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Impact Evaluation of the Gurnang Life Challenge Specialised Program for Young Adult Male Offenders in NSW

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1 Executive Summary

1.1 Aims

This study aimed to evaluate the effect of participating in the Gurnang Life Challenge (GLC) Specialised Program on recidivism outcomes among young adult male offenders (aged 18-25 years) in NSW. The GLC is designed to target offenders' dynamic risk factors and age-specific needs while taking into account their readiness for treatment and other responsivity factors. The study also aimed to provide an understanding of the GLC participants' treatment pathways, including program completion and treatment dosage.

1.2 Methods

The treatment sample included all young adult male offenders who participated in the GLC between 2012 and 2017, and who had been released from custody prior to 30 June 2018 (N= 593).

Primary analyses applied an Intention to Treat (ITT) design to estimate treatment effects and compare recidivism outcomes between GLC participants and a comparison group of matched offenders who did not participate in the GLC. In the secondary analyses using a Completion design, recidivism outcomes were compared between GLC participants who completed the program and their matched counterparts.

In both designs, equivalence between treatment and comparison groups was obtained through a two-stage statistical matching procedure. Recidivism outcomes were estimated using a series of binary logistic regression models. Given the identified priority of young adult offenders (YAOs) with Aboriginal and/or Torres Strait Islander (Indigenous) background, additional subgroup analyses were also performed to explore if offenders' background moderates the effect of treatment on recidivism outcomes.

1.3 Key findings

There was a reasonably high completion rate among the GLC participants, where more than two thirds of treated offenders completed the program (70.2%). Completion rates varied slightly among offenders of Indigenous (64.9%) and non-Indigenous (71.4%) background. On average, treated offenders had a median of 121.07 attendance hours (range=3 to 163.88 hours). The majority of offenders had treatment dosage ranging between 100 to 160 hours.

GLC participants showed some evidence of lower recidivism rates relative to matched comparison offenders; however, effects of treatment were not statistically significant, both in the primary ITT design and the Completion design. Subgroup analyses indicated that participation in the GLC may have been associated with differing reoffending outcomes for offenders of Indigenous and non-Indigenous background: Indigenous offenders who completed the GLC showed a significant reduction in odds of general reoffending compared to their matched counterparts. Non-Indigenous offenders who completed the program showed a slight and non-significant increase in likelihood of recidivism compared to their untreated counterparts.

1.4 Conclusions

The results of this study provided some evidence to suggest that over its course of operation from 2012-2017, participation in and completion of the GLC was associated with modest reductions in reoffending outcomes relative to matched comparison offenders. However, treatment effects did not reach statistical significance, which suggests that the program did not achieve sufficient impact to consistently affect recidivism outcomes across all participants. There were, however, indications that the GLC may have particular promise as a treatment avenue for YAOs of Indigenous background who complete the program.

As a targeted and effective approach in addressing risk of recidivism for YAOs will have substantial cumulative benefits over the life course of these offenders, it is important that the GLC be subject to regular review and development of best practice. Considering that the GLC is currently undergoing review towards potential reforms, it is possible that the program will have a more pronounced impact in lowering recidivism among YAOs in NSW in the future.

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2 Introduction

Latest trends data from Corrective Services NSW (CSNSW) showed that while the number of offenders aged 18-25 years in reception for full time custody has steadily decreased since 1999 until present, they consistently made up a large proportion of NSW adult custodial population (on average, from approximately 20-40% (Tang & Corben, 2020)). In the literature, offenders in the 18-25 year age group have often been referred to as young adult offenders (YAOs). This is to distinguish them from offenders in the older age groups (Farrington et al., 2012).

Of the YAOs managed by CSNSW in the last two decades, male offenders made up 85-90% (Corben & Tang, 2019; CSNSW, 2020). A similar situation was observed in other Australian jurisdictions where young adult male offenders made up the largest age group among adult prisoners (Crime Statistics Agency, 2016a; Office of the Inspector of Custodial Services, 2014). This was largely seen as the direct consequence of a high rate of offending committed by people in this age group (Crime Statistics Agency, 2016b).

Young adults with a history of imprisonment also have the highest rates of reoffending and reconviction of any age group (Halsey & de Vel-Palumbo, 2016; Howard & Corben, 2018; Sentencing Advisory Council, 2019). In NSW, statistics from 2000-2018 show that half of YAOs reoffended within 12 months of release (BOCSAR, 2020). This has contributed to NSW consistently being the second state, just after the Northern Territory, with the highest return to custody rates over the past five years (Australian Government Productivity Commission, 2020).

For YAOs of Aboriginal and/or Torres Strait Islander (Indigenous) background, the situation might be further exacerbated, as evidenced by their high representation in custody. Of YAOs managed by CSNSW since 1999, offenders who identified as Indigenous Australians made up 25-41% (Corben & Tang, 2019). This is consistent with the general observation that Indigenous Australians are overrepresented in the criminal justice system. In addition, rates of return to custody among YAOs of Indigenous background are higher than that of the non-Indigenous cohort. For example, a review by Office of the Inspector of Custodial Services (2014) indicated that young adult Indigenous people have a rate of return to prison 25 percentage points higher than their non-Indigenous counterparts.

High rates of recidivism among YAOs pose direct and indirect impacts to the justice system as well as the community at large. This is because breaking cycles of recidivism at a younger age will have lead-on effects for reducing criminal justice involvement throughout these offenders' lifespan. It is estimated that for every 10 prisoners who do not return to custody for one year, the projected saving in direct costs is approximately $1 million; if they never return to prison, the savings will increase many times (Office of the Inspector of Custodial Services, 2014). There are thus strong imperatives to reduce recidivism of offenders in this age group.

High costs of recidivism and public pressure to reduce repeat offending have underlined the importance of an effective corrective services system (Office of the Inspector of Custodial Services, 2014). This has resulted in CSNSW giving strategic focus to and targeting investment on treatment programs to reduce the rate at which YAOs reoffend or return to NSW prisons (NSW Government, 2019).

2.1 Background literature on young adult offenders

2.1.1 Young adulthood

In most Australian states, offenders are generally classified into juveniles (youth, under 18 years) and adults (18 years and above) (Lapp, 2019). There are separate court systems, sentencing options, and legal treatments for offenders in each group (Sentencing Advisory Council, 2019). A growing body of research, however, has

shown that the long-held practice of treating offenders aged 18 and above as a homogeneous group might not work well in reducing recidivism (Lapp, 2019). Although classified as adults, offenders aged 18-25 form a developmentally and socially distinct group to other age groups (Farrington et al., 2012).

Psychological and neurological evidence shows that the transition from adolescence to adulthood is a gradual process that takes place well beyond age 18, and varies between individuals (Farrington et al., 2012). While physical and intellectual development processes are usually completed during adolescence, higher executive functions, such as impulse control and moral reasoning are still developing until age 25. It is the maturity in these human psychosocial capacities, not reaching the legal age of 18, that improve young adults' decision making, and regulation of emotion and behaviours (Prior et al., 2011). Young adults are thus more similar to juveniles than to older adults in many aspects of cognitive functioning and psychosocial maturity (e.g., still have a diminished sense of responsibility and culpability (Lapp, 2019)). Indeed, evidence shows that crime prevalence in young adults is as high as it is in younger youth (Halsey & de Vel-Palumbo, 2016).

From a sociological perspective, rapid changes in social institutions means the transition to adulthood today is becoming more complex (Collins & Lousley, 2011). The majority of young adults now delay or take longer to achieve the traditional markers of adulthood, in terms of education, work and financial independence, marriage and child rearing, as well as self-perception (Lapp, 2019). In line with this, findings from a recent study by Howard and Corben (2018) indicated that there has been a shift in age trends among people managed by CSNSW; people are reoffending for longer periods and at later ages, which might be related to delays in adult transitions and experiences that they experienced at an earlier age.

The transition from adolescence to adulthood is potentially more complicated for vulnerable young adults, such as those with mental health issues, or a disadvantaged background (Collins & Lousley, 2011). Such individuals may not have grown up with resources enjoyed by more economically and socially advantaged youth, and thus may require additional support during this critical period of their life (Lapp, 2019). For young adults involved in cycles of crime and incarceration, the path to successfully becoming a fully grown adult is, at minimum, delayed, and at worst, interrupted in a prolonged and serious manner (Halsey & de Vel-Palumbo, 2016).

2.1.2 Criminogenic and other needs

Research on risk of offending suggests that there are eight major risk factors (the 'big eight') in both adolescents and adults. These included a history of antisocial behaviour, antisocial cognition, antisocial associates, and antisocial personality pattern, as well as problems in the domains of education and employment, family and marital relationships, recreation, and substance abuse (Bonta & Andrews, 2016). The available research indicates that YAOs tend to exhibit elevations on a number of these risk factors, in addition to others that may be a function of their age. For example, YAOs have been found to have a higher prevalence of mental illness and psychopathy (e.g., egocentrism, impulsivity, and irrational thinking) (Fougere et al., 2013), a lower level of intellectual functioning, and increased prevalence of learning disability than young adults in the general population (Herrington et al., 2007).

YAOs have also often come from disadvantaged backgrounds (Collins & Lousley, 2011). Some missed out on early parts of their development into adulthood due to a lack of role models, absence of parental control or too much control; early access to drugs, alcohol and gambling; or negative peer influence. Some experienced psychological vulnerabilities associated with a history of physical, emotional, or sexual abuse (prior victimisation) (CSNSW, 2018).

As a result of their situation, YAOs are reportedly characterised by having poor employability skills, poor social and communication skills, as well as poor decision making and judgement (Fougere et al., 2013). In addition, they tend to have a low self-concept, a lack of motivation and self-direction, and a tendency for risk taking. Difficulties with the inability to cope with and control negative emotions and impulsive behaviours, or the

inability to manage money and debt, are also common (Collins & Lousley, 2011). These issues further make them prone to unstable and problematic relationships or having a high propensity for depression and self-harm ideation (Fougere et al., 2013; Perker & Chester, 2017).

2.1.3 Re-entry challenges

Trends data from CSNSW indicate that since 1999 to present, about 2,283 YAOs were discharged from secure correctional facilities to return home each year. Of these, more than 90% were male; and approximately 35% of them identified to be of Indigenous heritage (CSNSW, 2020). In each of these cases, release from custody confers a range of challenges associated with the transition back into the community (James et al., 2016; Kendall et al., 2018).

As discussed above, most young people entering the criminal justice system lag behind their age cohort in terms of socio-economic attainment, employment status, and other markers of adulthood (Uggen & Wakefield, 2005). Although young adult prisoners may gain marginal increases in human and social capital while incarcerated, such as obtaining educational and vocational training, the vast majority of them will re-enter their communities with their disadvantages intact (Halsey & de Vel-Palumbo, 2016; Lösel et al., 2012).

Re-entry has been shown to be more difficult for young adults as they are facing transition from a structured-day detention facility to self-management in the community, while simultaneously transitioning to full adulthood, which has its own specific challenges (Travis et al., 2001). In addition, being incarcerated as a young adult has been shown to have more severe derailing effects compared to being involved in the justice system as an older adult (Apel & Sweeten, 2010). One possible explanation was that being incarcerated as an emerging adult impedes several crucial psychosocial processes, such as the development of identity and autonomy, the practising of romantic relationships (Jäggi et al., 2020), and processes of educational attainment and preparation for employment (Huizinga & Henry, 2008).

2.1.4 Desistance from crime

The *age-crime* curve theory posits that the prevalence of offending generally increases from late childhood into adolescence, peaks in late adolescence (around ages 15-19), and decreases subsequently into early adulthood (early 20s) (Farrington, 1986). The curve can be observed in all populations of youth and young adults; and that the highest concentration of desistance takes place during early adulthood irrespective of the age of onset (Farrington et al., 2012). The age-crime curve demonstrates that the majority of YAOs would naturally mature out of and desist from crime. This desistance process is seen as a result of an individual's accumulation of human and social capital in their early adulthood, including a sense of personal agency and identity, changes in cognitive and psychosocial capacities, changes in attitudes and beliefs, and changes in social contexts (Mulvey et al., 2004).

However, it is important to note that the desistance process varies across offence types (Allen, 2016) and individuals, depending on their cognitive and psychosocial characteristics, and the socio-economic context within which they reside (Halsey & de Vel-Palumbo, 2016). For example, desistance occurs earlier for property crime than for violence (Blokland & Palmen, 2012); earlier for girls than for boys (Farrington et al., 2012); and later for young males, especially those of a minority and disadvantaged status (Fabio et al., 2011). Some offenders are more likely to naturally desist and their offending might actually be aggravated if given an inappropriate sentence or the wrong type of intervention. On the other hands, some offenders would only desist if they are provided with appropriate and individualised intervention (Halsey & de Vel-Palumbo, 2016). This has implications for understanding how desistance might occur among YAOs as a group and as individuals; and importantly, how intervention programs for them should be designed and tailored.

2.2 Intervention programs and evaluation context

In recent years a growing number of intervention programs have been specifically designed to target YAOs. These have been custody-based, community-based, or re-entry focussed (Halsey & de Vel-Palumbo, 2016; James et al., 2013). Nevertheless, the scope and availability of these programs are limited compared to those for juveniles or general adult offenders (McGuire, 2015). This is partly due to how YAOs are often subsumed and treated together with older offenders in the adult offender population (Farrington et al., 2012).

A related consideration is that there has been a lack of robust evaluations conducted on the currently available programs for offenders aged 18-25. This is especially so for those in the Australian context (Halsey & de Vel-Palumbo, 2016; Office of the Inspector of Custodial Services, 2014). Much of what has been discussed in the existing literature to date is about legislation, sentencing options and legal treatments for YAOs rather than the intervention programs per se (e.g., Dünkel & Pruin, 2012; Lapp, 2019).

Existing evaluation into the effectiveness of treatment programs for YAOs has provided mixed evidence. A review by Lipsey and Cullen (2007) indicated that while interventions and rehabilitation programs during incarceration had some positive effects, it appears that these are not successful enough to prevent the majority of juveniles and YAOs from reoffending (Altschuler et al., 1999). In the same vein, results of a meta-analytic review by James et al. (2013) indicated that aftercare programs for juveniles and YAOs yielded only a small positive effect on recidivism compared to offenders receiving care as usual or no treatment.

On a more positive note, McGuire's (2015) review concluded that intervention programs for YAOs did help to reduce recidivism. The most sizeable effects were observed in structured parole re-entry systems, prison-based offending behaviour programs, and structured high-intensity detention regimes. The more military-style detention initiatives produced no positive outcomes, however. Based on his findings, McGuire (2015) concluded that YAOs are not "in any obvious sense intrinsically more difficult or challenging to achieve good outcomes with, than those at lower or higher age ranges" (p.3). McGuire's conclusion however should be viewed with caution as it was based on a small number of studies reviewed that had varying quality and methodological rigour.

Despite a lack of evidence base and mixed indications of effectiveness, existing reviews into 'what works' in reducing recidivism among YAOs have pointed to a number of best practice principles. These have been applied within Australian jurisdictions and worldwide, and observed to be most effective when underlined by the recognition of YAOs' developmental stage, natural ability to desist, and their ambiguous status in society generally and in custody specifically (Halsey & de Vel-Palumbo, 2016).

One of these best practice principles suggests the need to adhere treatment of YAOs to the Risk-Need-Responsivity (RNR) model (Andrew et al., 2011), and situating treatment within a strength-based and desistance-focused paradigm (Halsey & de Vel-Palumbo, 2016). The RNR model asserts that interventions aimed at reducing recidivism are most likely to be effective if they tailor the intensity of treatment based on the offender's risk of offending, target their multiple and complex criminogenic needs, and take into account their responsivity factors (Andrews & Bonta, 2010; Koehler et al., 2013). For YAOs, criminogenic needs should also be understood in the context of their developmental stage and transition process to adulthood (Halsey & de Vel-Palumbo, 2016).

In addition, the strength-based and desistance-oriented approach calls for working with YAOs as a 'whole person' with their own complex array of strengths, protective factors and vulnerabilities, rather than focusing on deficits alone. This helps understand the "defining aspects of the milieus that brought them to custody, and to which they are likely to return" (Halsey & de Vel-Palumbo, 2016, p. 33). Forming therapeutic alliances and trusting relationships with YAOs within and beyond custody is also critical to leveraging their ability to naturally desist (Giordano et al., 2002).

The literature also identifies a number of other key principles of working with and providing interventions to YAOs. These include promoting conditions for the adoption and reinforcement of a prosocial identity (Halsey & de Vel-Palumbo, 2016); reinforcing and consistently rewarding prosocial behaviours (i.e., not just sanctions and deterrence) (Uggen & Wakefield, 2005); promoting integrated and responsive service delivery (Gendreau et al., 2002); ensuring continuity of care (James et al., 2016); and promoting program fidelity (Lipsey, 2009).

In addition to 'what works', recent literature also points to the importance of recognising 'who works' (Halsey & Deegan, 2015). This emerging concept suggests that who delivers the program and who is able to connect meaningfully to each of the YAOs they work with are as important as the aim, theoretical underpinning, structural design, operation and logic of each initiative for this target group. This has implications for the recruitment and training for custodial and professional staff who are at the forefront of working with YAOs (Halsey & de Vel-Palumbo, 2016).

2.3 The Gurnang Life Challenge

Like elsewhere, YAOs managed by CSNSW are a specific and vulnerable group of offenders with complex risk factors and needs (CSNSW, 1995). Recognising their distinct situation, in August 1991, the then Minister for Justice, the Hon. Terry Griffiths, announced the need to provide Specialised Programs for YAOs. This has resulted in the establishment of the Gurnang Life Challenge (GLC), the Adventure Based Challenge (ABC) and the Young Adult Offender Satellite Program (YAOSP) for YAOs in NSW. While the ABC and YAOSP have had more intermittent implementation, the primary GLC has been running consistently since 1991, and targeted young adult male offenders in particular, given the high proportion of males in this age group. The program relocated from its initial location at Newnes Correctional Centre to Oberon Correctional Centre in 1993.

Managed by both custodial and non-custodial staff, the GLC at Oberon Correctional Centre offers an intensive program that comprises a series of interventions over 16 weeks. The program's philosophy is aligned with the Department of Justice (now Department of Communities and Justice) Young Adult Offender Strategic Framework; that is, to focus on addressing offenders' dynamic risk factors and age-specific needs to reduce their reoffending. The program's mission is also aligned with the Department's Vision and Mission, in that it works to enable young adult male offenders to reintegrate into society without reoffending.

Given the program's 16 week duration and Oberon Correctional Centre's maximum capacity of housing a total of 140 inmates, around 13 intakes are offered per year. Offenders eligible for the GLC are those who:

- Are male
- Are aged between 18 and 25 years for general offenders (and 18 to 30 for offenders of Indigenous background)
- Have a classification of C2 (minimum security)
- Have a custodial sentence of four months or more
- Have a completed Level of Service Inventory – Revised (LSI-R) assessment
- Are not on remand
- Are not on Special Management Area Placement (SMAP)
- Are not on the Methadone, Buprenorphine, or Subutex program
- Do not have any intellectual disability
- Have a medical checklist completed and confirmed by Justice Health as medically fit to attend (CSNSW, 2018).

Specialised Programs for YAOs in NSW generally operate in five stages as depicted in Figure 1. The GLC at Oberon Correctional Centre primarily operates at Stage 3.

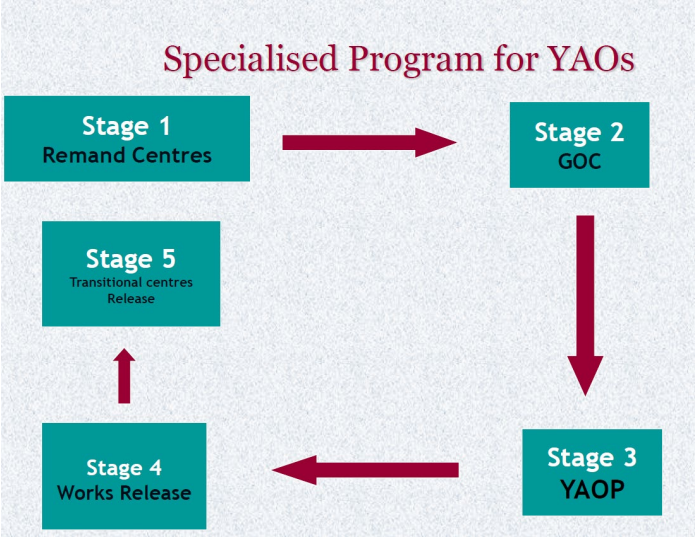

Figure 1. Specialised Program for YAOs in NSW (CSNSW, 2007)

Stage 1 of the Specialised Programs takes place at metropolitan remand centres where young offenders are identified and assessed for suitability. Stage 2 offers traineeships and the Intensive Learning Centre for offenders with literacy and numeracy skills support needs. Following this, eligible offenders are transferred to Oberon Correction Centre to commence the GLC (Stage 3). It is noted that some other offenders may go directly from initial reception or be transferred from a non-specialised centre if they are eligible for the GLC, and vacancies at Oberon Correctional Centre are available. Upon successful completion of Stage 3, offenders will be placed into Pre-Release Centres to prepare for release, and participate in external leave programs, such as Work Release, Education and Day Leave (Stage 4). In Stage 5, offenders receive assistance from Community Corrections to manage issues relating to addictions, accommodation, finance/budgeting, work/education, as well as family and relationships (CSNSW, 2007).

The GLC is designed based on a cognitive-behavioural approach that aims to ensure that offenders' readiness for intervention and other responsivity factors are effectively addressed. Operationally, the GLC is multimodal in its design. With its key components including Core Elements, Work Readiness, Vocational Education, Self-Responsibility and Dynamic Risk, the GLC offers a unique combination of adventure therapy, experiential and cognitive learning, personal development and wellbeing, as well as skills training, work ethics and readiness that are combined with intensive case management. All of the program's elements and objectives are equal in weighting, and work holistically towards addressing offenders' criminogenic needs. Programs conducted at GLC Oberon Correctional Centre are selected by case management staff in consultation with the offenders (CSNSW, 2018).

At GLC, participants are evaluated on a monthly basis on each component of the program through the utilisation of Program Performance Indicators, as well as towards the end of their participation. Participants are considered to have successfully completed the program if they receive satisfactory or higher results in all program elements. Participants who do not progress satisfactorily may receive warnings, intensive case management, or be back-classed to recommence the program in a later intake (CSNSW, 2018). Due to back-

classing, some offenders may consequently participate in more than one intake, until satisfactory completion of the program, or when situational changes deem them no longer eligible for the GLC.

2.4 The current study

To date, feedback on the formative performance of the GLC has been positive (CSNSW, 2015, 2018). For example, between 1998 and 2000, the National Outdoor and Leadership Services externally evaluated the program and concluded that "on the whole the Oberon program results compare very favourably with results in outdoor education and developmental programs elsewhere. In some cases, the Oberon results are exceptionally high and in most areas they are at least above average" (NSW Ombudsman, 2005, p.39). Most recently, the 'YAOs in NSW – Specialised Programs & Recidivism', an internal report by CSNSW, indicated that in general offenders who graduated from the GLC are 24% more likely to remain out of custody upon release compared to those who did not complete the program (CSNSW, 2018).

While existing studies provide positive indications about the impact of the GLC, they are subject to methodological limitations, such as use of research designs that do not address issues of non-equivalence between treatment and comparison groups. There is thus a need for robust empirical evidence as to whether the program has achieved its objective of reducing recidivism among young adult male offenders in NSW.

The primary aim of the current study is to evaluate the effect of participating in the GLC on recidivism outcomes, including instances of reoffending and return to custody, among young adult male offenders in NSW. Understanding the effect of the GLC in reducing recidivism is important to ascertain the program's integrity and impact as well as in establishing an evidence base on which to sustain, develop and expand the program.

An additional aim of the study is to explore process factors relating to GLC participants' treatment pathways, including program completion outcomes and treatment dosage. These factors provide valuable context for understanding implementation of the GLC as well as the results of impact analyses, by giving indications about offender engagement in the program and the extent of intervention received by participants.

The current study aimed to address four key research questions:

1. What are GLC participants' completion rates? What might be the reasons accounting for program non-completion?
2. What is GLC participants' average treatment dosage?
3. Do GLC participants have a lower rate of reoffending and return to custody compared to matched offenders who were eligible for but did not participate in the program?
4. How might the observed treatment effects differ for offenders of Indigenous background and non-Indigenous background?

3 Methods

3.1 Sampling

The treatment cohort

The original treatment sample included all offenders who participated in the GLC between 2012 and 2017, regardless of their GLC completion status. This implies that these offenders must have met all the eligibility criteria for GLC as discussed earlier. To be eligible for the study, offenders must also have been released from custody prior to 30 June 2018. This derived a sample of 593 unique offenders in the treatment sample.

The comparison cohort

Offenders in the comparison group were identified as those who appeared to meet the eligibility criteria to participate in the GLC during their index custodial episode yet did not participate. In particular, these included all male offenders who had an approved status for a YAOP or YOFF[1] flag, as indicated in the Offender Management Programs screen of the Offender Integrated Management System (OIMS). These offenders, however, did not have a referral to attend GLC, as indicated by the absence of a 'Gurnang Life Challenge' referral entry in their list of programs and services in OIMS's Offender Programs and Evaluation Measures screen. These offenders may have been approved for programs but ultimately be unable to attend for a number of reasons, including logistical difficulties or other last-minute changes in the offender's situation, such as health issue warnings by Justice Health, change in classification, assaults, or new court matters.

Further data screening was also performed to ensure that these offenders had not participated in any GLC program during the observation period. This was evidenced by the absence of GLC participation data, such as GLC intake codes, attendance hours and counts in their case file.

To achieve equivalence in offender cohorts, comparison offenders must also have secured a C2 or lower classification during their index custodial episode; have been identified as eligible for YAOP between 2012 and 2017; and have been released from custody prior to 30 June 2018. This process derived a sample of 1436 unique offenders for the purposes of matching to offenders in the treatment group.

3.2 Research design

We adopted a quasi-experimental research design to estimate treatment effects and compare recidivism outcomes between matched GLC participants and comparison offenders. Quasi-experimental research designs have been shown to yield relatively valid estimates when they properly control for systematic selection biases and research groups are robustly defined (Bruinsma & Weisburd, 2007).

The primary quasi-experimental research design of this study was an 'Intention to treat' (ITT) design. Treated offenders in the ITT design were those who had participated in the GLC regardless of their completion status (N=593). Comparison offenders were those who met the GLC eligibility criteria at some point during their custodial episode yet did not participate in the GLC as captured above. The ITT design was considered empirically robust because it minimises selection biases in the treatment group resulting from program attrition and non-completion among some offenders (see also, Blatch et al., 2016; Rahman & Poynton, 2018).

[1] YOFF stands for 'young offenders'

This study also undertook a secondary approach to estimating treatment effects on recidivism, hereby referred to as the Completion approach. The only difference between the Completion and ITT designs was in how the treatment group was defined. Treated offenders in the Completion design were those who had participated in and completed the GLC (see also, Rahman et al., 2018). Since this approach does not account for selection biases resulting from program attrition and non-completion, it would be likely to provide less robust estimates of treatment effects compared to the primary ITT design. However, this approach could provide useful additional insights into outcomes when offenders received the optimal level of GLC intervention as intended at the operational level (Stewart et al., 2014).

3.3 Data sources

Data for the current study were collated and linked from three distinct data sources, including:

Gurnang Life Challenge (GLC) operational data. GLC management and operational staff recorded data on a number of key variables relating to offenders' participation status, including intake codes, classification while attending the GLC intervention, completion status, and reasons for non-completion.

Offender Integrated Management System (OIMS). OIMS is the central operational database for CSNSW that records a wide range of information about offenders under CSNSW supervision. For the current study, OIMS provided data on offender custodial episodes, program referrals, case management and demographic characteristics. Data from OIMS were also used to identify and construct the comparison cohort, and to derive return to custody status, one of the recidivism outcome variables of this study.

Re-offending Database (ROD). ROD is maintained by the NSW BOCSAR. ROD links all finalised NSW Criminal Court appearances and movements in and out of NSW custody for a given offender from January 1994 to present (Hua & Fitzgerald, 2006). For the current study, primary data from ROD included all finalised convictions for any reoffending among offenders up to 30 June 2019.

3.4 Analytical plan

3.4.1 Statistical Matching

Since the current study adopted a quasi-experimental research design, balance between treatment and control groups was achieved through statistical matching. Given the aim of the current study, a two-stage matching strategy was deployed (see also, Burden et al., 2017; Kozma et al., 2011; Wang et al., 2018).

In the first stage, we used the Propensity Score Matching (PSM) procedure to match offenders in the treatment and comparison groups. PSM is a robust method widely used in quasi-experimental studies to reduce biases and confounding factors so as to enable meaningful comparison between groups (Posick, 2018; Wan et al., 2014). The aim of using the PSM in the current study was to achieve equivalence between offenders in two groups on a range of observed characteristics that were relevant to both likelihood of treatment and recidivism outcomes (Rosenbaum & Rubin, 1983).

We computed a logistic regression model to estimate the likelihood of being referred to the GLC for offenders in both groups. In this model, a range of offender characteristics were used as predictors (see Table 1), and treatment assignment was the outcome variable. The resulting predicted probability derived from the model for each offender was then used to estimate their propensity score. Offenders in the treatment and comparison groups were then matched using nearest neighbour matching algorithm, a one-to-one match ratio without replacement (Mahmood, 2018). This meant that each single offender from the treatment group was matched with only one offender from the comparison group who had the closest propensity score to his, provided that this was within the chosen caliper (Thoemmes, 2012); and each offender in the comparison group would only be matched once. A caliper is the maximum allowable difference between two offenders on

their estimated propensity scores. We applied a caliper of 0.2 to ensure relatively stringent matching of propensity between pairs of offenders (Austin et al., 2018).

As a result of the stage one matching, unmatched offenders were excluded, and two matched groups of equal sample sizes were produced. Included in these two matched groups were treated and comparison offenders with similar propensity scores who would be used in the next stage of matching.

In the second stage, we applied coarsened exact matching (CEM) to further match offenders (CEM: Iacus et al., 2009). The aim was to ensure representativeness and balance of the matched cohorts on Indigenous status, thus minimising the likelihood of bias when we performed subgroup analysis based on offenders' background (Burden et al., 2017). Given its high precision in matching, CEM is often used in combination with other statistical matching methods like PSM to improve balance between groups (see also, Burden et al., 2017; Kozma et al., 2011). CEM is a monotonic imbalance-reducing matching method. This means that it reduces the maximum imbalance on one covariate but would have no effect on the others (Blackwell et al., 2009). Besides being easily automated, CEM requires fewer assumptions to be met, is approximately invariant to measurement error, and balances all nonlinearities and interactions in the sample.

Specifically, CEM first temporarily coarsened each covariate into substantively meaningful groups, and then exact-matched these coarsened data to determine matches. This process dropped the unmatched observations from the sample, and kept the matched coarsened data. CEM then retained and passed on the original uncoarsened values of matched data for analysis (for a more detailed process, see Blackwell et al., 2009). In CEM, the overall imbalance is given by L_1 statistic, a comprehensive measure of global imbalance that ranges between 0 and 1. Perfect balance is indicated when L_1=0, and a larger value of L_1 indicates larger imbalance between groups (Iacus et al., 2008).

The two-stage matching procedure was performed for parameters under the ITT and Completion designs separately. For the ITT design, the matching sample included 593 offenders in the treatment group and 1436 offenders in the comparison group. The matching sample for the Completion design included 416 treated offenders and the same 1436 comparison offenders.

3.4.2 Recidivism analysis

Following matching of treatment and comparison groups under the parameters of each design, a series of binary logistic regression (logit) models were performed. These models were used to estimate treatment effects on odds of recidivism within 12 months.

Two recidivism outcomes were considered in this study: general reoffending and return to custody within 12 months. General reoffending was defined as any finalised instance of conviction for a new proven offence during the 12 months free time following release. The 12 months free time was defined as starting on the date the offender was released from custody and adjusted to exclude any periods of reimprisonment post-release that were not related to reoffending. Instances of these might have included breach of parole, or remand without subsequent conviction. Return to custody outcome was derived from OIMS and defined as any recorded instance of reimprisonment within 12 months following release.

Logit models for the two outcomes were computed separately. Treatment effect was estimated using both primary and covariate adjusted logit models. In the primary logit models, treatment was the sole predictor. In the covariate adjusted logit models, a number of covariates were added to and adjusted for, including Indigenous status, age at identification, LSI-R total score, and episode length. These covariates were pre-selected based on a review of empirical literature and contextual considerations relating to YAOs managed by CSNSW (Bonta & Andrews, 2016; Ciolino et al., 2014). Covariate adjusted or 'doubly robust' logit models were performed because in the analysis of binary outcome data, these models were shown to produce more robust, larger and more precise treatment effect estimates, as well as increasing test power compared to unadjusted analysis without inflating Type I error (Ciolino et al., 2014; Jiang et al., 2017; Nicholas et al., 2015).

Table 1. List of variables used for the statistical matching procedure

Variable	Description
Demographics	
Age	Age (years) of the offender when identified as eligible for the YAOP
Indigenous status	Whether the offender identified as being of Aboriginal and/or Torres Strait Islander cultural background
CALD	Whether the offender was identified as having a culturally and linguistically diverse background
Episode characteristics	
Episode length	Length in (days) of the offender's index custodial episode
Risk and needs	
Education/Employment	Total score derived from the LSI-R Education and Employment domain
Criminal History	Total score derived from the LSI-R Criminal History domain
Financial	Total score derived from the LSI-R Financial domain
Family/Marital	Total score derived from the LSI-R Family/Marital domain
Accommodation	Total score derived from the LSI-R accommodation domain
Leisure/Recreation	Total score derived from the LSI-R Leisure/Recreation domain
Companions	Total score derived from the LSI-R Companions domain
Alcohol/Drug	Total score derived from the LSI-R Alcohol/Drug domain
Emotional/Personal	Total score derived from the LSI-R Emotional/Personal domain
Attitudes/Orientation	Total score derived from the LSI-R Attitudes/Orientation domain
LSI-R Total	Total score derived from the LSI-R
Criminal history	
COPAS rate	Measure of density of offending activities[2]
Prior violence offence	Number of proven violent offences (ANZSOC division 01, 02, 05, 06) in the last five years prior to the current index episode start date
Prior theft offence	Number of proven theft, or break and enter offences (ANZSOC division 07, 08, 12) in the last five years prior to the current index episode start date
Prior fraud offence	Number of proven fraud, deception and related offences (ANZSOC division 09) in the last five years prior to the current index episode start date
Prior drug offence	Number of proven illicit drug offences (ANZSOC division 10) in the last five years prior to the current index episode start date
Prior weapon offence	Number of proven prohibited and regulated weapons and explosives offences (ANZSOC division 11) in the last five years prior to the current index episode start date
Prior traffic offence	Number of proven traffic and vehicle regulatory offences (ANZSOC division 14, in particular those related to PCA ANZSOC 0411 and 1431) in the last five years prior to the current index episode start date
Prior government offence	Number of proven offences against government procedures, security and operation (ANZSOC division 15) in the last five years prior to the current index episode start date
Prior sex offence	Number of proven sexual assault and related offences (ANZSOC division 03) in the last five years prior to the current index episode start date

Notes.

1. Originally, a total of 24 matching variables were identified based on theoretical, empirical, and contextual considerations related to the current study.
2. The eight prior offences variables were recoded into binary variables (Yes/No) for use in the PSM. Prior sex offence variable was later excluded in the final PSM as the means of this variable were not different between treated and comparison offenders before matching.
3. The final PSM included an Indigenous x Episode length interaction term as this helped improving balance (Ali et al., 2019; Wang et al., 2018).

[2] For offenders in custody, the COPAS rate was calculated as follows: $COPAS\ rate = \sqrt{n/(t+5)}$; where n is the total number of previous full-time custodial episodes; t is the time gap between the offender's age at the end of the current custodial episode and age at the first full-time imprisonment; and 5 is a constant (Copas & Marshall, 1998).

3.4.3 Subgroup analysis by Indigenous status

Given the identified priority of YAOs with an Indigenous background, additional analyses were performed to explore if having an Indigenous background moderates the effect of treatment on general reoffending and return to custody. The above logit models for 12 month general reoffending and return to custody outcomes were replicated and added with a 'treatment x Indigenous status' interaction term. The aim of adding the interaction term was to examine if the effect of treatment on recidivism outcomes was different between Indigenous and non-Indigenous offenders.

The interaction term represented a multiplicative effect of treatment and Indigenous status to the model. This effect was considered over and above the fixed effects of treatment and Indigenous status when these were entered into the model as separate predictors. In these models, the regression coefficient of the interaction term is the difference in the log odds of recidivism between treated and comparison offenders when they are of Indigenous background, and the log odds of recidivism between treated and comparison offenders when they are of non-Indigenous background.

4 Results

4.1 GLC treatment cohort and pathways

This section provides an overview of the offenders in the treatment group (N=593) and their GLC participation characteristics.

Offenders in the treatment group had an average age of 21.5 years (SD=1.9 years; range from 17-28 years) when they were identified eligible for YAOP. About 1 out of 5 offenders identified as being Indigenous Australian (n=111; 19%); whereas almost half of the treatment group had a culturally and linguistically diverse (CALD) background (n=261; 44%) other than Indigenous Australian background. Treated offenders had an average index custodial episode length of 631 days (SD=497 days).

Only a small proportion of treated offenders had an LSI-R rating of low (n=75; 12.6 %) or high (n=13; 2.2%). Offenders with an LSI-R rating of medium-low, medium, and medium-high made up 29.5% (n=175), 38.8% (n=230), and 16.9% (n=100) of the sample, respectively. The majority of the treated offenders were released from custody with a parole supervision status (n=561; 94.6%) and only a small number were released due to sentence expiry (n=32; 5.4%).

Of the total offenders in the treatment group, more than two thirds (n=416; 70.2%) completed the GLC program.[3] Completion rates varied slightly among offenders of Indigenous and non-Indigenous background. The completion rate was 64.9% (72/111) for Indigenous offenders, which was slightly lower than the completion rate of non-Indigenous offenders (71.4%; 344/482).

Qualitative review of GLC operational data indicated a variety of reasons for program non-completion. The most common reasons that were provided included:

- Having participation suspended due to failures at performance review, or regression to a higher classification (n=47/159[4]; 30%);
- Change of placement to another gaol, or to a special management area such as protection (n=33/159; 21%);
- Quitting or withdrawal from participation (n=29/159; 18%);
- Release on balance of parole, or following a court appeal (n=27/159; 17%);
- Drug taking and/or trafficking in gaol (n=15/159; 9%)
- Escaping from the centre, threatening to escape, or being an accessory to cellmate escape (n=5/159; 3%), and
- Being deported to another jurisdiction (n=3/159; 2%).

Figure 2 shows the histogram of the total number of GLC attendance hours as recorded in OIMS for offenders in the treatment group. On average, treated offenders had a median of 121.07 attendance hours (range = 3 to 163.88 hours). The majority of offenders had attendance hours ranging between 100 to 160 hours.

[3] The definition of completion was based on the completion flags recorded by the GLC operations. When a completion flag was not available, program outcome would be determined as 'completed' if the offender completed more than 75 per cent of the number of hours required for the GLC as recorded in OIMS.

[4] Of 177 participants who did not complete the GLC, only 159 offenders were noted in terms of reasons for non-completion.

It is observed that there was a notable gap in terms of attendance hours between GLC completers and non-completers: Offenders who completed the GLC had a mean of 127.12 attendance hours (SD=23.24), whereas offenders who did not complete the GLC had a mean of 67.25 attendance hours (SD=34.39).

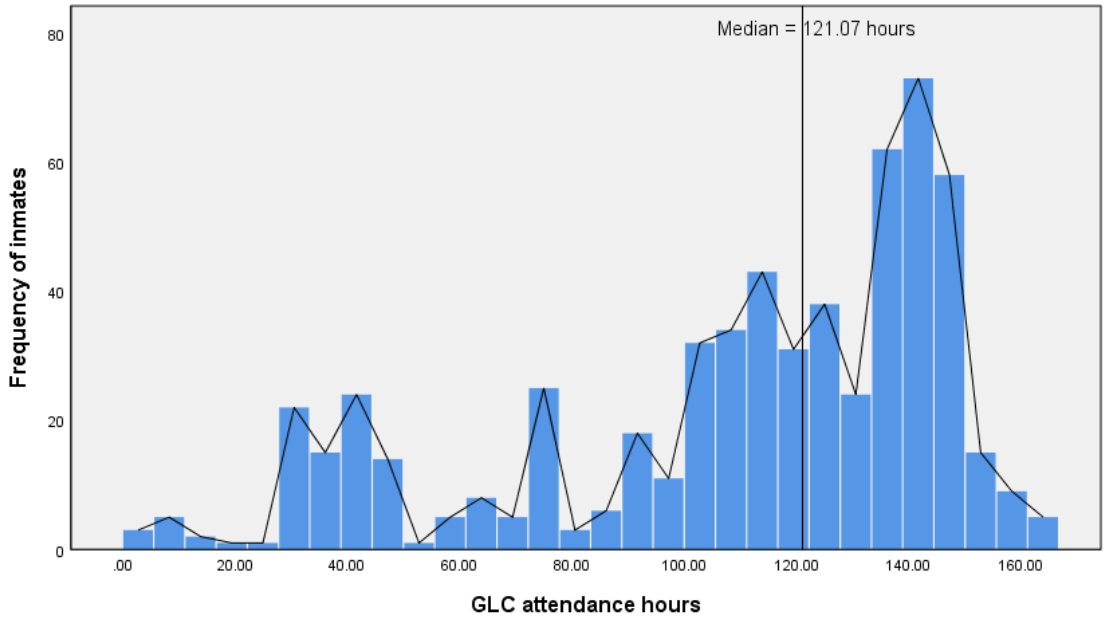

Figure 2. Histogram of GLC attendance hours of treated offenders (N=593)

4.2 Matching model diagnostics

Following completion of the two-stage matching procedure, a series of model adequacy checks were conducted to ensure that balance between treatment and comparison groups was achieved through the matching. This included examining the Chi-square test statistic for overall balance[5] (Hansen & Bowers, 2008); the global multivariate imbalance L_1 measure[6] (Iacus et al., 2008); standardised mean differences of all observed covariates before and after matching; a number of diagnostic plots; and statistical testing for differences between groups (Burden et al., 2017).

Results indicated that overall balance was achieved between treatment and comparison groups for parameters of both the ITT design ($\chi2$=10.63; df=24; p>0.05; caliper=0.2; L_1=0); and the Completion design ($\chi2$=12.15; df=24; p>0.05; caliper=0.2; L_1=0). No observed covariate exhibited a large absolute imbalance value after matching (or, |d| > .25). A detailed balance of propensity scores before and after matching is shown in the Appendix. The matching procedure resulted in 438 matched pairs of treated and comparison offenders for the ITT design, and a total of 321 matched pairs for the Completion design.

[5] The test examined all covariates that were used to estimate the propensity scores, and assessed simultaneously whether any covariate or any linear combination of covariates was significantly unbalanced after matching (Thoemmes, 2012).
[6] This measure assessed simultaneously the full joint distribution based on the discretisation of all covariates, and is bounded by 0 (perfect balance) and 1 (complete separation) (Iacus et al., 2008; Thoemmes, 2012).

4.3 Recidivism outcomes: Intention to Treat (ITT) design

4.3.1 Treatment effects on recidivism within 12 months

Following matching of treatment and comparison groups under the ITT parameters, a series of binary logistic regression (logit) models were performed to estimate the impact of treatment on recidivism outcomes. Results are presented in Tables 2 and 3.

Table 2 shows descriptive statistics for recidivism outcomes for offenders in matched treatment and comparison groups. Compared to offenders in the comparison group, offenders in the treatment group had a 4.1% lower rate of reoffending and a 2.1% lower rate of return to custody within 12 months. While these differences are not of a large magnitude, this suggests that offenders who participated in the GLC had a slightly lower likelihood of reoffending compared to those who did not participate in the program.

Table 2. Cross-tabulation of recidivism outcomes by group membership (Intention to Treat design)

Recidivism outcomes within 12 months		**Comparison group** N/%	**Treatment group** N/%	**Total** N/%
General reoffending	Non-reoffending	255 (58.2%)	273 (62.3%)	528 (60.3%)
	Reoffending	183 (41.8%)	165 (37.7%)	348 (39.7%)
	Total	438 (100%)	438 (100%)	**876 (100%)**
Return to custody (RTC)	Non-RTC	310 (70.9%)	319 (73.0%)	629 (72.0%)
	RTC	127 (29.1%)	118 (27.0%)	245 (28.0%)
	Total	437 (100.0%)	437 (100.0%)	**874 (100.0%)**

Table 3 gives the results of regression models for reoffending and return to custody outcomes under the ITT design. It can be seen that the treatment odds ratios were lower than 1 in each case, indicating that offenders in the treatment group had a lower likelihood of recidivism compared to offenders in the comparison group. For example, the odds ratios in the primary logit model show that treated offenders had 16% lower odds of reoffending and 10% lower odds of return to custody within 12 months compared to matched offenders in the comparison group. However, in each case the treatment coefficient was not significant, indicating that differences in the odds of recidivism were not significantly different from 1, or there were equal odds between treatment and comparison groups. Similar patterns were observed in both the primary logit models and the covariate adjusted logit models.

Table 3. Logit models predicting general reoffending (n = 876) and return to custody (n= 874) within 12 months free time following release (Intention to Treat design)

Predictors	**General reoffending**				**Return to custody**			
	B	**p**	**OR**	**95% CI**	**B**	**p**	**OR**	**95% CI**
Primary logit model								
Treatment	-.17	.214	.84	.64 - 1.10	-.10	.498	.90	.67 - 1.21
Constant	-.33	.001	.72	N/A	-.89	.000	.41	N/A
Covariate adjusted logit model								
Treatment	-.13	.406	.88	.65 – 1.19	-.05	.744	.95	.68 – 1.31
Indigenous status	.46	.013	1.58*	1.10 – 2.26	.54	.004	1.71*	1.18 – 2.48
Age at identification	-.16	.000	.85*	0.79- 0.92	-.23	.000	.80*	0.73 - .87
LSI-R total score	.09	.000	1.09*	1.07 – 1.11	.104	.000	1.11*	1.09 – 1.14
Episode length	-.00	.000	.99*	0.99 – 1.00	0.00	.225	1.00	0.99 – 1.00
Constant	1.09	.225	2.98	N/A	1.06	.289	2.89	N/A

Notes. * Statistically significant (p<0.05) odds ratios (OR).

4.3.2 Treatment effects by Indigenous status: Subgroup analysis

Additional analyses were conducted to explore if having an Indigenous background might have moderated treatment effects on general reoffending and return to custody. The above logit models for 12 month general reoffending and return to custody outcomes were replicated with the addition of a 'treatment x Indigenous status' interaction term. Results showed a non-significant interaction effect for both general reoffending (B=-.48; SE=.33; Wald $\chi2(1)=2.09$; $p>.05$) and return to custody (B=-.18; SE=.34; Wald $\chi2(1)=.28$; $p>.05$). This indicates that the moderating effect of Indigenous status on treatment was not statistically significant for both recidivism outcomes.

Table 4 further shows the proportions and raw rates of general reoffending and return to custody within 12 months as a function of Indigenous status. For both Indigenous and non-Indigenous offenders, the difference in rates of general reoffending between treated and comparison offenders is small. The same pattern of results is observed for the return to custody outcome.

Table 4. Proportions and rates of general reoffending (N=876) and return to custody (N=874) within 12 months as a function of Indigenous status (Intention to Treat design)

Group	n/N	%
General reoffending		
Non-Indigenous comparison offenders	123/341	36.1%
Non-Indigenous treated offenders	118/341	34.6%
Indigenous comparison offenders	60/97	61.9%
Indigenous treated offenders	47/97	48.5%
Return to custody		
Non-Indigenous comparison offenders	81/340	23.8%
Non-Indigenous treated offenders	78/341	22.9%
Indigenous comparison offenders	46/97	47.4%
Indigenous treated offenders	40/96	41.7%

4.4 Recidivism outcomes: Completion design

In the Completion design, the above analyses were repeated for only those offenders who had completed the GLC and their matched comparison group counterparts. It was intended that this secondary analytical approach would provide additional insights into recidivism outcomes when offenders received the optimal level of GLC intervention as intended (Stewart et al., 2014). Since the available matched samples were smaller than those used in the ITT design, this might have affected the power of statistical analyses conducted and the comparability of results to some extent.

4.4.1 Treatment effects on recidivism within 12 months

Similar to results of the ITT design, Table 5 shows that treated offenders showed a slight reduction in rates of general reoffending and return to custody compared to comparison offenders in the 12 months period following release (both estimates=1.8%).

Table 6 provides the results of regression modelling for recidivism outcomes under the Completion design. Again, odds ratios comparing treatment to comparison offenders were all less than 1 (ORs<1), indicating that treatment was associated with a lower odds of reoffending and return to custody within 12 months. However, treatment status was not a statistically significant predictor of either recidivism outcome for the Completion design (ps>0.05). This was observed both in the primary logit models and the covariate adjusted logit models.

Table 5. Cross-tabulation of recidivism outcomes by group membership (Completion design)

Recidivism outcomes within 12 months		Comparison group N/%	Treatment group N/%	Total N/%
General reoffending	Non-reoffending	206 (64.2%)	212 (66.0%)	418 (65.1%)
	Reoffending	115 (35.8%)	109 (34.0%)	224 (34.9%)
	Total	321 (100.0%)	321 (100.0%)	**642 (100.0%)**
Return to custody (RTC)	Non-RTC	237 (74.1%)	243 (75.9%)	480 (75.0%)
	RTC	83 (25.9%)	77 (24.1%)	160 (25.0%)
	Total	320 (100.0%)	320 (100.0%)	**640 (100.0%)**

Table 6. Logit models predicting general reoffending (n=642) and return to custody (n=640) within 12 months free time following release (Completion design)

Predictors	General reoffending				Return to custody			
	B	**p**	**OR**	**95% CI**	**B**	**p**	**OR**	**95% CI**
Primary logit model								
Treatment	-.082	.619	.92	.67 - 1.27	-.10	.584	.91	.63 - 1.29
Constant	-.58	.000	.56	N/A	-1.05	.000	.35	N/A
Covariate adjusted logit model								
Treatment	-.02	.908	.98	.68 – 1.41	-.02	.912	.98	.65 - 1.47
Indigenous status	.65	.004	1.92*	1.23 – 3.01	.76	.001	2.14*	1.34 – 3.42
Age at identification	-.17	.000	.84*	.77 - .93	-.14	.010	.87*	.79 - 0.97
LSI-R total score	.11	.000	1.11*	1.09 – 1.14	.12	.000	1.13*	1.10 – 1.16
Episode length	-.00	.005	.99*	.99 – 1.00	.00	.186	1.00	0.99 – 1.00
Constant	.48	.660	1.62	N/A	-1.50	.217	.224	N/A

Notes. * Statistically significant ($p<0.05$) odds ratios (OR).

4.4.2 Treatment effects by Indigenous status: Subgroup analysis

Similar to the ITT design, a 'treatment x Indigenous status' interaction term was added to the recidivism analyses for the Completion design. Results indicated a significant interaction effect for general reoffending (B=-.90; SE=.42; Wald $\chi2(1)=4.75$; $p<.05$); but not for return to custody (B=-.58; SE=.43; Wald $\chi2(1)=1.87$; $p>.05$). This means that there was a statistically significant moderating effect of Indigenous status on treatment for general reoffending, or that the difference in odds of reoffending within 12 months between treated and comparison offenders differed for offenders of Indigenous and non-Indigenous backgrounds.

To further examine the nature of the significant moderating effect of Indigenous status on general reoffending, we conducted pairwise comparisons between treated and comparison offenders when their background was Indigenous, and when their background was non-Indigenous.

Results indicated that among Indigenous offenders, treatment was a significant predictor of recidivism: Treated Indigenous offenders who completed the GLC had a 54% lower odds of reoffending (B=-.78; SE=.37; Wald $\chi2(1)= 4.49$; $p<.05$; OR=.46) relative to offenders in the comparison group.

Among non-Indigenous offenders, it was observed that treated offenders had a 13% higher odds of reoffending (OR=1.13) than comparison offenders. However, the treatment coefficient was not statistically significant (B=.125; SE=.19; Wald $\chi2(1)= .42$; $p>.05$). This indicates that the difference in odds of recidivism was not significantly different from 1, or equal odds between treated and comparison offenders of non-Indigenous background.

Table 7 shows the proportions and raw rates of general reoffending within 12 months as a function of Indigenous status. As can be seen, the rate of general reoffending was 19.1% lower for treated offenders of Indigenous background compared to untreated Indigenous offenders. Meanwhile, treated offenders of non-Indigenous background had a slightly higher rate of general reoffending compared to their counterparts in the comparison group (estimate=2.6%).

Table 7. Proportions and rates of general reoffending (N=876) within 12 months as a function of Indigenous status (Completion design)

Group	n/N	%
Non-Indigenous comparison offenders	74/257	28.8%
Non-Indigenous treated offenders	82/261	31.4%
Indigenous comparison offenders	41/64	64.1%
Indigenous treated offenders	27/60	45.0%

5 Discussion

As one of the key Specialised Programs for YAOs in NSW, the GLC focuses on addressing dynamic risk factors and age-specific needs of young adult male offenders so as to reduce their risk of recidivism. The aim of this study was to examine if participating in the GLC reduces participants' likelihood of reoffending and return to custody. To achieve this aim, the study adopted a robust quasi-experimental research design to estimate GLC treatment effects and compare recidivism outcomes between GLC participants and their matched counterparts in the comparison group. The study also provided insights into the treatment pathways of GLC participants, including their patterns of program participation and treatment dosage received.

5.1 GLC treatment pathways

Results of the current study indicate that there was a reasonably high completion rate among the GLC participants, where more than two thirds of treated offenders completed the program (70.2%). This rate of program completion is similar to that of other offender programs delivered by CSNSW in the same period. [7] For example, in the 2013-14 financial year, the overall completion rate of CSNSW programs was 67% for inmates and 66% for community-based offenders; 67% for aggression and violence programs; and 68.5% for alcohol, drugs and addiction programs (Department of Police and Justice, 2014). The relatively high completion rate of the GLC participants is promising, with a positive implication that YAOs can be engaged in a similar manner to that of older adult offenders. In addition, it provides context to the relative consistency of results between the ITT and Completion designs used in this study.

Completion rates were observed to differ between offenders of Indigenous and non-Indigenous backgrounds. Offenders of Indigenous background appeared to have a slightly lower rate of completion (64.9%) compared to their non-Indigenous counterparts (71.4%). One possible explanation is that certain components of the program may not have well met the culturally specific needs of some YAOs of Indigenous background. Alternatively, a lower completion rate among Indigenous offenders could have been related to their having higher risk of recidivism on average compared to non-Indigenous offenders, which has been found to be a relatively consistent predictor of program attrition (Wormith & Olver, 2002).

A broad range of reasons that accounted for program non-completion among GLC participants were found. These included having participation suspended due to regression to a higher classification, or failures at performance review; change of placement to another gaol, or to Special Management Area Placement (SMAP); quitting or withdrawal; release on balance of parole, or following a court appeal; and drug taking and/or trafficking in gaol.

While it has been a common practice to suspend offenders' participation in a custody-based program when misconduct occurs, it might benefit that alternative sanctions be explored at GLC in place of program exclusion or termination for those displaying behaviour problems during participation. This might help address offenders' underlying needs, and at the same time, support their ongoing participation in and completion of programs allocated to them. An example in this direction is CSNSW's recent implementation of the Alternative Sanctions Pilot program which provides therapeutic alternative sanctions to inmates who were convicted of drug misconduct, in place of imposing purely punitive measures on them.

[7] With the exception of the Custody-based Intensive Treatment (CUBIT) program, which produced a 99% completion rate in 2013-14 financial year.

On another note, withdrawal and quitting were also common among GLC non-completers. It has been observed that prisoners who withdraw from a program before completion are more likely to reoffend compared to those who complete or do not participate in programs at all (Cann et al., 2005). From this, some GLC participants might benefit from additional preparatory sessions and interventions, such as motivational interviewing to improve their continued engagement in the program. This is to ensure that GLC participants would receive the optimal level of intervention intended at the operational level, and thus, would be likely to derive benefit from the intervention (Andrews et al., 1990).

5.2 GLC recidivism outcomes

When compared to matched offenders in the comparison group, GLC participants were observed to have lower rates as well as lower odds of general reoffending and return to custody within 12 months' free time following release. This was observed both in the primary Intention to Treat (ITT) design and the Completion design. However, treatment was not a significant predictor of recidivism, indicating that differences in recidivism between treated and comparison offenders were not statistically greater than what could be attributed to error alone. The pattern of treatment effects of the GLC on recidivism outcomes appears to be consistent with that of previous studies, in that while custody-based programs produce some positive effects, these are often not of sufficient impact to prevent the majority of juveniles and YAOs from reoffending (James et al., 2013; Lipsey & Cullen, 2007).

While the observed impact of the GLC on recidivism outcomes was not optimal, it is not surprising given how YAOs are often characterised by particular risk factors and complex needs as discussed earlier. As such, results of the GLC, or any intervention programs for YAOs, need to be viewed from multiple angles and situated within an understanding of the unique characteristics and circumstances of these offenders. At the minimum, these should include an understanding of the GLC participants themselves, and how intervention programs for them have been designed and implemented.

The demographic profile of GLC participants indicates that they were typical for offenders in this age cohort. The majority of them were in the very early stage of adulthood when identified as eligible for the GLC (average age of 21.5 years; range=17-28). One in five identified as Indigenous Australian; and almost half had a culturally and linguistically diverse (CALD) background. It is expected that like others in their age cohort, GLC participants may have experienced multifaceted challenges pre-incarceration, during custody and after release. At the minimum, these could include the challenges associated with the dual transition from adolescence to adulthood, and from incarceration to a normal life in the community post release (James et al., 2016). Indeed, like elsewhere, GLC participants have been reported to be one of the most vulnerable groups of offenders managed by CSNSW (CSNSW, 2018). Also, it might have taken many years and an accumulation of problems for GLC participants to become the young adults they now are (James et al., 2016; Lane et al., 2005). It thus may require a greater duration and intensity of intervention to effect significant changes in these young people than is possible within the scope of 16 weeks' intervention delivered by the GLC.

The limited results of the GLC are also understandable when taking into account how the GLC has been designed and delivered since inception, with respect to the RNR model. Historically the GLC has admitted inmates on the condition that they have a complete LSI-R risk assessment, but eligibility is not associated with specific risk-related criteria. As reported earlier, the LSI-R risk profile of GLC participants indicates that about 57.9% of them were classified as having a medium or higher risk; and up to 42.1% of them had a risk rating of medium-low or lower. In terms of attendance hours, GLC participants had about 121 hours on average, with the majority of them attending between 100 to 160 hours.

As discussed earlier, evidence from both the 'what works' and desistance literature indicates that interventions are most likely to be effective when tailoring its intensity to the offender's risk level (Makarios et al., 2014). By this, only higher risk offenders should receive more hours of criminogenic interventions, or what

is termed as treatment dosage (Sperber & Latessa, 2016); and low risk cases should receive little, if any, services (Gendreau et al., 1996). While the relationship between treatment dosage and recidivism is not linear, there are indications that the greatest reductions in recidivism may be achieved in medium/high risk offenders who receive relatively high dosage (e.g., 200-249 hours of intervention: Makarios et al., 2014). On this basis, it appears that with its current non-specific eligibility criteria in relation to risk level and a standardised length of 16 weeks for offenders of all levels of risk, the GLC might not have adhered well to the risks principle of the RNR model. The program might have provided reasonable intensity for some offenders (such as those with medium risk), but might have provided too much intervention for those with low risk, or too little for those with high risk. This could have resulted in the dilution of the program's treatment effect size.

From the perspective of the needs principle, the GLC aims to holistically address offenders' complex needs by providing a number of key interventions, including Core Elements, Work Readiness, Vocational Education, Self-Responsibility and Dynamic Risk. These elements aim to provide a unique combination of adventure therapy, experiential and cognitive learning, personal development and wellbeing, as well as skills training, work ethics and readiness combined with intensive case management. Some of these elements, however, might not necessarily address offenders' criminogenic needs, and potentially make the program less adherent to the needs principle. Evidence indicates that while multimodal interventions using a cognitive-behavioural approach like that of the GLC are generally effective, these need to be offered in adherence to the RNR principles to achieve the intended outcome (Halsey & de Vel-Palumbo, 2016).

5.3 Outcomes among priority offender groups: Moderating effects of Indigenous status

Additional analyses indicate that participation in the GLC may have been associated with differing outcomes for offenders of Indigenous and non-Indigenous background. After adding an interaction term into our logit models for 12 month recidivism analyses under the Completion design, we found that the association between treatment and general reoffending differed significantly as a function of offenders' background. Indigenous offenders who completed the GLC showed a significant reduction in odds of general reoffending compared to their counterparts in the comparison group. Meanwhile, non-Indigenous offenders who completed the program showed a slight, non-significant increase in rates of general reoffending compared to their untreated counterparts.

The pattern of results generally suggests that the GLC might have comparatively yielded a more positive effect on YAOs who are of Indigenous background and completed their designated GLC intervention. This pattern of results is also consistent with that of prior impact evaluation of CSNSW interventions where treated parolees of Indigenous background were found to respond to reintegration support services better than their non-Indigenous counterparts (Morony et al., 2019).

As reported earlier, Indigenous offenders in the current study had a lower completion rate than non-Indigenous offenders. Offenders of Indigenous backgrounds are also often reported to have higher risk and more complex support needs, both in and out of custody (Willis, 2008). In this context, a potential explanation is that Indigenous offenders who completed the GLC were likely to represent a self-selected group of inmates who were highly motivated to engage in interventions and were ready for change. There is also the implication that criminogenic needs addressed by the GLC might have had greater relevance to criminal justice outcomes for Indigenous offenders compared to non-Indigenous offenders. In this vein, the results provide some early indications of impact of programs like the GLC for Indigenous offenders. As this impact is contingent on maintaining offender engagement in and completion of interventions, there would be benefit in further exploring ways to optimise participation outcomes among offenders of Indigenous heritage in particular.

On the other hand, the results show that participation in the GLC had negligible or adverse impacts on reoffending outcomes for offenders of non-Indigenous background. While it is unclear as to why this occurred, one possible explanation is that non-Indigenous participants might have had a particular profile of risk and needs that the GLC intervention model was not appropriate for, or treatment dosage was not sufficient to address. Indeed, international research indicates that when a program is not aligned to the correct person, it is likely not to produce the expected outcome (Office of the Inspector of Custodial Services, 2014). Alternatively, it is possible that GLC completers of non-Indigenous background might have been relatively prone towards focusing on components of the GLC interventions that address more instrumental or non-criminogenic needs, to the neglect of other components that are designed to directly target their criminogenic needs and promote behaviour change.

5.4 Limitations of the study

Some limitations of the current study are noted. First, there were challenges in identifying and constructing a comparison group for use in our quasi-experimental research design. While this has been substantially accounted for by our adoption of a robust two-stage statistical matching process, certain unobserved selection biases could have remained. This could have contributed to additional non-equivalence between groups, and thus, impacted on results of the analyses and interpretation of the GLC treatment effects.

In addition, using reduced sample sizes in the Completion design could have impacted the statistical power of tests conducted and likelihood of type II error (see also, Zhang et al., 2019). Similarly, due to reduced sample sizes used in subgroup analyses of priority offender groups, the relevant results may be less robust compared to results of the primary analyses. Another limitation of the current study relates to its use of a treatment cohort that was limited to the period of 2012-2017. The GLC has been in operation for almost three decades. Multiple changes to the program are likely to have occurred, and the program may have had trends of varying effectiveness over time. This study's particular focus on this recent period of GLC operations was to capture and understand current practice in the model and its associated impact, rather than to understand changes to the model over time. An implication is that the results of this impact evaluation should only be viewed as reflective of GLC outcomes within this period.

A related consideration is that the GLC has previously been observed to achieve better results when its participants accessed earlier readiness programs offered in Stage 2 of the Specialised Programs, and that they accessed those offered in Stages 4 and 5 following their satisfactory completion of Stage 3 (CSNSW, 2018). More broadly, completion of the GLC does not occur in isolation and those who participated might have followed different pathways, including changes of placement across correctional centres, remaining at Oberon as an adult worker and completing further intervention programs, or progressing in classification to C3 to include Day/Weekend Leave, Education Leave and Works Release Programs (from Oberon to other correctional centres). Following different pathways has the potential to segment the treatment group into subgroups of offenders who experienced different types and levels of intervention prior to their release from custody. It is noted that offenders who do not attend GLC are also likely to experience a range of other interventions and pathways through the custodial system during their sentence which might not be fully accounted for in the design of this study. In this regard, the current study may be best conceptualised as an evaluation of the marginal effects of attending the GLC on recidivism outcomes within the context of a complex environment with multiple influences.

Lastly, we acknowledge that the current study has evaluated the impact of the GLC on recidivism mostly from a statistical standpoint. As thus, it has not taken into account other indicators of change among the participants. In the literature, alternative ways to measure recidivism have been proposed, including viewing success after prison as equating to less severe and/or less frequent offending in the early attempts to desist from crime rather than a sudden once-off cessation of all offending (Maruna, 2001). It has been suggested

elsewhere that results of impact evaluations, especially those for challenging groups such as YAOs, should be viewed beyond the significance level of a statistical model, and towards a more holistic outlook (Tomczak & Tomczak, 2014).

5.5 Conclusion

The results of this study provided some evidence to suggest that over its course of operation from 2012-2017, participation in and completion of the GLC was associated with modest reductions in reoffending outcomes relative to matched comparison offenders. However, treatment effects did not reach statistical significance, which suggests that the program did not achieve sufficient impact for many participants to consistently affect recidivism outcomes. There were, however, indications that the GLC may have particular promise as a treatment avenue for YAOs of Indigenous background who complete the program.

The observed limited treatment effects of GLC are consistent with other research on interventions for YAOs. This suggests that addressing YAOs' criminogenic needs and assisting them to reintegrate into society without reoffending is a particularly challenging process. As such, the impact of interventions for YAOs might be facilitated and maximised if these interventions are designed and operated based on a comprehensive understanding of offenders' specific needs, as well as adherence to RNR and 'what works' principles (Gendreau et al., 1996; McGuire, 2015).

Some specific features of the GLC may contribute to the observed effects on recidivism outcomes, including relatively low adherence to risk and need principles of the RNR model. Offenders were admitted to the program without reference to assessment of their recidivism risk, and the fixed-length format of the GLC may limit capacities to tailor intensity or dosage to the individual. In addition, it is not clear whether certain adventure and experiential components of the GLC program serve to address criminogenic needs (although such components may have other benefits for engaging many offenders in the program). As a targeted and effective approach in reducing recidivism for YAOs has particular potential to disrupt cycles of offending that may persist for many years, it is important that the GLC be subject to regular review and development of best practice. Considering that the GLC is currently undergoing review towards potential reforms, it is possible that the program will have a more pronounced impact in lowering recidivism among YAOs in NSW in the future.

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7 Appendix

Model adequacy checking before and after matching

Detailed balance of propensity scores before and after matching for the Intention to Treat design (N=876)

Covariates	Means Treated		Means Comparison		Std. Mean Diff.	
	Before	After	Before	After	Before	After
Propensity	0.49	0.40	0.21	0.39	1.11	0.03
Age at identification	21.53	21.61	21.71	21.51	-0.10	0.05
Indigenous status	0.19	0.22	0.35	0.22	-0.42	0.00
CALD	0.44	0.38	0.29	0.41	0.30	-0.05
LSI-R Total	24.68	25.24	27.28	25.45	-0.28	-0.02
LSI-R Criminal History	5.04	4.92	4.92	4.95	0.05	-0.01
LSI-R Education/Employment	5.58	5.78	6.27	5.77	-0.24	0.00
LSI-R Financial	1.21	1.25	1.37	1.24	-0.20	0.01
LSI-R Family/Marital	1.24	1.34	1.60	1.32	-0.31	0.02
LSI-R Accommodation	0.78	0.79	0.92	0.87	-0.16	-0.10
LSI-R Leisure/Recreation	1.51	1.53	1.60	1.51	-0.12	0.02
LSI-R Companions	1.95	1.95	2.01	1.94	-0.08	0.02
LSI-R Alcohol/Drug	4.63	4.71	4.96	4.86	-0.14	-0.07
LSI-R Emotional/Personal	1.27	1.46	1.89	1.44	-0.47	0.02
LSI-R Attitudes/Orientation	1.47	1.54	1.76	1.56	-0.21	-0.02
COPAS rate	0.25	0.22	0.14	0.23	0.42	-0.01
Prior violence offence	0.15	0.13	0.12	0.16	0.09	-0.06
Prior theft offence	0.14	0.13	0.11	0.12	0.08	0.02
Prior fraud offence	0.01	0.00	0.01	0.00	-0.04	-0.03
Prior drug offence	0.02	0.02	0.01	0.03	0.01	-0.06
Prior weapon offence	0.01	0.01	0.01	0.01	0.00	0.00
Prior traffic offence	0.06	0.05	0.03	0.05	0.13	0.00
Prior government offence	0.14	0.13	0.12	0.13	0.06	-0.02
Episode length	6.34	5.06	2.82	4.76	0.71	0.06
Indigenous x Episode length interaction	1.19	1.22	0.98	1.23	0.06	0.00

Detailed balance of propensity scores before and after matching for the Completion design (N=642)

Covariates	Means Treated		Means Comparison		Std. Mean Diff.	
	Before	After	Before	After	Before	After
Propensity	0.46	0.36	0.16	0.35	1.11	0.03
Age at identification	21.60	21.63	21.71	21.78	-0.06	-0.08
Indigenous status	0.17	0.19	0.35	0.20	-0.48	-0.03
CALD	0.47	0.44	0.29	0.44	0.36	-0.01
LSI-R Total	23.54	24.34	27.29	24.58	-0.41	-0.03
LSI-R Criminal History	4.84	4.87	4.93	4.91	-0.04	-0.02
LSI-R Education/Employment	5.19	5.42	6.27	5.50	-0.37	-0.03
LSI-R Financial	1.11	1.19	1.37	1.20	-0.31	-0.01
LSI-R Family/Marital	1.14	1.20	1.60	1.29	-0.41	-0.08
LSI-R Accommodation	0.72	0.73	0.92	0.77	-0.24	-0.05
LSI-R Leisure/Recreation	1.50	1.49	1.60	1.51	-0.14	-0.03
LSI-R Companions	1.93	1.92	2.01	1.94	-0.12	-0.03
LSI-R Alcohol/Drug	4.50	4.67	4.96	4.59	-0.20	0.03
LSI-R Emotional/Personal	1.24	1.38	1.89	1.37	-0.49	0.00
LSI-R Attitudes/Orientation	1.39	1.50	1.76	1.52	-0.26	-0.02
LSI-R Total	0.24	0.22	0.14	0.24	0.38	-0.05
Prior violence offence	0.14	0.13	0.12	0.13	0.05	-0.02
Prior theft offence	0.11	0.11	0.11	0.11	0.02	-0.01
Prior fraud offence	0.01	0.00	0.01	0.01	-0.01	-0.04
Prior drug offence	0.01	0.02	0.01	0.01	-0.02	0.06
Prior weapon offence	0.00	0.01	0.01	0.01	-0.05	0.00
Prior traffic offence	0.05	0.05	0.03	0.05	0.09	0.00
Prior government offence	0.12	0.11	0.12	0.13	0.02	-0.07
Episode length	6.94	5.41	2.82	5.19	0.78	0.04
Indigenous x Episode length interaction	1.18	1.03	0.98	1.18	0.06	-0.05

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