((0.68, p = .02)\), indicating that the model classified the sample better than by chance; at a 95% confidence interval (CI), there was a 68% probability that a randomly selected recidivist would obtain a higher YLS/CMI score than a randomly selected non-recidivist \((CI \text{ range} = 0.53-0.83)\). When analyzed by group, the AUC statistics were not significant, likely due to small sample sizes, although the Indigenous group approached significance \((0.69, p = .08)\).

In order to examine whether the relationship between total risk and reoffense differed depending on Indigenous status, a hierarchical logistic regression was conducted with total YLS/CMI risk score entered at Step 1, Indigenous status entered at Step 2, and the interaction of risk score with Indigenous status entered at Step 3. Total risk score was the only significant predictor in the model, Wald \( \chi^2 (1) = 4.55, p = .03 \), odds ratio (OR) = 1.12, 95% CI = [1.01,

for every unit increase on the YLS/CMI, the odds of reoffending increased by 12%.

Indigenous status did not contribute significantly to the model and neither did the Indigenous status by total risk score interaction term.

We were also interested in days to reoffense among recidivists \((n = 48)\). Due to the non-parametric distribution of the data representing days in the community for the whole sample \((p = .004, \text{Shapiro-Wilk Test})\) and for both groups \((p < .05, \text{Shapiro-Wilk Test})\), the relationships between risk scores and days to reoffense were analyzed using Spearman’s rank-order correlation; none of the correlations were significant.

Service Match. At the trend level, the overall proportion of identified criminogenic needs matched during youths’ sentences was higher for youth who did not reoffend \((M = 40\%, \ SD = 32\%)\) than for those who did \((M = 27\%, \ SD = 27\%)\), \(t(67) = -1.73, p = .09\). To examine whether service matching predicted reoffending after taking risk into account, a hierarchical logistic regression was conducted, with youths’ Criminal History scores\(^6\) entered at Step 1, Indigenous status and overall proportion match entered at Step 2, and the interaction of overall proportion match with Indigenous status entered at Step 3. The overall model was not significant at any of the steps and none of the individual predictors were significant.

While the overall proportion of criminogenic needs matched did not predict whether a youth reoffended, within the group of recidivists, there was a strong positive correlation between overall proportion match and days to reoffense \((r_s = .50, n = 47, p = < .0001)\). Group-level analyses indicated that this effect was due to the Indigenous youth in the sample, for whom this positive relationship was strong and significant \((r_s = .64, n = 25, p = .001)\); the correlation for non-Indigenous youth was not significant \((r_s = .37, n = 22, p = .09)\). Overall proportion match was therefore examined alongside risk (using the Criminal History domain score) and Indigenous
status in a Cox regression with days to reoffense as the outcome variable. The model at Step 1, which included only the static risk (Criminal History) variable, did not significantly predict days to reoffense, $\chi^2(1, N = 68) = 1.56, p = .21$. The overall proportion match variable was added to Criminal History at Step 2, resulting in a significant model, $\chi^2(2, N = 68) = 5.84, p = .05$. The only significant predictor was overall proportion match, $\chi^2(1) = 4.50, p = .03$, OR = 0.31, 95% CI = [.10, .91], such that for every percentage increase in service match, a youth’s likelihood of reoffending decreased by 69%. The wide confidence interval indicates that this decreased likelihood of recidivism ranged from 9-90%, a degree of variability that may reflect the number of predictors in relation to the small sample size. Indigenous status was added at step 3, resulting in a non-significant model, $\chi^2(3, N = 68) = 6.02, p = .11$, although overall proportion match remained significant, $\chi^2(1) = 4.44, p = .04$, OR = 0.30, 95% CI = [.10, .92].

To determine whether receipt of services targeted at responsivity factors predicted recidivism, a hierarchical logistic regression was conducted with Criminal History entered at Step 1, overall proportion match entered at Step 2, proportion of responsivity needs met entered at Step 3, and a proportion of responsivity needs met by Indigenous status interaction term entered at Step 4. The model was not significant at any of the steps; in the final model, proportion of responsivity needs matched was not significant, Wald $\chi^2(1) = 3.12, p = .08$.

Exploring the correlation between match for responsivity factors and days to reoffense yielded a non-significant result, both for the sample as a whole and for recidivists alone. Analysis via Cox regression, with Criminal History, criminogenic needs match, and Indigenous status as covariates, confirmed this non-significant relationship; responsivity match did not contribute significantly to the model.

Discussion
The present study compared the risk assessment, criminogenic need profiles, and recidivism of Indigenous and non-Indigenous youth serving community sentences, and examined service match for criminogenic needs and for responsivity factors in these two groups. Results raise questions about how Indigenous youth and non-Indigenous youth differ on level of risk and type of criminogenic needs and how risk is defined and needs are manifested in an Indigenous context. In addition, certain needs were less likely to be addressed for Indigenous youth, which we link to the idea that the same criminogenic needs may be expressed differently in different populations. Finally, we discuss the predictive validity of RNR-based assessment and match to services, along with the implications of these findings for research and policy.

Comparing (and Disentangling) Risk, Criminogenic Need, and Responsivity

Indigenous and non-Indigenous youth did not significantly differ in terms of overall risk to reoffend, which runs contrary to previous findings (Jung & Rawana, 1999; Luong & Wormith, 2011; Olver, Stockdale, & Wong, 2012). However, when examined at the domain level, Indigenous youth did score significantly higher in the criminogenic domains of Peer Relations and Leisure/Recreation, which is consistent with prior research (Olver, Stockdale, & Wong, 2012; Jung & Rawana, 1999). In addition to higher scores in the domains discussed above, Indigenous youth in our sample were also significantly more likely to have clinician-identified needs in Education/Employment and Leisure/Recreation, a finding that was not related to where they lived (i.e., urban vs. rural communities).

Examined individually, these three areas—education, recreation, and peer relations—reflect broad, longstanding challenges facing Indigenous youth. First, the education gap between Indigenous and non-Indigenous Canadians has been described as one of the nation’s greatest public policy challenges (Richards, 2008). For First Nations and Metis individuals living off-
reserve, 60% of men and 75% of women between the ages of 20 and 24 have a high school
diploma; for non-Indigenous Canadians, this figure ranges from 84-91%, depending on the
province (Richards, 2008). For the on-reserve Indigenous population, the divide is even more
pronounced, with only 35.3% of individuals completing high school (Rosenbluth & Drummond,
2013). Second, with respect to leisure needs, research conducted with Indigenous youth across
Canada has identified numerous barriers to participating in organized recreational activity,
including lack of infrastructure and programming, limited access to transportation, pervasive
underfunding, and continued racism (Brown, Higgitt, Wingert, Miller, & Morrissette, 2005;
Mason & Koehli, 2012). Finally, to turn to social relations, quantitative research indicates that
Indigenous individuals are more residentially segregated in urban areas compared to other ethnic
groups (Maxim, Keane, & White, 2003), while qualitative research suggests that Indigenous
individuals often leave cities because of a lack of support networks (Cooke & Belanger, 2006).
Thus, for the Indigenous youth in our sample, many of them from rural areas, opportunities for
forming positive peer relations were conceivably more limited than for their non-Indigenous
counterparts.

A common thread linking the elevated risk and/or need identified in these areas may be
migration. The rate of residential mobility in the Indigenous population is roughly twice that of
the non-Indigenous population, in both urban and rural areas (Clatworthy & Norris, 2007;
Clatworthy & Norris, 2014). In particular, 30% of urban Indigenous residents move within cities
or in and out of cities annually (Clatworthy & Norris, 2014). Qualitative research supports these
findings, indicating that urban Indigenous youth are highly mobile, moving within urban centers
(as well as between urban centers and their home communities) multiple times for school, work,
health, and other socioeconomically motivated reasons (Baskin, 2007; Brown et al., 2005). Our
categorization of urban and rural residence may not have been nuanced enough to capture these migration patterns, perhaps explaining why place of residence did not emerge as a significant predictor in our analyses. Such mobility would make Indigenous youth more likely to have interrupted schooling, sporadic recreational pursuits, and inconsistent social ties.

This study focused exclusively on criminogenic needs within the RNR framework. Unpacking ‘standard’ RNR domains of criminogenic risk to understand how they may operate differently for Indigenous youth is an important task that may help design policies and programs to meet youths’ needs and support rehabilitation. However, there is theoretical and qualitative scholarship suggesting that colonization has created a distinctive set of circumstances for Indigenous individuals that is not adequately reflected in existing risk assessment measures (Hannah-Moffat, 2013; Martel et al., 2011). Factors such as disconnection from traditional culture and spirituality (Ellerby & McPherson, 2002), life on reserves (Hannah-Moffat & Maurutto, 2003), and intergenerational trauma related to attendance at residential schools (Mann, 2009) have been proposed as unique experiences influencing the lives of Indigenous peoples, including their criminal behavior. In the court-ordered assessments for the present sample, individual and family traumas were commonly identified as treatment targets in the recommendations. Indeed, a recent study indicates that measures of family cohesion, residence on reserves, and community well-being increased the predictive validity of the YLS/CMI for Indigenous youth (Wilson, 2016). These results suggest that further investigation into these additional, colonization-linked factors may be warranted for Indigenous youth.

At the same time, careful consideration needs to be given to whether and how any such ‘colonization-specific’ factors are incorporated into assessment, case management, and intervention programs for justice-involved Indigenous youth. In particular, couching systemic
problems and disadvantage affecting Indigenous youth within the language of ‘risk’ (e.g., adding new ‘risk factors’ to RNR-based assessment tools), even if these add to the predictive accuracy of such instruments, has the appearance (and perhaps also the effect) of ‘responsibilizing’ individuals for the legacy of colonization and the many disadvantages experienced by Indigenous individuals and communities. Thus, in addition to exploring the variables that may be more potently associated with reoffending for Indigenous than non-Indigenous youth, we also need to be careful to frame those issues in a way that is most likely to benefit the youth and not cause additional harm. Taxman’s concept of systemic responsivity (Taxman, 2014; Taxman & Caudy, 2015) may provide a useful lens through which to consider possible colonization-specific factors.

Indeed, it may be more appropriate to examine colonization-specific variables from a responsibility perspective: traditional culture and spirituality, life on reserve, intergenerational trauma, and disproportionate socioeconomic disadvantage may be better conceptualized and addressed at the treatment stage rather than the assessment stage. Evidence for the efficacy of Indigenous-specific youth justice programming is scarce. Studies of culturally tailored treatments are mostly qualitative or quasi-experimental, and focus on incarcerated adult Indigenous samples. They reveal high levels of engagement and satisfaction among program participants (Heckbert & Turkington, 2001; Trevethan, Crutcher, & Rastin, 2002; Trevethan, Moore, & Allegri, 2005; Zellerer, 2003), but no improvement in recidivism (Trevethan et al., 2002; Trevethan et al., 2005). For Indigenous youth and adults alike, a better understanding is needed of how culturally tailored services are being delivered, whether they affect recidivism, and, if so, what components of those programs are the active ingredients of change. Preliminary research suggests that Indigenous-specific programming treats the same needs identified by the RNR framework, but approaches them differently from mainstream programming (Finseth, 2014;
Finseth & Peterson-Badali, 2015). Further exploration is needed to better understand whether culturally sensitive services align with restorative justice frameworks and with the RNR model.

**Matching Services to Criminogenic Needs and Responsivity Factors**

This is the first study to examine criminogenic need- and responsivity-targeted service delivery for Indigenous justice-involved youth and its relationship to recidivism, a critical test of whether following RNR-based principles of treatment is associated with better outcomes. Our results showed that the number and proportion of criminogenic needs matched to services did not differ between groups. On average, the youth in this sample had about one third of their needs met, a proportion comparable to previous studies (Peterson-Badali et al., 2015; Vieira et al., 2009). This low service match rate could be attributed to a number of factors: lack of appropriate services, client’s ability to work on only a limited set of issues at a time, pressing non-criminogenic needs that take priority (e.g., housing), and problems within the family and community systems (e.g., parent mental illness, high crime neighborhoods) have all been cited by probation officers as barriers to addressing youths’ needs (Haqanee, Peterson-Badali, & Skilling, 2015). Of note in the present study, however, is that Indigenous youth were significantly less likely to have their peer relation needs met. While virtually all Indigenous youth had a need identified in this domain, only 21% had it adequately addressed. As proposed above, it is possible that the social isolation experienced by Indigenous youth is not as easily addressed as it may be for non-Indigenous youth. Traditional methods for addressing peer-related needs, such as encouraging school attendance or extra-curricular pursuits, may be hindered by racism (Mason & Koehli, 2012; OFNYPC, 2016) and poverty (Abele & Delic, 2014; Latimer & Foss, 2004; Wilson & MacDonald, 2010). Gang membership among Indigenous youth is likewise intertwined with issues of discrimination and disadvantage (Ogilvie &
Eggleton, 2013; Sinclair & Grekul, 2012; Totten, 2009). Moreover, the higher mobility of Indigenous populations is an obstacle to accessing services and to building social cohesion (i.e., integrating into neighborhoods and forming stable communities) (Norris & Clatworthy, 2003), both factors that could explain the difficulty addressing the peer-related needs of the Indigenous youth in this sample. In support of such an interpretation, frontline workers in the justice system in Ontario identified the interconnected issues of poverty, unstable housing, and transience as significant barriers to service for Indigenous justice-involved youth (Finseth & Peterson-Badali, 2015; Lockwood & Peterson-Badali, 2016). It is important to note that the low match to service rate in both groups is cause for concern and highlights the need for greater attention to the challenges faced by rehabilitation efforts.

Indigenous and non-Indigenous youth did not differ in their receipt of trauma- and other mental health-targeted intervention. Most notably, rates of mental health services for this sample were high relative to criminogenic need-specific services. This is consistent with information provided by probation officers, who state that they prioritize responsivity factors like mental health—over established risk factors for recidivism—when they clearly interfere with a client’s ability to participate in programming (Haqanee et al., 2015).

**Potential Predictors of Recidivism**

Contrary to previous studies (Jung & Rawana, 1999; Luong & Wormith, 2011; Rojas & Gretton, 2007), recidivism rates did not differ between the two groups. However, it is important to acknowledge that the rate of recidivism in both the Indigenous and non-Indigenous samples was high, falling at roughly 70%. In terms of predictive validity, the YLS/CMI total risk score reliably distinguished recidivists from non-recidivists in the sample as a whole and predicted recidivism in Indigenous and non-Indigenous youth at comparable rates. These results are
consistent with findings from the literature that the YLS/CMI significantly predicts recidivism for Indigenous youth (Jung & Rawana, 1999; Olver et al., 2012; Olver et al., 2009), although some studies have found that the YLS/CMI is less predictive for Indigenous youth overall (Luong & Wormith, 2011) or less predictive at the lower risk levels (Wilson, 2016).

Match to services for criminogenic needs did not emerge as a significant predictor of recidivism in either group. On the other hand, it was a significant predictor of time to reoffense for Indigenous and non-Indigenous youth, even when controlling for risk. This lends support to the need principle of the RNR framework. That is, addressing a higher percentage of youth’s identified needs with appropriate services kept youth in the community longer without reoffending, an important intermediary goal of probation. While treatment for responsivity factors did not predict recidivism or time to reoffense, follow-up analysis revealed a strong positive correlation between match for criminogenic needs and match for responsivity variables. This is consistent with recent research showing that while mental health treatment was not associated with recidivism, justice-involved youth whose mental health needs were addressed had a significantly higher proportion of their criminogenic needs met (McCormick, Peterson-Badali, & Skilling, 2017). As these authors propose, it is possible that youth with mental health needs are referred to more wraparound services, which in turn provide more support for criminogenic needs. Mental health treatment may thus have an indirect effect on recidivism. Coupled with the high proportion of youth with trauma and other mental health-related issues and the emphasis placed on this area by frontline personnel, as discussed above, this indicates that resources for mental health are a crucial component of youth justice services.

Limitations and Future Directions
The present study consisted of a small sample receiving services in a community with a high Indigenous population. While the results were largely consistent with existing research, replication with a larger sample is required. Moreover, considering the great diversity that exists among Indigenous communities, replication in other regions and countries is essential in order to place these results in the context of a larger Indigenous experience.

Additionally, our sample consisted of youth referred for specialized mental health assessments, who could arguably represent a distinct subset of justice-involved youth in terms of risk and needs. While rates of violent and/or sexual offenses were higher in this sample than in the national youth justice population (Allen & Superle, 2016), youths’ mean overall risk was in the moderate range, which is consistent with non-referred custodial youth (Hoge & Andrews, 2011). Furthermore, the proportion of youth in our sample affected by mental health issues falls within the 50-75% range found in the juvenile justice literature (Ulzen & Hamilton, 1998; Underwood & Washington, 2016). These concordances in risk and mental health profiles support the relevance of study findings to the broader youth justice population.

The mental health assessments that informed risk and need coding provided a consistent, systematic, and extensive account of each youth’s criminogenic and responsivity factors, closely reflecting the principles of the RNR framework and enhancing the study’s internal validity. Coding service match was more challenging, as the level of detail in probation officer case notes varied, likely reflecting the limited time probation officers have to devote to this task among their other responsibilities (e.g., assessment, service referral and coordination, monitoring, enforcement, etc.). At the same time, case notes are a centralized source of information that would otherwise have to be assembled from multiple sources (e.g., schools, community centres,
clinics, hospitals, foster care agencies, etc.). From this perspective, case notes provided us with the most *comprehensive* record of intervention, even if incomplete.

As noted earlier, colonization-specific factors have been posited as integral to understanding and serving Indigenous justice-involved youth (Gutierrez et al., 2013; Hannah-Moffat, 2013; Martel et al., 2011; Wilson, 2016). Given the questions we raised about how such factors are conceptualized (i.e., as risk or responsivity variables) and the absence of theoretical and empirical work in this area, examining these factors is a critical avenue for future research. In addition, more information is needed about a) why and in what ways education, leisure, and peers are such high areas of need for Indigenous youth; b) how Indigenous youth are and can be more effectively engaged in services, especially in those high-intensity domains and especially from the perspectives of youth themselves; and c) where colonization-informed factors fit into risk assessment and intervention, so that these services do not become additional instruments of oppression for Indigenous youth and their communities.
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RISK, NEED, AND RECIDIVISM IN INDIGENOUS YOUTH

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Table 1
*Demographic and offense information by Indigenous status*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Indigenous</th>
<th>Non-Indigenous</th>
<th>Total</th>
<th>t-test/χ²/FET</th>
<th>p</th>
<th>d/Φ/Φc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Age in Years (SD)</td>
<td>15.54 (1.37)</td>
<td>15.30 (1.33)</td>
<td>15.43 (1.35)</td>
<td>t = -0.73</td>
<td>.47</td>
<td>-.18</td>
</tr>
<tr>
<td>% Gender (n)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>67.6 (25)</td>
<td>75.8 (25)</td>
<td>71.4 (50)</td>
<td>χ²(1) = 0.57</td>
<td>.45</td>
<td>.09</td>
</tr>
<tr>
<td>Female</td>
<td>32.4 (12)</td>
<td>24.2 (8)</td>
<td>28.6 (20)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Residence (n)</td>
<td></td>
<td></td>
<td></td>
<td>χ²(1) = 13.00</td>
<td>&lt; 0.0001***</td>
<td>.43</td>
</tr>
<tr>
<td>Urban</td>
<td>51.4 (19)</td>
<td>90.9 (30)</td>
<td>70.0 (49)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>48.6 (18)</td>
<td>9.1 (3)</td>
<td>30.0 (21)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Index Offense (n)</td>
<td></td>
<td></td>
<td></td>
<td>Fisher’s Exact Test</td>
<td>.34</td>
<td>.08</td>
</tr>
<tr>
<td>Administrative</td>
<td>18.9 (7)</td>
<td>18.2 (6)</td>
<td>18.6 (13)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-violent</td>
<td>16.2 (6)</td>
<td>33.3 (11)</td>
<td>24.3 (17)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Violent (non-sexual)</td>
<td>54.1 (20)</td>
<td>36.4 (12)</td>
<td>45.7 (32)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sexual</td>
<td>10.8 (4)</td>
<td>12.1 (4)</td>
<td>11.4 (8)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Initial Sentence (n)</td>
<td></td>
<td></td>
<td></td>
<td>Fisher’s Exact Test</td>
<td>.41</td>
<td>.06</td>
</tr>
<tr>
<td>Secure custody</td>
<td>22.2 (8)</td>
<td>21.2 (7)</td>
<td>21.7 (15)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Open custody</td>
<td>16.7 (6)</td>
<td>6.1 (2)</td>
<td>11.6 (8)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Probation</td>
<td>61.1 (22)</td>
<td>72.7 (24)</td>
<td>66.7 (46)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Reoffended (n)</td>
<td>70.3 (26)</td>
<td>66.7 (22)</td>
<td>68.6 (48)</td>
<td>χ²(1) = 0.11</td>
<td>.75</td>
<td>.05</td>
</tr>
<tr>
<td>Mean Days (SD) to Recidivism for youth who reoffended</td>
<td>248.24 (164.97)</td>
<td>297.14 (176.74)</td>
<td>271.13 (170.49)</td>
<td>t = 0.98</td>
<td>.33</td>
<td>.29</td>
</tr>
</tbody>
</table>
### % Reoffense Type (n)

<table>
<thead>
<tr>
<th>Type</th>
<th>Administrative</th>
<th>Non-violent</th>
<th>Violent (non-sexual)</th>
<th>Sexual</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>23.1 (6)</td>
<td>22.7 (5)</td>
<td>22.9 (11)</td>
<td>0.0 (0)</td>
</tr>
<tr>
<td>Non-violent</td>
<td>34.6 (9)</td>
<td>54.6 (12)</td>
<td>43.8 (21)</td>
<td>0.0 (0)</td>
</tr>
<tr>
<td>Violent (non-sexual)</td>
<td>42.3 (11)</td>
<td>22.7 (5)</td>
<td>33.3 (16)</td>
<td>0.0 (0)</td>
</tr>
<tr>
<td>Sexual</td>
<td>0.0 (0)</td>
<td>0.0 (0)</td>
<td>0.0 (0)</td>
<td>0.0 (0)</td>
</tr>
</tbody>
</table>

\( \chi^2(2) = 2.45 \)

.30 .16

*a One Indigenous youth was sentenced to five days of secure custody as a stopgap measure while awaiting admission to a mental health facility. This individual was excluded from disposition analyses, leaving a total sample size of n = 69.

***\( p < .0001 \)
Table 2
*Total risk and domain scores for Indigenous and non-Indigenous youth*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Indigenous (n = 37)</th>
<th>Non-Indigenous (n = 32)</th>
<th>Total (N = 69)</th>
<th>t-test</th>
<th>p</th>
<th>CI (95%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(SD)</td>
<td>(SD)</td>
<td>(SD)</td>
<td></td>
<td></td>
<td>Lower</td>
</tr>
<tr>
<td>Total Risk</td>
<td>19.59 (7.75)</td>
<td>18.22 (7.25)</td>
<td>18.96 (7.50)</td>
<td>t = -0.76</td>
<td>.45</td>
<td>-1.56</td>
</tr>
<tr>
<td>Criminal History</td>
<td>1.62 (1.57)</td>
<td>1.31 (1.56)</td>
<td>1.48 (1.58)</td>
<td>t = -0.81</td>
<td>.42</td>
<td>-0.17</td>
</tr>
<tr>
<td>Family</td>
<td>2.89 (1.65)</td>
<td>2.88 (1.52)</td>
<td>2.88 (1.58)</td>
<td>t = -0.04</td>
<td>.97</td>
<td>-0.36</td>
</tr>
<tr>
<td>Education/Employment</td>
<td>3.05 (1.79)</td>
<td>3.44 (1.41)</td>
<td>3.23 (1.63)</td>
<td>t = 0.98</td>
<td>.33</td>
<td>-0.62</td>
</tr>
<tr>
<td>Peer</td>
<td>2.65 (1.44)</td>
<td>1.94 (1.24)</td>
<td>2.32 (1.39)</td>
<td>t = -2.18</td>
<td>.03</td>
<td>0.22</td>
</tr>
<tr>
<td>Substance Abuse</td>
<td>2.81 (1.76)</td>
<td>2.03 (1.60)</td>
<td>2.45 (1.72)</td>
<td>t = -1.91</td>
<td>.06</td>
<td>0.08</td>
</tr>
<tr>
<td>Leisure</td>
<td>1.97 (0.76)</td>
<td>1.47 (0.80)</td>
<td>1.74 (0.82)</td>
<td>t = -2.67</td>
<td>.01</td>
<td>0.47</td>
</tr>
<tr>
<td>Personality</td>
<td>2.92 (1.82)</td>
<td>3.47 (1.70)</td>
<td>3.17 (1.77)</td>
<td>t = 1.29</td>
<td>.20</td>
<td>-0.73</td>
</tr>
<tr>
<td>Attitudes</td>
<td>1.68 (1.55)</td>
<td>1.72 (1.33)</td>
<td>1.70 (1.44)</td>
<td>t = 0.12</td>
<td>.90</td>
<td>-0.37</td>
</tr>
</tbody>
</table>

*p < .05
### Table 3
**Mean proportion of youth identified with a criminogenic need by domain (n)**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Indigenous (n = 37)</th>
<th>Non-Indigenous (n = 33)</th>
<th>Total (N = 70)</th>
<th>$\chi^2$/FET</th>
<th>p</th>
<th>$\Phi$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family/parenting</td>
<td>81.1 (30)</td>
<td>93.9 (31)</td>
<td>87.1 (61)</td>
<td>$FET$</td>
<td>.16</td>
<td>.03</td>
</tr>
<tr>
<td>Education/employment</td>
<td>94.6 (35)</td>
<td>69.7 (23)</td>
<td>82.9 (58)</td>
<td>$\chi^2(1) = 7.61$</td>
<td>.01*</td>
<td>.36</td>
</tr>
<tr>
<td>Peer relations</td>
<td>94.6 (35)</td>
<td>81.8 (27)</td>
<td>88.6 (62)</td>
<td>$FET$</td>
<td>.14</td>
<td>.02</td>
</tr>
<tr>
<td>Substance abuse</td>
<td>78.4 (29)</td>
<td>60.6 (20)</td>
<td>70.0 (49)</td>
<td>$\chi^2(1) = 2.62$</td>
<td>.11</td>
<td>.23</td>
</tr>
<tr>
<td>Leisure/recreation</td>
<td>81.1 (30)</td>
<td>57.6 (19)</td>
<td>70.0 (49)</td>
<td>$\chi^2(1) = 4.59$</td>
<td>.03*</td>
<td>.31</td>
</tr>
<tr>
<td>Personality/behavior</td>
<td>91.9 (34)</td>
<td>97.0 (32)</td>
<td>94.3 (66)</td>
<td>$FET$</td>
<td>.62</td>
<td>.11</td>
</tr>
<tr>
<td>Attitudes/orientation</td>
<td>48.6 (18)</td>
<td>48.5 (16)</td>
<td>48.6 (34)</td>
<td>$\chi^2(1) = 0.00$</td>
<td>.99</td>
<td>.00</td>
</tr>
</tbody>
</table>

* $p < .05$
Endnotes

1 The terms ‘culturally-specific’ and ‘Aboriginal-specific’ have previously been employed in the literature to describe the unique risk/need profile of Indigenous justice-involved youth. However, these terms imply that there is something within Indigenous culture or Indigenous identity that predicts involvement with the justice system. This, in effect, identifies Indigenous communities as inherently risky. Instead, terms such as ‘colonization-informed’ and ‘colonization-specific’ are used in this paper to reflect the general consensus that the continued repercussions of colonization are at the heart of the distinct issues facing Indigenous youth. Intergenerational trauma, disconnection from traditional practices and languages, and residence on reserves are not cultural markers, but the sociopolitical artifacts of generations of oppression.

2 There were no significant differences between males and females on total risk score, $t(45) = -0.78, p = .44$, number of needs, $t(68) = -0.73, p = .47$, proportion of needs matched to services, $t(67) = 0.01, p = 1.00$, or recidivism, $\chi^2 (1, N = 70) = 1.70, p = .19$. As a result, and because of the small number of female youth in the sample, gender was not included in subsequent analyses.

3 Indigenous status was determined during the assessment process based on youth self-report and at least one parent identifying as Indigenous.

4 Convictions that fell within the first three months following the release date were not counted. This three-month period was set aside in order to allow time for services to “kick in,” with the reasoning that a youth who reoffended immediately after release to the community has not had an opportunity to have his/her needs addressed.
There is some evidence for gender differences in risk, need, and responsivity among justice-involved youth (Plattner et al., 2009; Vitopoulos, Peterson-Badali, & Skilling, 2012; Woodson, Hives, & Sanders-Phillips, 2010). As a result, it is important to examine possible gender effects in analyses. However, due to the small number of females in the sample (especially when broken down by Indigenous/non-Indigenous group; see Table 1) it was not possible to include gender as a variable alongside Indigenous status in the analyses. To rule out possible gender effects, analyses were conducted with the sample as a whole and also with males only in order to examine for any possible female effect. Using total risk and overall proportion match as predictors, logistic regressions with recidivism as the outcome and survival analyses with time to reoffense as the outcome were conducted. The pattern of results was the same with or without females in the sample. Significant findings remained significant and non-significant findings remained non-significant. Thus, the analyses presented are based on the full sample.

Criminal History was used instead of the YLS/CMI total risk score because the overall proportion match variable entered in step two of the analysis is derived from the youth’s YLS/CMI-identified criminogenic needs. The clinician recommendations used to calculate overall proportion match overlap with the domain scores that constitute the YLS/CMI total score; inclusion of the latter in the model would thus take away from the variance explained by overall proportion match. Criminal History was deemed an appropriate substitute measure of risk due to its strong correlation with total YLS/CMI scores, $r(69) = .58, p < .0001$, as well as its ability to effectively discriminate between recidivists and non-recidivists in the sample, $AUC = 0.65, p = .05$. 