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Evaluating Youth on Track:

A randomised controlled trial of an early intervention program for young people who offend

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AIM

To evaluate the impact of an early intervention caseworker program called Youth on Track, on recidivism, education, employment, community activity and housing.

METHOD

A randomised controlled trial (RCT) was implemented between August 2017 and June 2020. A brief intervention called Fast Track was created as the control arm to ensure some level of treatment for all young people participating in the RCT. All eligible young people were randomised to either Youth on Track (*N*=391) or Fast Track (*N*=334). Criminal justice outcomes including the proportion reoffending, the proportion entering custody and the time to first reoffence were compared between young people in Youth on Track and Fast Track. Social outcomes including education, employment, community activity and housing were also examined.

RESULTS

No significant differences between Youth on Track and Fast Track were found in the proportion of young people who reoffended within 12 months, 24 months, or in the time to first reoffence. Young people in Youth on Track were 2.8 percentage points less likely to enter custody within 12 months and 3.5 percentage points less likely to enter custody within 24 months compared with young people in Fast Track. However, these differences were not statistically significant. Youth on Track participants in one site and those who entered in the first year of the trial had much larger and some statistically significant reductions in offending and custody entries Turning to social outcomes, young people in Youth on Track were 6.2 percentage points more likely to participate in employment at the end of their programs and spent, on average, one more hour in employment each week. Youth on Track participants were also 1.5 percentage points less likely to be in out-of-home care at program exit compared with Fast Track participants. Both these differences were statistically significant. However, no group differences were found in rates or weekly hours of education, or rates of participation in community activities at program exit.

CONCLUSION

Although the trial revealed better outcomes for Youth on Track participants in some domains, reoffending rates of Youth on Track participants were similar to the reoffending rates of young people allocated to the briefer, less intensive intervention. Variability in implementation of the scheme across sites and over time may partially explain these effects.

KEYWORDS Young people /Juveniles | Randomised controlled trial | Risk-needs-responsivity | Cognitive behavioural therapy

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INTRODUCTION

Over the last two decades, NSW has experienced significant falls across most major crime categories. The observed decline in property crime has been especially dramatic, with rates of burglary and motor vehicle theft dropping by more than 80% since 2001 (Goh & Ramsey, 2021). Much of this crime decline appears to be due to fewer young people offending, particularly those aged 15 to 20 years (Trimboli, 2019a; Weatherburn et al., 2014).

However, despite substantial improvements in the number of young people committing an offence, the reoffending rates of young offenders have remained stable, or increased, over the last decade. In 2018-19, 57% of those aged 10 to 16 who completed a community-based supervised sentence received another supervision order within 12 months. This compares with 49% returning to supervision in 2011-12. The rate of return within 12 months for young people sentenced to a detention order was stable over this period, with a peak of 80% in 2017-18 and a low of 76% in 2011–12 (Australian Institute of Health and Welfare, 2021). Work by both Payne et al. (2018) and McCarthy (2021) also suggests that much of the reduction in youth offending observed in recent decades is due to a decrease in low to moderate youth offending. They found that the proportion of young people who can be considered chronic offenders (which they define as committing five or more offences) has increased over this same period.

The high rate of youth reoffending highlights the need to identify effective strategies to reduce recidivism among young people with more complex needs. Culturally appropriate youth interventions are especially important given that Aboriginal young people continue to be grossly overrepresented in the youth justice system, with nearly half of all young people in custody identifying as Aboriginal (Australian Institute of Health and Welfare, 2022). This paper presents the results of an evaluation of Youth on Track: a NSW scheme where specialist caseworkers work with young offenders to address their needs across multiple domains, including behavioural issues, family functioning, and participation in education and employment.

Strategies to reduce youth reoffending

While most young people involved in crime will desist without any need for intervention, there is a small group who continue offending into adulthood and who account for a disproportionate amount of crime committed (Moffitt, 2003; Nelson, 2015). Evidence suggests that early identification and targeting of this group of young people who are most at-risk is likely to achieve the greatest reductions in recidivism (Caldwell & Van Rybroek, 2005; Cox et al., 2020; Dowden & Andrews, 2000; Fagan & Catalano, 2012), and be the most cost-effective approach to crime control (Lipsey et al., 2010).

Reviews of the international literature have identified a number of interventions that are successful in reducing youth reoffending. Common to these approaches are a focus on matching services to a young person's risk level (i.e., delivering more intensive services to those at greatest risk), targeting a range of risk factors known to be associated with reoffending and tailoring service provision to an individual's abilities and learning styles (Adler et al., 2016; Day et al., 2003; Dowden & Andrews, 2000; Lipsey & Wilson, 1998; Ogloff, 2002). In addition, effective interventions are those which consider the wider offending context, including the influence of family and peers, as well as any relevant community or cultural issues (Allard et al., 2007). This literature is collectively known as "risk-needs-responsivity" or the "what works" literature.[1]

It is well established that young people at higher risk of reoffending have complex needs across multiple domains. They are more likely to come from socio-economically disadvantaged backgrounds, often have experienced some form of trauma (Yohros, 2022), often have parents who have separated/divorced, and many have been in out-of-home care (Gerard et al., 2018; Ringland et al., 2015) or the subject of a confirmed report of neglect or abuse (Cottle et al., 2001; Weatherburn et al., 2007). Past contact with

1 There are critiques of the "what works" literature. For example, McAra and McVie (2007) argue that interventions based on the 'what works' literature have the potential to create harm. This occurs because these interventions may mislabel young people as high-risk, and this may result in deviance amplification among these young people.

the criminal justice system, particularly at an early age, has also been found to be a strong predictor of future offending (Cottle et al., 2001; Weatherburn et al., 2007). Additional factors associated with the risk of recidivism, include poor school attendance, school expulsions (Weatherburn et al., 2007), substance misuse, association with antisocial peers and low income (Yukhnenko et al., 2019).

Many of these risk factors are "static" or unmodifiable (e.g., criminal history or parental separation), so while useful in classifying risk and level of service intensity, they are less informative for identifying target areas for intervention. "Dynamic" or modifiable risk factors such as anti-social attitudes, school behaviour, and substance abuse, are therefore typically the focus of evidence-based youth interventions which aim to reduce reoffending risk. The success of these approaches will depend on the extent to which these dynamic risk factors independently contribute to the young person's offending behaviour. Given the complex needs of young offenders, interventions that use multiple services to address a range of dynamic offending-related risks are therefore thought to lead to better outcomes for young people (Adler et al., 2016; Lipsey et al., 2010).

The type of treatment program is also strongly related to crime outcomes, with therapeutic programs found to be more successful in reducing reoffending than punitive programs. Effective therapeutic programs include those that incorporate elements of Cognitive Behavioural Therapy, Social Skills training, and counselling (e.g., for individuals, groups and families) (Allard et al., 2007; Koehler et al., 2013; Lipsey et al., 2010; Pappas & Dent, 2021). The magnitude of the treatment effect from therapeutic programs varies across different types of programs, with estimates ranging from a 15.9% reduction in recidivism rates for Family Functional Therapy to a 2.5% reduction for Cognitive Behavioural treatment (see for example Aos et al., 2006). However, what the empirical research consistently highlights is that the way in which these programs are implemented matters. Therapeutic programs are only effective if they are of high quality, delivered with sufficient dosage and adhere to program design principles (Day et al., 2003; Knoth et al., 2020; Lipsey et al., 2010). Effective programs should also be tailored to the age of a young person. Youth involvement in crime often peaks in the mid to late teenage years (a phenomenon known as the "age-crime curve"), which suggests that different types of interventions may be required at different developmental stages (Adler et al., 2016).

While there is a strong evidence base for youth offending programs with the above features, the bulk of the existing research has focused on programs delivered within a Youth Justice setting, where service providers are working with young people who are in custody or serving community-based orders. There are fewer rigorous evaluations of programs targeting young offenders who are in the early stages of their criminal career with little or no prior contacts with police (CIRCA, 2017). Further, most of the research to date on youth offending programs has been undertaken in the United States and the United Kingdom. Butcher et al. (2021) argue that these programs have limited generalisability to Australia, primarily due to the substantial Aboriginal overrepresentation in the Australian youth justice system. Aboriginal young people may have different risk profiles to their non-Aboriginal counterparts and therefore interventions that focus on standardised risk factors derived from international literature are likely to be inadequate (Butcher et al., 2020). Indeed, previous evaluations of youth offender programs in NSW have provided mixed evidence for their effectiveness in reducing reoffending (Poynton & Menéndez, 2015; Ringland, 2016).

The Youth on Track scheme

The Youth on Track scheme was introduced by the NSW Government in 2013 to help reduce the risk of young people re-offending and becoming entrenched in the criminal justice system (i.e., becoming chronic offenders). The scheme commenced on 1 July 2013 in the Blacktown, Newcastle City, and Mid North Coast Police Area Commands (PACs), and on 2 February 2015 was expanded to include the PACs of Manning Great Lakes, Lake Macquarie, Port Stephens, Mount Druitt, and Quaker's Hill. Three additional sites commenced operation in December 2016: Central West (Orana and Canobolas PACs); Coffs (Coffs Clarence PAC); and New England (Oxley and New England PACs). In 2019, following the commencement of this evaluation, Youth on Track was expanded to the Riverina Police District.

Youth on Track uses a combination of engagement strategies, case management and interventions (including Cognitive Behavioural Therapy and Collaborative Family Work) to try and reduce the risk of a young person coming into contact with police/law enforcement and to improve their attitudes, relationship with family/carers, and engagement with education and the community. The key objectives of Youth on Track are (Trimboli, 2019b):

- To identify young people at high risk of continuing in the criminal justice system, in a timely way;
- To provide one-on-one case management and evidence-informed interventions targeted to address the individual criminogenic risk factors of the young person;
- To provide an evidence-informed family intervention to support the family of young offenders to reduce the young person's contact with police.

The expected outcomes[2] of Youth on Track include:

- Young people's formal contact with police is reduced compared to a similar cohort of young people;
- Young people's wellbeing is improved by reducing their criminogenic risk and needs;
- Young people's participation and achievement in education or employment is improved; and
- Families display more positive family behaviours and ability to support their children.

Young people are eligible for Youth on Track if they have either: (1) at least one formal contact with police[3] and have been identified by a police Youth Liaison Officer (YLO), or their school as at risk of further offending (known as a discretionary referral); or (2) have at least two formal contacts with police and are assessed as at 60% or greater chance of further formal contact with police based on a revised version of the Group Risk Assessment Model[4] (Smith & Jones, 2008) (an automatic referral). The young person must also be 10 – 17 years old, have never received a supervised court order and have offended in, or is attending a school in one of the Youth on Track sites.

The NSW Police Force or school staff can refer young people to Youth on Track, or the Youth on Track screening officer will identify suitable referrals through the automatic process. Once referred and assessed as eligible, the Youth on Track service provider in the relevant area (the non-governmental organisation funded by Youth Justice to deliver the scheme) contacts the young person and their family to ask if they would like to participate in Youth on Track. If a young person consents to participate in the scheme, they are assigned a Youth on Track caseworker who administers a risk assessment tool known as the Youth Level Service Case Management Inventory-Australian Adaptation (YLS/CMI-AA). The YLS/CMI-AA assesses eight areas of criminogenic risk in the young person's life such as family and living circumstances, peer relations, and personality and behaviour. Based on this assessment, the Youth on Track caseworker develops a case plan with the young person and their family to address the young person's individual risks/needs. The YLS/CMI-AA is readministered every 12 weeks to enable a young person's case plan to be modified to reflect any change in risk level. The YLS/CMI-AA is used to assess a young person's risk of reoffending as well as to identify a young person's needs in terms of their case management.

The caseworker works with a young person for between three and 12 months, depending on the level of risk identified by the YLS/CMI-AA assessment. They meet with the young person on a regular basis and deliver or refer young people to a range of evidence-informed criminogenic interventions to address the underlying causes of the young person's offending behaviour. While the interventions young people receive can differ across individuals (in accordance with their individualised case plan), at a minimum, all young people participating in Youth on Track should receive the behavioural intervention[5] known as Changing Habits and Reaching Targets (CHART). CHART is a cognitive behavioural program that is

2 A complete list of outcomes can be found in the Youth on Track program logic shown in Figure A1.
3 As the person of interest (POI).
4 GRAM is a logistic model that aims to predict reoffending among adults and young people who were given non-custodial sentences. For young people, variables including age, sex, Aboriginal status, prior convictions and concurrent convictions are used to calculate the score.
5 Unless they are determined by the YLS/CMI-AA to be low risk.

informed by the "what works" literature. Table A1 shows the main components of CHART and how these compare to effective components of treatment programs from the "what works" literature. CHART has six core modules that every young person with a YLS/CMI-AA above low is expected to receive. It also has six additional modules that can be delivered to the young person based on their specific needs. The caseworkers may also deliver a family intervention using techniques from Collaborative Family Work (Trotter et al., 2020), and work with schools to improve a young person's engagement with education.

The young person is considered to have completed the Youth on Track scheme when they have met their case plan goals and reduced their risk of re-offending (as measured by a change in the YLS/CMI-AA). The caseworker then works with the young person and family to develop an exit plan and facilitates access to ongoing community supports where required.

Fast Track

In August 2017 a randomised controlled trial (RCT) was implemented to evaluate the impact of Youth on Track on reoffending and incarceration. A brief intervention called Fast Track was developed specifically for the control arm of this randomised controlled trial and was designed to provide only minimal support and intervention for the young person. It used a screening version of the YLS/CMI-AA to assess criminogenic needs and limited the number of case management interactions between the young person and the Youth on Track caseworker to four face-to-face sessions over six weeks. During these sessions, the caseworker worked with the young person to develop an action plan, which included goals for the young person and identified services needed to address higher risk domains. Caseworkers also facilitated referrals to external services and programs. Unlike Youth on Track, offence-based behavioural (e.g., CHART) and family interventions were not provided to young people allocated to Fast Track. An additional case-conference session was held in cases where the service provider deemed it in the best interest of the young person. The case conference ensured a plan was in place for continuity of care after the young person exited Fast Track. To ensure consistency of skill, caseworkers who delivered Youth on Track also delivered Fast Track.

As such, there are three main differences between the Youth on Track scheme and Fast Track. Firstly, the length of Fast Track was strictly capped at six weeks and five sessions, whereas for Youth on Track, high-risk young people could be involved in the scheme for 12 months or more. Secondly, Youth on Track participants worked through evidence-based behavioural (e.g., CHART) and family interventions with their caseworker (see also Trimboli, 2019b), but Fast Track participants did not receive these interventions. Finally, Youth on Track participants were assessed on the YLS/CMI-AA which allowed caseworkers to understand the young person's risk level and their needs across eight criminogenic domains. Fast Track participants were assessed using a highly simplified version of this tool.

Prior evaluations of Youth on Track

In 2017, the Cultural and Indigenous Research Centre of Australia (CIRCA) undertook an evaluation of the Youth on Track scheme (CIRCA, 2017). This study focused on the social benefits of the scheme, specifically the impact on factors related to the risk of re-offending: such as antisocial behaviour and thinking; contact and interactions with pro-social peers; and alcohol and other drug use. The evaluation also sought to understand participants' satisfaction with the scheme, facilitators and barriers to achieving successful outcomes, and opportunities for process improvements. Qualitative data were collected through interviews with participants, carers, caseworkers, and key stakeholders, and changes in the young person's behaviour and risk level were assessed through the YLS/CMI-AA.

The evaluation suggested that Youth on Track contributed to enhanced social outcomes for many participants. Stakeholders noted significant shifts in the anti-social attitudes and behaviours of many young people participating in the scheme, as well as increased engagement with education and employment. Increased positive interactions with peers and caseworkers were also observed by stakeholders to be an important benefit of the scheme. These positive results from the qualitative interviews were supported by an analysis of YLS/CMI-AA scores, which demonstrated significant

improvements in participants' total risk assessment scores at three and six months after referral. In fact, more than half of the Youth on Track participants were found to have improved in the YLS/CMI-AA domains of anti-social behaviour and thinking, peer scores, and education/employment attendance. Satisfaction survey results also indicated an overwhelmingly positive response to the Youth on Track scheme. Caseworkers and family therapists were rated very highly by young people participating in the scheme and their families. The elements of the scheme considered the most successful by stakeholders were: a focus on early intervention; capacity to provide holistic and tailored responses; performance of trained and skilled caseworkers and family therapists; capacity to work with families and family relationships; and advocacy and collaboration with other services.

While the CIRCA evaluation identified improvements in participants' social outcomes, it is limited in a few respects. Most notably, no comparison group was included in the analysis. Without a valid counterfactual (a comparison between what actually happened and what would have happened in the absence of the scheme) we cannot be confident that the improvements observed in the stated outcomes are due to participation in Youth on Track and not some other confounding factor. For example, evaluations of other youth reoffending programs have demonstrated that young people modify their offending behaviour after a police contact, even in the absence of any intervention or support program (see for example Poynton & Menéndez, 2015). Secondly, the social outcome evaluation did not examine whether the primary outcome of the scheme is being achieved; a reduction in rates of youth re-offending.[6] A rigorous re-offending evaluation of Youth on Track is critical to any future decisions regarding expansion of the scheme.

In August 2019, the NSW Bureau of Crime Statistics and Research (BOCSAR) published a process evaluation report examining the implementation of the randomised controlled trial (Trimboli, 2019b). It found that both the Youth on Track and Fast Track interventions were being implemented as intended and that young people were engaging well with each intervention. Importantly, the randomisation process appeared to have had a negligible impact on engagement rates, with 94% of eligible young people consenting to participate in the evaluation. Stakeholders stated that participants allocated to Fast Track were primarily referred to, or linked in with, other service providers, while young people allocated to the more comprehensive and longer Youth on Track intervention received a variety of supports. Most stakeholders had a negative perception of Fast Track, questioning its effectiveness in reducing reoffending risk given the program length, the limited range of interventions that could be offered to the young person and the inability to tailor the intervention to the young person's needs.

The current study

The current study evaluates the effectiveness of participating in the Youth on Track scheme on a young person's subsequent offending and other social outcomes. Therefore, our study seeks to answer the following research questions:

1. Whether Youth on Track reduces a young person's offending, including further charges and custodial episodes (an indicator of more serious offending);
2. Whether Youth on Track increases a young person's participation in education and employment;
3. Whether Youth on Track increases a young person's wellbeing, as indicated by rates of participation in community activities and stable housing;
4. Whether Youth on Track is more effective in certain sites.

The first three research questions examine the intended outcomes of the scheme (NSW Department of Communities and Justice, n.d.). Multiple measures of reoffending are examined, including the probability of a new offence, probability of a new custody episode, and time to first offence. The latter is considered a more sensitive measure of offending and may allow us to detect smaller impacts of Youth on Track if

6 It was intended that an outcome evaluation would have been completed in June 2020. However, a slower-than-expected accrual of participants into the evaluation meant that it was delayed.

they exist. The probability of a new offence and the probability of custody are examined within 12- and 24-months of consent as the Youth on Track program logic (shown in Figure A1) theorises reductions in reoffending in both the short and longer term. Social outcomes are examined at program exit. Given the substantial overrepresentation of Aboriginal young people in the Australian youth justice system and the lack of empirical research on the effectiveness of interventions for Aboriginal Australians, in the appendix, we also present estimates of the impact of Youth on Track on reoffending and custody outcomes separately for Aboriginal young people. Additionally, as Youth on Track is implemented across six different sites by several NGO providers, and research consistently highlights the importance of high quality program delivery (Day et al., 2003; Knoth et al., 2020; Lipsey et al., 2010), we examine whether similar outcomes were achieved across the six Youth on Track sites.

A challenge for this evaluation is that young people who volunteer to participate in the scheme may differ from those who do not participate on factors that place them at higher or lower risk of recidivism. If these differences cannot be accounted for when comparing outcomes of participants with other young offenders, then our estimates of the "treatment" effect will be biased. There is good reason to believe that selection effects would be present given the voluntary nature of the Youth on Track scheme. This is particularly true in the case of referrals which involve police or school staff exercising their discretion to identify and refer young people who they believe are at risk of becoming entrenched in the criminal justice system.

Given the likely selection bias in any retrospective evaluation of Youth on Track, a randomised controlled trial was set up to evaluate the scheme. A randomised controlled trial (RCT) is considered the "gold standard" in evaluation as the randomisation process, with a sufficient sample size, ensures that the treatment and comparison groups are equivalent on both observed and unobserved characteristics. A successfully implemented RCT can identify causal impacts of programs by simply comparing outcomes across groups without the need for statistical controls (although controls can be included to increase the precision of estimates).

The RCT for the Youth on Track evaluation was designed to compare young people randomly assigned to Youth on Track with those assigned to an alternative treatment called Fast Track. Ideally, Youth on Track would have been compared with a no-treatment control group. However, consultations with Youth Justice staff, Youth on Track service providers and community groups revealed serious concerns about withholding treatment from some young people referred to the scheme, given the potential risk of harm to themselves and/or others, or further involvement with the police.

METHOD

Data sources

Youth Justice NSW maintains a detailed Youth on Track database which includes information regarding all young people referred to the Youth on Track scheme and the services they receive from providers. For this report, Youth Justice supplied BOCSAR with records only for those young people who consented to the evaluation. The data provided included demographic and situational factors, including whether the young person (or their family) reported having ever been diagnosed with a mental health issue or an intellectual disability, and whether they reported having been a victim of family violence. The data also included information relating to the evaluation, including the consent date, whether the young person was allocated to Youth on Track or Fast Track, the referral source and the formal contact (e.g., court, youth justice conference or caution) that initiated the referral, the young person's YLS/CMI-AA score upon entry (for Youth on Track participants only), the date the young person exited the scheme, what services the young person was referred to, and details of any interventions the caseworker delivered. Information on a young person's social outcomes, including their education and employment status at entry to and exit from the scheme, were also provided. These Youth Justice data were merged with BOCSAR's Re-Offending

Database (ROD) to obtain further information on a young person's offending history and any time spent in custody. Additional demographic factors, including remoteness area and SEIFA quartile (defined in the variables section), were also obtained from ROD.

Experimental design

Figure 1 provides an overview of the experimental design.[7] Eligible young people who lived and offended within a Youth on Track site could be referred to the evaluation through the usual two Youth on Track pathways: (1) a discretionary referral by a school or a NSW Police Force Youth Liaison Officer or (2) an automatic referral by the Youth on Track screening officer.

Young people identified as eligible were then referred to the Youth on Track service provider operating in their local area (six sites in total). The provider assessed whether the young person was suitable for the Youth on Track scheme[8] and if so, contacted the young person and their family to ask if they would like to participate in a program. The young person and their family were then informed that an evaluation was being undertaken and asked if they would like to participate. Consent to participate in the evaluation was sought before randomly allocating young people to treatment conditions to mitigate sample bias arising from unobservable motivation effects, as well as to help keep the sample size roughly equal between the two groups.

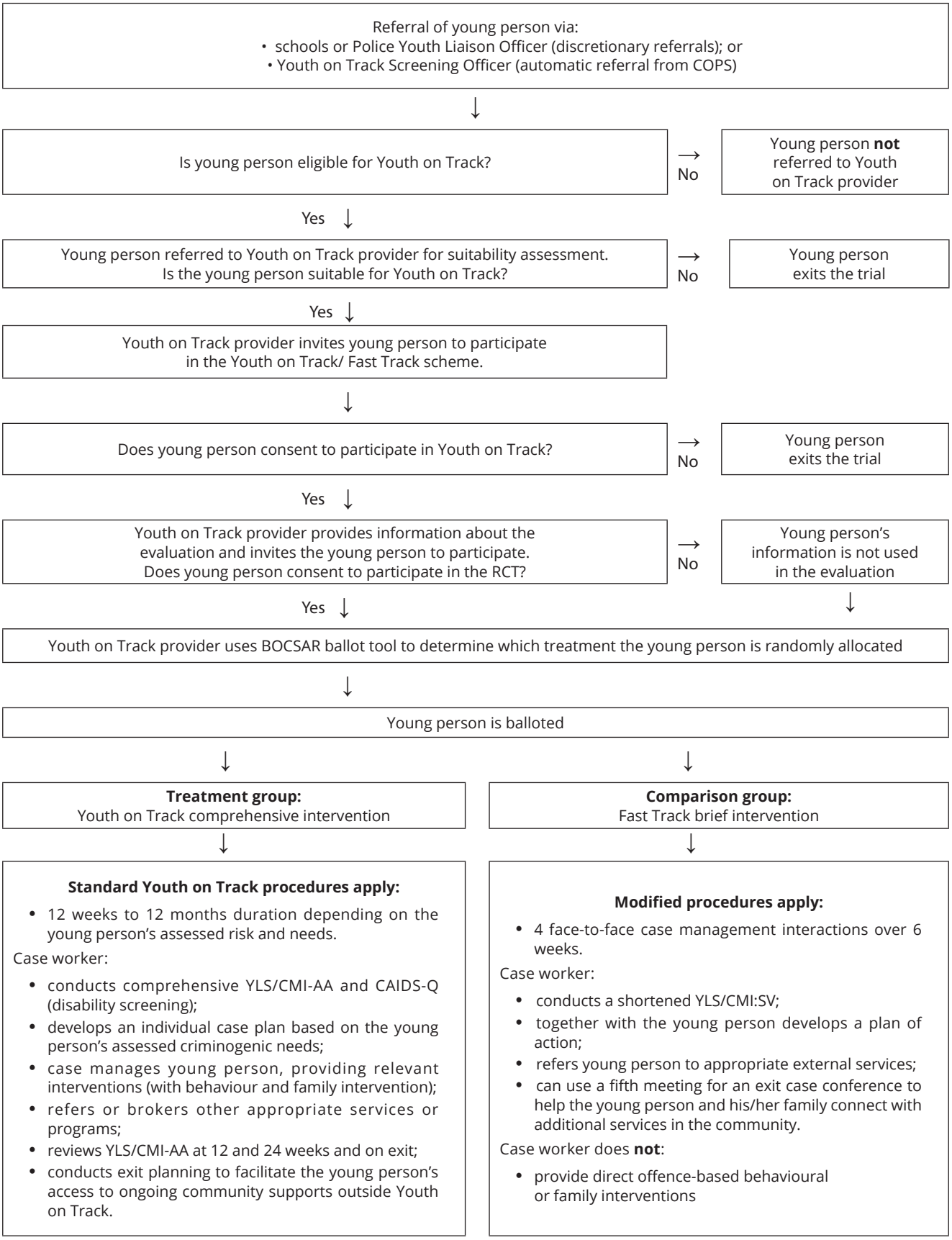
Once a young person consented, caseworkers entered the young person's case number into a purpose-built on-line ballot system. The on-line system assigned the young person to either Youth on Track or Fast Track with equal probability. This process ensured that BOCSAR could independently verify that the young person was allocated to the correct group. Consent to the evaluation only determined whether a young person's data was used in the study. In other words, all young people who were referred, eligible, suitable, and voluntarily agreed to participate in the Youth on Track/Fast Track scheme entered the ballot. This was done to avoid the potential for manipulation and to simplify the process for providers.

Young people who re-offended during the trial and were re-referred to Youth on Track, did not re-enter the ballot. In these cases, the service provider had the discretion to determine (in conjunction with the young person) what program the young person received. Service providers also exercised control over program placement when more than one young person from the same household was referred for treatment. In this instance, however, only the first-placed young person was included in the study and the second referred household member was given the same intervention so not to influence the outcomes for the young person in the study. This is because some elements of the Youth on Track scheme involve working with the participant's family, and these elements were not covered in Fast Track. A young person could also be excluded (with approval from the Program Manager) from the ballot if the service provider identified a significant safety risk (e.g., self-harm) during the suitability assessment.

Prior to the commencement of the RCT, a series of workshops and consultations were held with key stakeholders. An initial workshop was conducted which included representatives from Youth Justice, Youth on Track service providers, NSW Treasury, and NSW Bureau of Crime Statistics and Research (BOCSAR). BOCSAR and Youth Justice representatives then undertook site visits to the six Youth on Track sites where a further 18 consultation meetings were held with Youth on Track staff, Aboriginal Community members and other key local stakeholders. These consultations informed the development of the evaluation protocol, research procedures and consent/information forms. Ethics approval was obtained from Bellberry Human Research Ethics Committee (HREC 2017-05-361) and the Australian Institute of Aboriginal and Torres Strait Islander Studies (AIATSIS) (HREC EO56-01052017). An Evaluation Advisory Committee, which included members from Aboriginal Affairs, Youth Justice Aboriginal Strategic Unit and Research and Information Unit, NSW Police, NSW Treasury, and NSW Department of Premier and Cabinet, also provided oversight of the trial.

7 More detail on the experimental design is also provided in Trimboli (2019b).
8 A young person may not be suitable for YOT if the provider deemed that they were unsafe or if the young person already had an existing case manager that believed participation in the scheme would not benefit the young person.

Figure 1. An overview of a young person's progress through either Youth on Track or Fast Track



Source: Trimboli (2019b). COPS = Computerised Operational Policing System, RCT = Randomised Control Trial, YLS/CMI-AA= Youth Level of Service/ Case Management Inventory – Australian Adaptation, CAIDS-Q = Child and Adolescent Intellectual Disability Screening Questionnaire, YLS/CMI:SV = Youth Level of Service/ Case Management Inventory: Screening Version

Figure 2. Sample sizes at different stages of the RCT

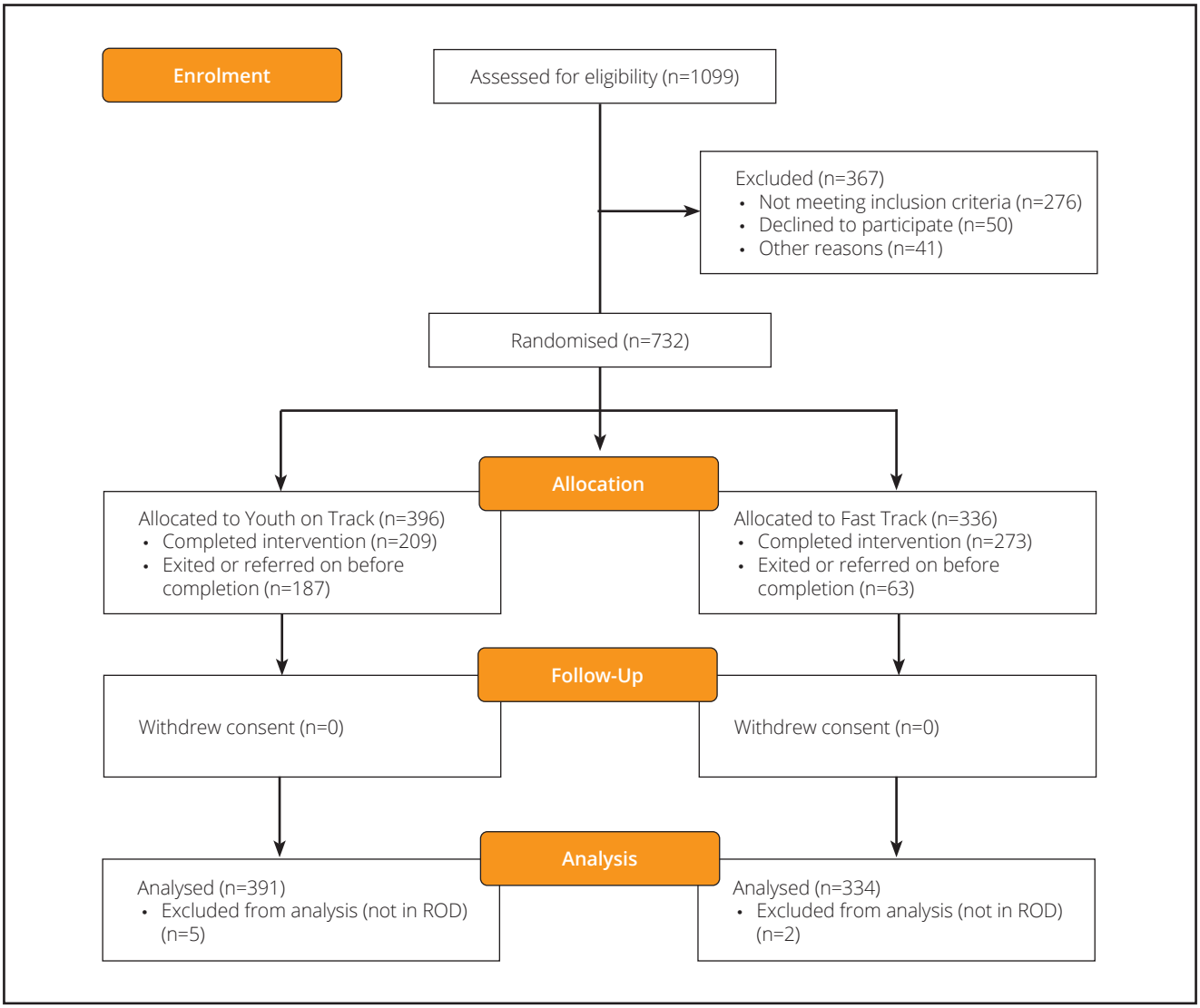


Figure 2 shows the number of young people recruited at each stage of the evaluation between August 2017 and June 2020. Of the 1,099 young people who underwent an eligibility assessment, 732 were deemed eligible for the evaluation and entered the ballot: 396 were allocated to Youth on Track and 336 to Fast Track. The remaining 367 young people were excluded from the study. This included: 276 young people who did not meet the inclusion criteria (most commonly because a household member had already participated in the study, or because they themselves had already participated); 50 young people who declined to participate in the evaluation; and 41 young people who were excluded for other reasons, including a lack of capacity to give consent, safety reasons, the provider losing their consent form, or because the young person did not reside in one of the six Youth on Track sites participating in the evaluation. No young people withdrew their consent to participate in the trial.

It is worth noting several unplanned deviations from the intended process. Firstly, we could not verify the random allocation that a young person received through the on-line ballot system in a small number of cases. This was due to caseworkers not submitting the online form when the initial treatment allocation was generated. In these cases, the random allocation was not recorded in the system, and as such we could not confirm that these young people received the assigned treatment. There was also a small degree of crossover (i.e., where a young person received a different intervention to their allocation). In total there were only 31 young people (23 Youth on Track, 8 Fast Track) who crossed over or whose allocation could not be verified. In the appendix, as a robustness check, we re-ran our analyses excluding these 31 young people and found no meaningful differences in our results.

Secondly, caseworkers did not always exclude ineligible young people prior to randomisation. In particular, it appeared that caseworkers would only exclude young people for whom they observed safety concerns if the young person had been randomised to Fast Track. This could represent a threat to our experiment because young people with safety concerns may have stayed in the evaluation if they were randomly allocated to Youth on Track but excluded if they were allocated to Fast Track. Again, however, the number of cases affected was small with only four young people excluded for these reasons.

Finally, Youth on Track allowed for re-referrals into the scheme. Often a young person would reoffend after being randomised, making them eligible for re-referral into the scheme. Participants from Fast Track were most commonly re-referred into Youth on Track. However, this should not have impacted our evaluation strategy because the re-referral was not eligible for the evaluation, and our outcomes only look at the first instance of reoffending and custody entry, which would have occurred before any re-referral back into Youth on Track or Fast Track. However, due to the lag between offending and when the police become aware of the offence, a young person may be re-referred for an offence committed before their original consent date. This means that a young person may have completed both Fast Track and Youth on Track before we observe their first reoffence. However, we found that there were only two young people who were re-referred for an offence that occurred before their original consent date.

Sample

Between August 2017 and June 2020, 732 young people consented to the evaluation. Seven young people could not be matched to ROD and were therefore excluded from the analysis. This left 725 young people in the final sample. All reoffending and custody outcomes were measured until 28 February 2022, allowing each young person to be followed up for at least 12 months. We also examine longer-term outcomes for a smaller group of young people who could be observed for at least 24 months.[9] The sample for both follow-up periods, including the split between Youth on Track and Fast Track, is shown in Table 1. Youth on Track has more participants than Fast Track, even though each young person had an equal probability of being allocated to each group. This is most likely due to random chance, but as mentioned in the previous section may also be the result of potential misallocations and exclusions after treatment allocation.

Table 1. Sample sizes for different follow-up periods

Period	Latest consent date	Youth on Track (*N*)	Fast Track (*N*)
Total sample (i.e., consenting young people with at least 12 months follow-up time post-consent)	4th June 2020	391	334
Subsample of young people with at least 24 months follow-up post-consent	28th August 2019	277	242

Power calculations using our realised sample size are presented in Table A2 in the appendix. Power calculations allow us to determine the minimum detectable effect (MDE) size that can be detected as statistically significant with our sample if such an effect exists. These calculations suggest that we can detect (as statistically significant) a reduction of at least 9.2 percentage points (p.p.) in the probability of reoffending and a 7.1 p.p. reduction in the probability of entering custody, in the full sample, if such an effect exists. For the reduced 24-month follow-up sample, the minimum effect sizes we can detect are slightly larger; a 10.8 p.p. reduction for the probability of reoffending and 9.5 p.p. reduction for the probability of entering custody.

9 The 24-month period has its cut-off in August 2019 due to the need for an additional six months (plus the 24-month follow period) to allow cases to be finalised and appear in ROD.

Variables

We examine the following offending outcome variables:[10]

1. **The probability of a reoffence:** A variable coded one if a young person reoffended after their consent date and zero otherwise. A reoffence includes a caution, youth justice conference or proven charge.[11]
2. **The probability of entering custody:** A variable coded one if a young person entered custody after their consent date and zero otherwise. The custody episode may have been sentenced or unsentenced, and of any length.
3. **The number of days to first reoffence:** A variable indicating the number of days from consent to the first reoffence (including cautions, youth justice conferences, and proven court appearances). If no reoffence occurred or the offence was after 28 August 2021, the variable is coded as the number of days from consent until 28 August 2021.

Variables 1 and 2 were calculated at 12 and 24 months after the date the young person consented to participate in the study and receive a service. Variable 3 had no time restrictions.

Additionally, we also examine the following social outcomes:

4. **The probability of employment at program exit:** A variable coded one if a young person was in employment at the completion of their program, and zero otherwise (as reported by the young person's caseworker). This includes being "engaged with an employment service (has a case manager) with strong prospects of gaining employment" and being in a traineeship.
5. **The average number of weekly hours spent in employment at program exit:** As reported by the young person's caseworker.
6. **The probability of being in education at program exit:** A variable coded one if a young person was in education at the completion of their program, and zero otherwise (as reported by the young person's caseworker). This includes TAFE or university and special education programs.
7. **The average number of weekly hours spent in education at program exit:** As reported by the young person's caseworker.
8. **The probability of being in a community activity at program exit:** A variable coded one if a young person was participating in a community activity at the completion of their program, and zero otherwise (as reported by the young person's caseworker). This includes community sport, attending a community group or youth centre like PCYC, or volunteer work.
9. **The probability of being in stable housing at program exit:** A variable coded one if a young person was in stable housing at the completion of their program, and zero otherwise (as reported by the young person's caseworker). This is defined as not being homeless or in other unsafe or temporary accommodation.
10. **The probability of being in out of home care (OOHC) at program exit:** A variable coded one if a young person was in OOHC at the completion of their program, and zero otherwise (as reported by the young person's caseworker).

10 Recidivism or reoffending is often defined in many ways. King and Elderbloom (2014) argue that multiple measures of recidivism improve program evaluations. Our three different outcome measures allow us to measure desistance (probability of reoffence), severity (probability of custody), and any delay in offending (time to first offence).

11 Warnings are excluded from our reoffending measure as they normally are for minor offences including travelling on public transport without a ticket, not wearing a bicycle helmet, and trespass. Proven offences are only relevant to offences that were finalised in the courts as cautions and youth justice conferences must involve an admission of guilt. For the 24-month follow up this variable is calculated as the probability of a reoffence within 24 months, that was finalised within 30 months.

We also use a range of young person characteristics as controls in the analysis. From the Youth on Track database we control for the following characteristics:

- Gender: a variable coded one for female and zero for male.
- Aboriginality: a variable coded one if the caseworker reported the young person as non-Aboriginal, two if they were reported as Aboriginal, and zero if unknown. Young people with Torres Strait Islander background are included as Aboriginal in this variable.
- Age at consent date (date of consent to Youth on Track RCT): Young person's age (in years) at consent date.

These were supplemented by the following demographic and prior offending characteristics from ROD:

- Remoteness area: coded as Major City, Inner Regional, Outer Regional to Very Remote, and missing.
- SEIFA quartile: a measure of socioeconomic disadvantage based on the defendant's postcode of residence at index contact.[12] Lower scores indicate more disadvantage (Australian Bureau of Statistics, 2016).[13] We code SEIFA into five indicator variables, one for each quartile of the distribution and a fifth category for those with a missing SEIFA rank.
- Number of concurrent offences at index contact: coded as zero, one, or, two or more.
- Number of prior cautions in the past 5 years before the index contact: coded as zero, one, or, two or more.
- Court appearances: A variable coded one if the young person had one or more court appearances in the 5 years before the index contact, and zero otherwise.
- Violent offences: A variable coded one if the young person had one or more prior violent offences, defined as ANZSOC[14] divisions 1, 2, 3, or 6 in the 5 years before the index contact, and zero otherwise.
- Prior custody: A variable coded one if the young person has been in custody for any reason before their consent date.

Finally, the following characteristics were recorded by caseworkers from the Youth on Track database:

- Family violence: a variable coded one if the caseworker reported the young person as a victim of family violence, two if the young person was reported as not a victim of family violence and three if unknown
- Mental health: a variable coded one if the young person was diagnosed with a mental health condition, two if the young person has had no diagnosis, and three if unknown. This information is based on what caseworkers find out through parents or schools. Caseworkers do not diagnose any mental health conditions themselves.
- Intellectual disability: A variable coded one if the young person was diagnosed with an intellectual disability, two if they were screened with a possible intellectual disability and three if no intellectual disability was identified. The Child and Adolescent Intellectual Disability Screening Questionnaire (CAIDS-Q) is used to identify whether a young person could have an intellectual disability.
- Referral source: a variable coded one if a young person was referred to Youth on Track or Fast Track through their school, two if they were referred through the police or three if they were referred automatically using the police's database.

Additionally, when we examine social outcomes at program exit, we control for the status of that outcome at program entry, and the age at program exit instead of the age at consent date.

12 The index contact is defined as the most recent formal police contact before a young person's consent date.
13 Defendants held on remand at the time that their matter was finalised have missing SEIFA scores in our data.
14 ANZSOC codes are used to group offences by type across Australian and New Zealand jurisdictions. Interested readers are directed to the Australian Bureau of Statistics (2011) for more information.

Statistical analysis

The random allocation of young people to treatment conditions simplifies our analysis. Provided that randomisation was successful, we can estimate the impact of Youth on Track relative to Fast Track by simply comparing outcomes for the two groups (Rubin, 1974). In addition to this simple analysis, we undertake two further analyses. First, we adjust our estimate for the site where a young person participated. This is because selection into a Youth on Track site was non-random and there may be area-level differences in risk factors for reoffending and/or entry into custody. An additional concern is that different sites accrued participants at different rates. Controlling for treatment site enables us to estimate the average effect of Youth on Track accounting for these differences. Second, we estimate the impact of Youth on Track controlling for demographic and prior offending characteristics. While these covariates should be balanced across groups, even successful randomisation can result in slight differences between groups, particularly where the study's sample size is small. Adding controls may also increase the precision of our estimates.

Therefore, we estimate an equation of the following form:

$$Y_{is} = \beta_0 + \beta_1 YOT_i + \gamma X_i' + \alpha_s + \epsilon_{is} \qquad (1)$$

Where Y_{is} refers to the outcome variables measured for young person i who started their program at site s. YOT_i is a binary variable that equals one if a young person was randomly assigned to Youth on Track and zero if they were assigned to Fast Track. X_i' refers to our vector of demographic and prior offending controls which are described in the previous section, while α_s refers to the site fixed effects (FEs) which control for different offending rates between sites as well as different rates of involvement in education and employment. ϵ_{is} refers to the error term. We estimate equation (1) using ordinary least squares for all our outcomes, due to its ease of interpretability (Gomila, 2021). We found that our estimates were virtually identical when compared with estimates from a logistic regression model.

β_1 is the estimate of the average treatment effect, or the impact of being assigned to Youth on Track compared to Fast Track. β_1 signifies the causal impact of being assigned to the Youth on Track program compared to Fast Track if randomisation was successful (i.e., young people allocated to Youth on Track had the same characteristics as young people that were allocated to Fast Track). The next section will examine whether Youth on Track participants were similar to Fast Track participants on observable characteristics, which can provide some indication as to whether Youth on Track and Fast Track were balanced.

One further threat to causal inference is differences in when social outcomes were measured for participants. Social outcomes were measured at program exit for both Youth on Track and Fast Track participants, however Youth on Track is substantially longer than Fast Track. This may be an issue for outcomes such as employment and education because young people are more likely to be in employment and less likely to be in education if they are older. To help account for this difference, we control for age at program exit (rather than entry) when analysing outcomes that are calculated at program exit. Although this strategy helps account for age differences, there is an additional risk that we are over-controlling, because age at exit is determined by the length of the program, which is itself determined by a young person's YLS-CMI-AA. Therefore, estimates for social outcomes should be interpreted with caution.

We use a different statistical method, called survival analysis, when estimating the impact of Youth on Track on days to first reoffence. Survival analysis allows us to identify any differences in the timing of reoffences in addition to reoffending during specified time periods. We use Kaplan-Meier estimates to graphically examine the distribution of time to first reoffence for Youth on Track and Fast Track, and Cox regression to estimate a hazard ratio. The hazard ratio compares the rate at which Youth on Track participants reoffend relative to Fast Track participants adjusting for the same covariates as equation 1.

Descriptive statistics and balance

Table 2 presents the characteristics of young people randomised to Youth on Track and Fast Track, and statistical tests for any differences. Most Youth on Track participants were male (around 76%) and the majority (53%) identified as Aboriginal. Half of the Youth on Track participants resided in an inner regional area and 41% resided in areas with the highest socioeconomic disadvantage. For 15% of Youth on Track participants, the offence immediately preceding their consent date was domestic violence (DV) related and 40% of young people were a victim of family violence. The majority of Youth on Track participants had at least one prior police caution (61%) but most had no prior court appearances (80%) or prior custodial episodes (84%). Nearly one-quarter of Youth on Track participants had been diagnosed with a mental health issue and 8% had been diagnosed with an intellectual disability. Just over half of the Youth on Track participants were in education at their consent date and 7% were employed. The high proportion of young people in Youth on Track living in SEIFA areas of most disadvantage and very low proportion attending education, and the corresponding proportions of Fast Track young people, demonstrate the selectiveness of our sample. In particular, young people thought to be at the highest risk of reoffending were selected to be part of this RCT.

Table 2 largely confirms that the Youth on Track and Fast Track groups were balanced, with no significant differences between the two groups on most observable characteristics. The exceptions are family violence victimisation, intellectual disability, and mental health status. However, these differences are likely due to caseworkers being less likely to have this information about Fast Track participants than Youth on Track participants, because caseworkers, who collect this information, are engaged with Youth on Track participants for longer. Youth on Track participants were also more likely to have two or more concurrent offences (43% v. 34%) at their index contact and less likely to have one concurrent offence (49% v. 58%). A few statistically significant differences are likely to occur among such a large number of variables, even if Youth on Track and Fast Track were successfully randomly assigned. However, we also conducted analyses which included these variables as controls, given they are likely to influence the risk of reoffending. We decided not to include any variables in Panel C of Table 2 as controls because these variables seem to be recorded after a young person is assigned to either program. Additionally, DV offence and existing agency are not used as controls in any of our models.

Table 2. Characteristics of young people allocated to Youth on Track and Fast Track

	Youth on Track [N=391] (Proportion)	Fast Track [N=334] (Proportion)	Difference (p.p.)	Test of equality (p-value)
Panel A: Demographics				
Female	0.24	0.24	0.00	0.89
Aboriginality				
Non-Aboriginal	0.42	0.41	0.01	0.75
Aboriginal	0.53	0.51	0.02	0.69
Unknown	0.05	0.08	-0.03	0.14
Remoteness Area				
Major cities	0.37	0.41	-0.04	0.22
Inner regional	0.50	0.47	0.03	0.37
Outer regional/Remote/very remote	0.12	0.11	0.01	0.71
Missing	0.01	0.01	0.00	0.78
SEIFA				
Q1	0.41	0.40	0.01	0.88
Q2	0.38	0.38	0.00	0.97
Q3	0.16	0.19	-0.03	0.39
Q4	0.05	0.03	0.02	0.20
Missing	0.01	0.01	0.00	0.79

Table 2. Characteristics of defendants allocated to Youth on Track and Fast Track *- continued*

	Youth on Track [*N*=391] (Proportion)	Fast Track [*N*=334] (Proportion)	Difference (p.p.)	Test of equality (*p*-value)
Age (in years) at consent date (mean)	14.72	14.57	0.15	0.25
Panel B: Offending				
DV offence	0.15	0.13	0.02	0.51
Concurrent offences				
0	0.08	0.08	0.00	0.82
1	0.49	0.58	-0.09	0.02*
2+	0.43	0.34	0.09	0.01*
Cautions				
0	0.39	0.41	-0.02	0.57
1	0.32	0.31	0.01	0.58
2+	0.29	0.29	0.00	0.96
Prior court appearance	0.20	0.19	0.01	0.87
Prior custody episode	0.16	0.15	0.01	0.59
Prior violent offence	0.12	0.09	0.03	0.27
Panel C: Collected by caseworkers				
Family violence				
Victim of FV	0.40	0.37	0.03	0.32
Not a victim of FV	0.29	0.22	0.07	0.03*
Unknown	0.31	0.42	-0.11	0.00*
Intellectual disability				
Diagnosed intellectual disability	0.08	0.05	0.03	0.22
Screened with possible ID	0.06	0.03	0.03	0.08
No intellectual disability Identified	0.86	0.91	-0.05	0.03*
Mental Health				
Yes - diagnosed	0.23	0.18	0.05	0.08
No diagnosis	0.48	0.41	0.07	0.06
Unknown	0.29	0.42	-0.13	0.00*
Panel D: Baseline social outcomes				
Employed	0.07	0.07	0.00	0.66
In education	0.51	0.53	-0.02	0.62
Community activity	0.14	0.18	-0.04	0.18
Stable accommodation	0.92	0.93	-0.01	0.80
Average employment hours *(mean)*	0.70	0.83	-0.13	0.68
Average education hours *(mean)*	9.31	9.60	-0.29	0.75
Panel E: Referral characteristics				
Referral Source				
COPS	0.57	0.55	0.02	0.76
DEC	0.10	0.07	0.03	0.24
YLO	0.34	0.37	-0.03	0.31
Existing agency	0.30	0.28	0.02	0.50

Note: * means the difference is statistically significant at the 5% level ($p<.05$). p.p. = percentage points, COPS = Computerised Operational Policing System, DEC = Department of Education, YLO = Police Youth Liaison officer.

Table 3 presents statistics on the implementation of Youth on Track and Fast Track during the trial. Implementation was examined in detail in Trimboli's (2019b) process evaluation using semi-structured interviews with stakeholders. This section presents more limited information about Youth on Track and Fast Track implementation based on information that was available from administrative data. These statistics primarily relate to duration, completion rates, and the number of interventions and services young people received.

The majority of young people assigned to Youth on Track received a behavioural intervention[15] (i.e., CHART (72%)) but only a small minority received a family intervention (11%). Consistent with treatment protocol, very few young people assigned to Fast Track (1%) received either of these interventions. On average, Youth on Track participants were referred to slightly more services than Fast Track participants (2.04 v. 1.51). Similarly, Youth on Track participants were less likely to receive no services or interventions (10% v. 26%) but were also less likely to complete their programs (52% v 81%). Of the participants that did not complete their programs, a similar proportion of Youth on Track and Fast Track participants were referred on to other services. Finally, on average, participants spent 212 days in Youth on Track compared with just 42 days in Fast Track.

Table 3. Interventions, completion rates, and program duration for Youth on Tack and Fast Track

	Youth on Track		Fast Track	
	Proportion	Count	Proportion	Count
Behavioural interventions	0.72	391	0.01	334
Family interventions	0.11	391	0.01	334
Number of services (mean) *[SD]*	2.04 *[2.07]*	391	1.51 *[1.31]*	334
No services or interventions	0.10	391	0.26	334
Completed	0.52	391	0.81	334
Referred on if not completed	0.26	186	0.25	63
Duration from consent date to exit date (mean) *[SD]*	211.64 *[116.79]*	391	41.96 *[11.13]*	334

SD= Standard deviation

15 Our measure of whether a behavioural intervention occurred may not have been consistent across caseworkers. The behavioural intervention consisted of numerous modules, and some caseworkers may have marked that they gave a young person a behavioural intervention if they completed one module, while another caseworker may have only done so if they had completed all modules. There was no central direction on when to indicate that a young person completed a behavioural intervention.

RESULTS

Does Youth on Track reduce a young person's offending?

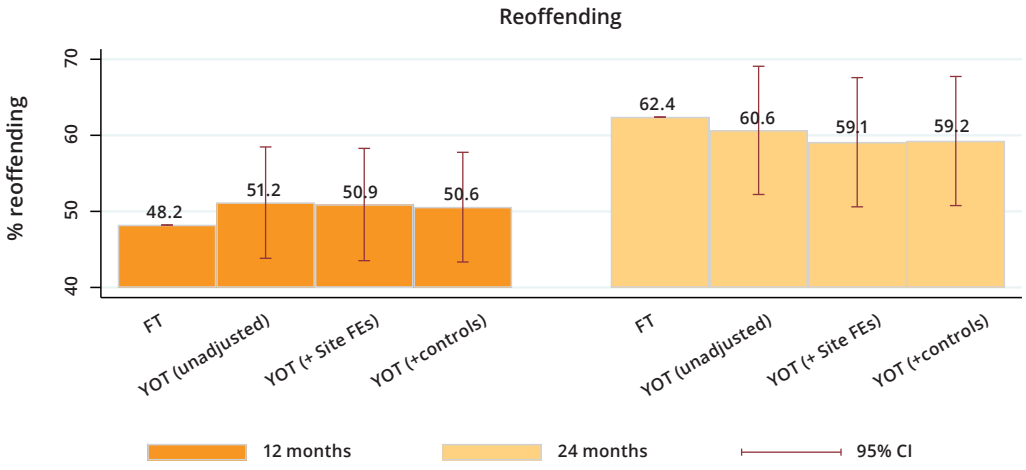
Probability of reoffending and incarceration

In this section we present our results for the impact of Youth on Track on the probability of reoffending and entering custody within 12 and 24 months. The following figures show our results from the estimation of regression equation 1. The point estimate is the difference between the Youth on Track and Fast Track proportions, while the standard error can be inferred from the confidence interval bars in the figures. Our estimates are also shown in tabular form in the appendix.

Figure 3 shows the percentage of young people who were allocated to Youth on Track and Fast Track who reoffended within 12 and 24 months of their consent date. The first bar shows the proportion of Fast Track participants who reoffended within 12 months, while the second bar shows the proportion of Youth on Track participants who reoffended within 12 months. The third bar presents the estimated proportion reoffending after adjusting for site-specific fixed effects (FEs) in the regression model, while the estimates in the fourth bar also adjusts for demographic and offending characteristics. These characteristics refer to all the variables in Table 2 except for the baseline social characteristics and the other variables recorded by caseworkers (i.e., panels C and D). The same results are repeated for reoffending within 24 months of the consent date.

We find no significant difference in the proportion of Youth on Track and Fast Track participants who reoffended within 12 months. Youth on Track participants were slightly (2.4 p.p.) more likely to reoffend when compared to Fast Track participants. When examining a 24-month reoffending period, we find that Youth on Track participants are 1.8 p.p. less likely to reoffend, or 3.2 p.p. less likely to reoffend when we adjust for demographic and prior offending characteristics. These differences are not statistically significant at conventional levels. However, it is worth noting that they are substantially smaller than our minimum detectable effect size for 24 months (10.8 p.p.) (see ex-post power calculations in the appendix for further details). This means that even if the difference we found was the true difference, we would be unlikely to find that it was statistically significant.

Figure 3. Proportion of participants that reoffend, by treatment and observation period



Note: YOT= Youth on Track, FT= Fast Track, FE= Fixed effects

Figure 4 is a similar bar chart to Figure 3 but examines the proportion of young people entering custody within 12 and 24 months of their consent date. The unadjusted estimate indicates that Youth on Track participants are 0.9 p.p. less likely to enter custody within 12 months of consenting to the scheme. This rises to a 2.8 p.p. reduction after adjusting for demographic and offending characteristics. Thus, only 18.8% of Youth on Track participants entered custody within 12 months compared with 21.6% of Fast Track participants. The results are very similar when examining a 24-month follow-up period. The adjusted estimate shows that 26.7% of Youth on Track participants have a new custodial episode within 24 months compared with 30.2% of Fast Track participants (a difference of 3.5 p.p.). However, none of the differences shown in Figure 4 are statistically significant at conventional levels.

Since we find larger reductions in the probability of reoffending and custody within 24 months compared with 12 months, we also examine whether young people who commenced Youth on Track earlier in the trial achieved better criminal justice outcomes than those who commenced later. This supplementary analysis can be found in the appendix and suggests that the differences between the 12 and 24 month results is likely due to differences in cohorts rather than being indicative of a longer-term impact of Youth on Track. In fact, young people who entered Youth on Track in the first year of the trial had a statistically significant 10.3 p.p. reduction in the probability of entering custody compared to Fast Track participants who entered in the first year. In the appendix we also present reoffending and custody outcomes separately for Aboriginal young people. Here we found slightly larger reductions in reoffending and new custody episodes for Aboriginal Youth on Track participants compared with non-Aboriginal participants, but none of the differences are statistically significant.

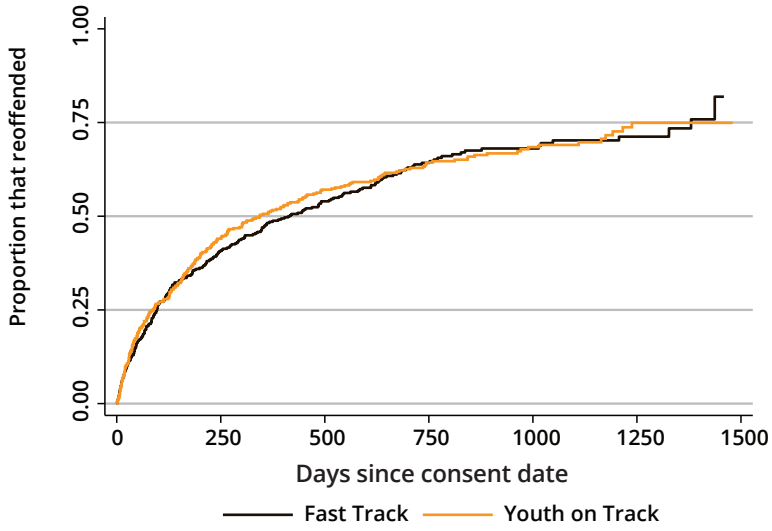
Figure 4. Proportion of participants that enter custody, by treatment and observation period

Note: YOT= Youth on Track, FT= Fast Track, FE= Fixed effects

Time to first reoffence

This section presents the results of the survival analysis. Figure 5 shows a graphical distribution of when Youth on Track and Fast Track participants committed their first reoffence. The figure shows that most young people in both groups reoffended within a year of consenting to the scheme, with 50% of Youth on Track participants reoffending within 344 days and 50% of Fast Track participants reoffending within 412 days. It is also apparent from Figure 5 that the distribution of the time to first reoffence is almost identical for Youth on Track and Fast Track participants. That is, on average, Youth on Track participants did not take longer to reoffend or reoffend sooner than Fast Track participants.

Figure 5. Cumulative proportion re-offending, by treatment group



We also find no substantial difference in time to reoffending when examining hazard ratios from different cox regression models (see Table 4). The hazard ratio compares the rate at which Youth on Track participants reoffend with the rate at which Fast Track participants reoffend. A hazard ratio above one indicates that Youth on Track participants reoffend at a faster rate than Fast Track participants, and a hazard ratio below one indicates that Youth on Track participants reoffend at a slower rate. In all our models, which progressively add site FEs and controls, the hazard ratio is very close to one. This suggests that Youth on Track and Fast Track participants reoffend at similar rates even after adjusting for other potential confounders.

Table 4. Effect of Youth on Track on time to first offence

	(1) Hazard ratio	(2) Hazard ratio	(3) Hazard ratio
Youth on Track	1.029	1.019	1.030
	(0.0937)	(0.0937)	(0.0966)
Demographic Controls	No	No	Yes
Offending Controls	No	No	Yes
Site FEs	No	Yes	Yes
Observations	725	725	725

Exponentiated coefficients; Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

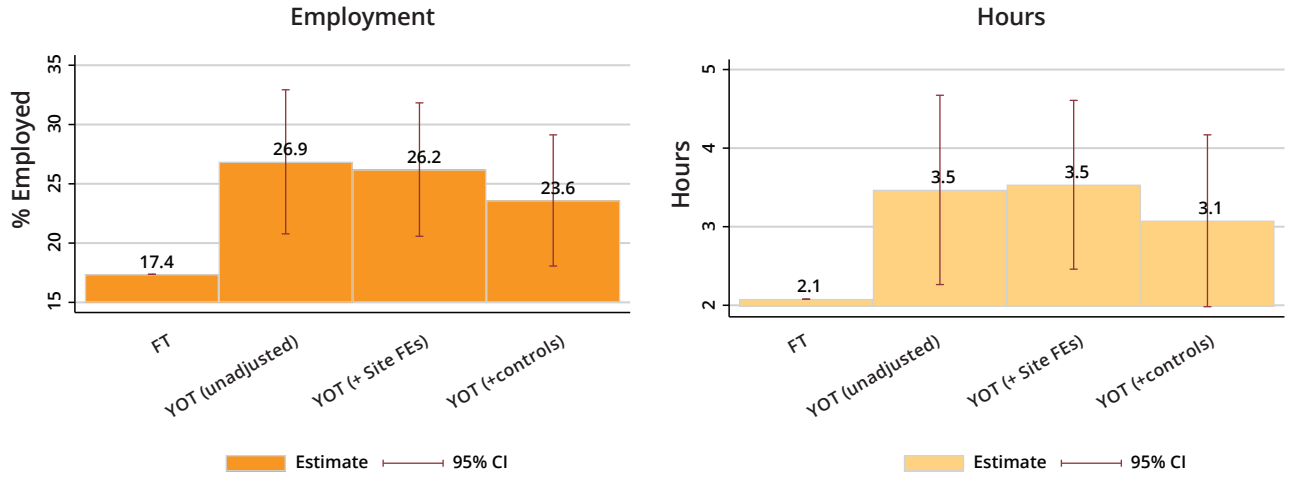
Does Youth on Track increase a young person's participation in education and employment?

This section presents our estimates of the impact of Youth on Track on participation in employment and education. Like the previous figures, Figures 6-9 report the estimates from regression equation 1. For Figures 6-9, the first bar shows the proportion of Fast Track participants engaging in the respective activity and the second bar shows the unadjusted proportion of Youth on Track participants engaging in the activity. The third bar shows the proportion of Youth on Track participants engaging in the activity after we

have adjusted for the proportion of young people participating in the respective activity at program entry, and site FEs, in our regression models. The third bar shows the proportion of Youth on Track participants participating in the respective activity adjusted for the former characteristics as well as demographic and offending characteristics.

Figure 6 presents the proportion of young people in employment or in an employment program, and their average number of hours in employment at program exit. The unadjusted estimate shows that Youth on Track participants are 9.5 p.p. more likely to be in employment at program exit than Fast Track participants. Once we adjust our estimate for other important factors, including whether the young person was employed at program entry and their age at exit, we estimate that Youth on Track participants are 6.2 p.p. more likely to participate in employment, at a rate of 23.6% compared with 17.4% for Fast Track participants. This estimate is statistically significant at the 5% level. When considering hours of employment, we find that Youth on Track participants work one more hour per week on average than Fast Track participants (3.1 compared to 2.1 hours), after adjusting for other factors. This difference is statistically significant at the 10% level.

Figure 6. Proportion of young people in employment and average hours, by treatment group

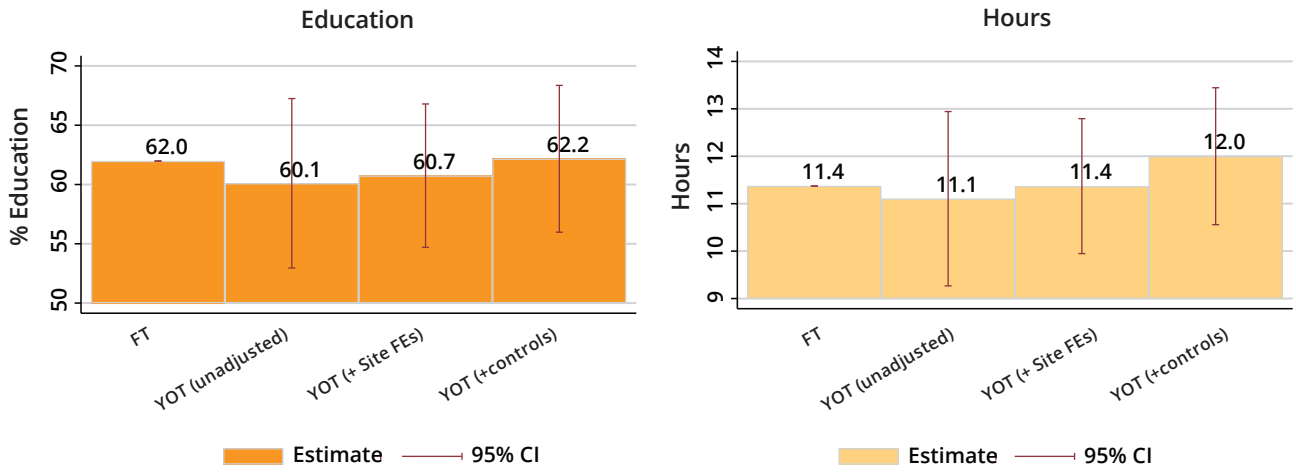


Note: YOT= Youth on Track, FT= Fast Track, FE= Fixed effects

Figure 7 examines education outcomes. There are no statistically significant differences between the Youth on Track and Fast Track participants in terms of the proportion attending education or their average number of education hours at program exit. There is a very small increase (of 0.2 p.p.) in the probability of being in education for the Youth on Track group compared with Fast Track, after adjusting for other important factors. Youth on Track participants also spent slightly more hours in education, on average, by program exit compared with Fast Track participants. According to our adjusted estimate, Youth on Track participants were in education, on average for 12 hours a week compared with 11.4 hours for Fast Track participants[16], but this difference was not statistically significant. It should be noted that the proportion and weekly average hours in education of both Youth on Track and Fast Track participants was much lower at program entry than exit. As shown in Table 3, 51.1% of Youth on Track participants were involved in education at program entry and their average weekly hours were 9.3 hours, while for Fast Track these figures were 53% and 9.6 hours, respectively.

16 The average weekly hours is brought down by the substantial proportion of young people in both Youth on Track and Fast Track that were not engaged in education.

Figure 7. Proportion of young people in education and average hours, by treatment group



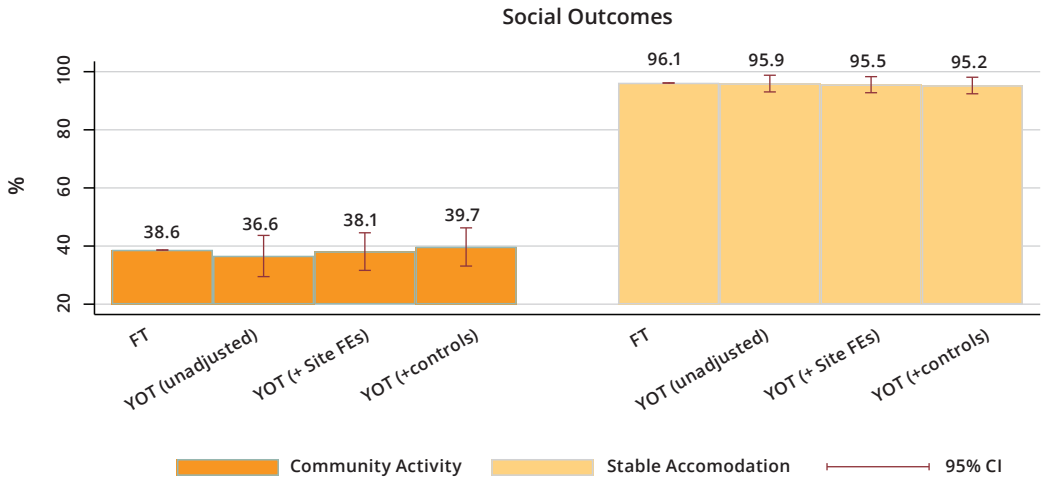
Note: YOT= Youth on Track, FT= Fast Track, FE= Fixed effects

Does Youth on Track increase a young person's wellbeing?

This section presents our estimates of the impact of Youth on Track on the following measures of wellbeing: community involvement, stable accommodation, and out-of-home care. Figure 8 shows the proportion of young people participating in a community activity and the proportion in stable housing. For both these outcomes, the adjusted and unadjusted proportions are very similar for Youth on Track and Fast Track participants, suggesting no impact of Youth on Track participation on engagement in community activities or stable housing. It should be noted, however, that over 95% of participants in both the Youth on Track and Fast Track groups were in stable accommodation at program exit.

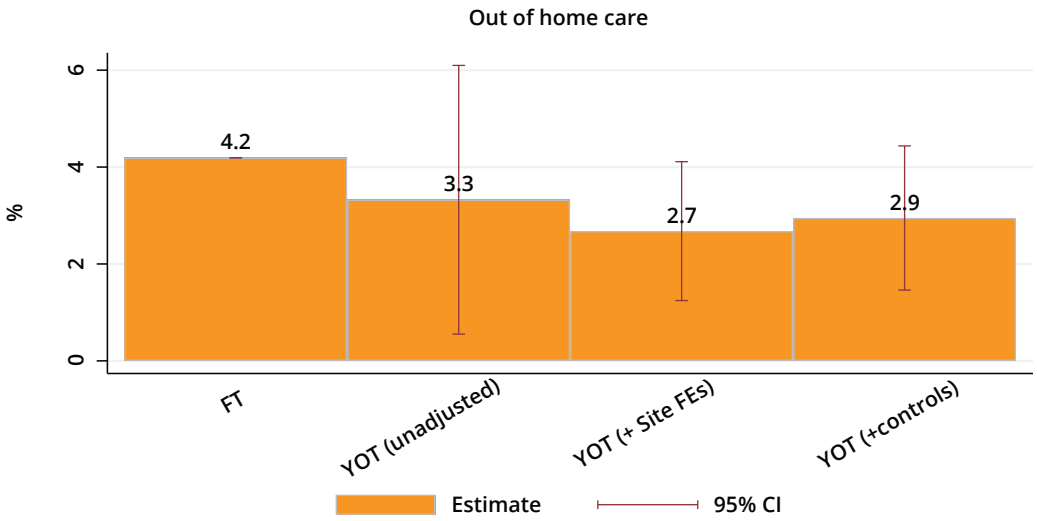
Figure 9 shows that Youth on Track participants have lower rates of being in out-of-home care (OOHC) at program exit. Once we adjust for the participant site, and their OOHC status at the beginning of their program the difference in OOHC at exit increases to 1.5 p.p. (4.2% in Fast Track compared to 2.7% in Youth on Track). This difference is statistically significant at the 5% level. However, the difference decreases to 1.3 p.p. after accounting for other factors including a young person's age at exit and is no longer statistically significant. Our preferred estimate is the 1.5 p.p. difference represented by the second bar. As the age at exit of a young person is partially determined by the duration of their program which is determined by their risk level, the third estimate may be affected by over-controlling.

Figure 8. Proportion of young people in a community activity and stable accommodation by treatment group



Note: YOT= Youth on Track, FT= Fast Track, FE= Fixed effects

Figure 9. Proportion of young people in out of home care at program exit by treatment group

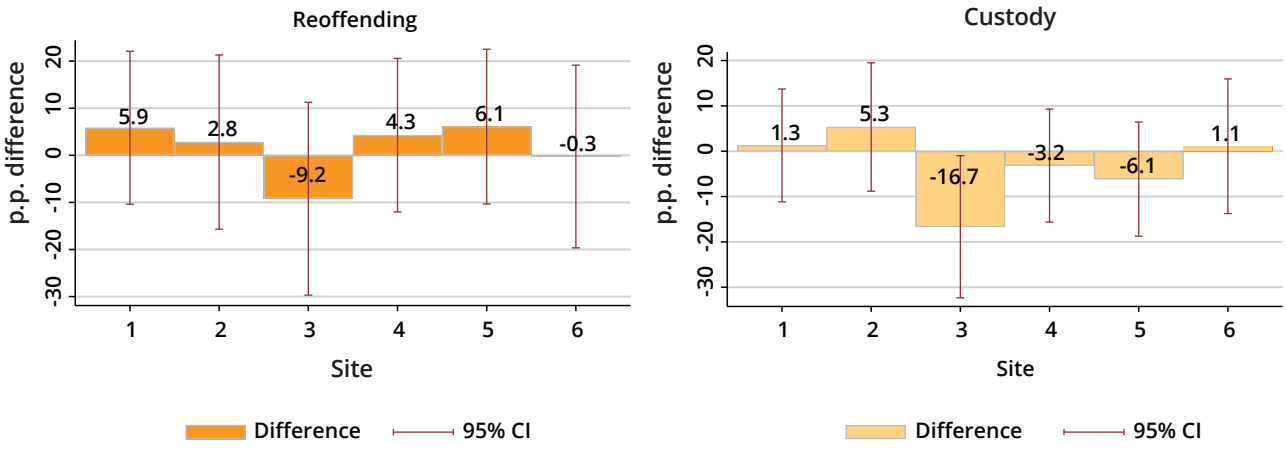


Note: YOT= Youth on Track, FT= Fast Track, FE= Fixed effects

Is Youth on Track more effective in certain sites?

The Youth on Track evaluation was implemented in six sites with three different service providers. The treatment effects presented earlier were an average across all six sites, but it is possible that some sites achieved better outcomes than others. Figure 10 examines this possibility. It presents, for each of the six treatment sites, the difference between Youth on Track and Fast Track in the probability of reoffending and custody within 12 months.[17] In most sites there were only small differences in outcomes across the two groups. Site 3 is a notable exception. It recorded much larger reductions in 12-month rates of reoffending (9.2 p.p.) and custody (16.7 p.p.) for Youth on Track participants when compared with Fast Track. However, there are large confidence intervals associated with these site-specific treatment effects because of the small sample sizes. For reoffending, our estimates for site 3 do not meet conventional thresholds for statistical significance, while for custody the estimate for site 3 is significant at the 5% level.

Figure 10. Differences between Youth on Track and Fast Track in reoffending and custody (within 12 months), by site



17 Reoffending and custody are only examined within 12 months so that we do not need to restrict the sample.

Implementation of Youth on Track across sites

Figure 10 suggests some differences in outcomes depending on where a young person completed their program. To explore potential reasons for these differences we examined if there were any differences across sites with regard to the implementation of Youth on Track (see panel A of Table 8) or the risk level of young people participating in Youth on Track (see panel B of Table 8). Table 8 shows substantial variability in how Youth on Track was implemented across the six sites. For example, 92% of Youth on Track participants received a behavioural intervention in site 2 but only 50% of participants received a behavioural intervention in site 6.[18] Similarly, in site 3, Youth on Track participants were on average referred to 4.23 services, while in site 2 they were only referred to 0.5 services on average. Only 35% of young people actually completed Youth on Track in site 1 but 75% completed it in site 3.

Table 8. Interventions, completion rates, program duration and YLS/CMI-AA scores for Youth on Track participants by site

	Site 1 Proportion (or mean) [N=81]	Site 2 Proportion (or mean) [N=64]	Site 3 Proportion (or mean) [N=65]	Site 4 Proportion (or mean) [N=64]	Site 5 Proportion (or mean) [N=65]	Site 6 Proportion (or mean) [N=52]
Panel A: Implementation						
Behavioural interventions	0.58	0.92	0.88	0.72	0.69	0.50
Family interventions	0.06	0.03	0.34	0.05	0.06	0.15
Number of services *(mean)*	1.23	0.50	4.23	2.33	1.92	2.21
No services or interventions	0.16	0.08	0.03	0.11	0.08	0.13
Completed	0.35	0.56	0.75	0.50	0.52	0.50
Referred on if not completed	0.21	0.07	0.38	0.41	0.19	0.38
Duration *(mean)*	203.67	188.97	253.29	161.91	230.65	237.33
Panel B: YLS/CMI-AA						
Low	0.02	0.02	0.00	0.09	0.02	0.00
Medium	0.17	0.39	0.35	0.52	0.14	0.31
Medium high	0.43	0.55	0.57	0.38	0.66	0.58
High	0.16	0.00	0.05	0.00	0.11	0.04
Missing	0.21	0.05	0.03	0.02	0.08	0.08

Note: The sample size for 'Referred on if not completed' are 53 (Site 1), 28 (Site 2), 16 (Site 3), 32 (Site 4), 31 (Site 5) and 26 (Site 6)

Importantly, Table 8 shows that site 3, which had the largest reductions in both reoffending and custody entries, also had the highest proportion of completions, the highest proportion of family interventions, the highest average number of services, and the longest duration of Youth on Track. There was also some variation across sites in the risk profile of the young people participating in Youth on Track. For example, site 4 had a much higher proportion of low and medium risk participants, whose criminogenic needs could have potentially been met by Fast Track.

18 Some of the variations in the rate of behavioural interventions across sites could be an artefact of the variation among caseworkers on how this outcome was recorded. See footnote 15.

DISCUSSION

This bulletin evaluated the impact of an early intervention program for young people on reoffending and incarceration using a randomised controlled design. Comparing outcomes for young people assigned to Youth on Track with those assigned to a brief intervention (known as Fast Track), we found no significant differences in the probability of a new offence within 12 or 24 months, or in time taken to reoffend. Youth on Track participants were found to be less likely to enter custody within 12 and 24 months of program entry compared with Fast Track participants, but these differences were not statistically significant at conventional levels. We estimated slightly larger reductions in reoffending and new custody episodes for Aboriginal Youth on Track participants compared with non-Aboriginal participants, but these differences also were not statistically significant. Additionally, we found that Youth on Track participants were 6.2 percentage points more likely to be in employment at the end of their program and worked 1 hour more each week, on average, compared with Fast Track participants. Youth on Track participants were also 1.5 percentage points less likely to be in OOHC at program exit. These results were statistically significant. No significant differences were found between the two groups in school attendance, involvement in community activities, or stable accommodation at program exit.

A major limitation of our study is the small sample size. Our power calculations indicated that we were unlikely to detect a difference of less than 9.2 percentage points as statistically significant, when examining reoffending. For custody, our minimum detectable difference was 7.1 percentage points (p.p.). Due to the smaller sample size when measuring the probability of reoffending and incarceration within 24 months, our minimum detectable effect increased to 10.8 p.p. for reoffending and 9.5 p.p. for entering custody. Small treatment effects are therefore unlikely to be detected as statistically significant with the sample size included in this trial. Further extensions of the 3-year trial were not considered feasible given COVID-19 disruptions to service delivery, uncertainty surrounding future funding, and the slowing participation rate in the evaluation sites (due to a greater number of young people having already engaged in the scheme or having household members who had engaged, as the trial progressed). Unfortunately, small sample sizes are a common limitation of studies examining the effectiveness of youth justice programs in reducing reoffending (Koehler et al., 2013).

Although the trial revealed positive results for Youth on Track participants in some domains, namely employment and out-of-home care, a sustained reduction in reoffending was not achieved over the course of the study. One reason for this could be problems with implementation. In the appendix, we provide some evidence that Youth on Track was more effective than Fast Track for young people who entered the trial in the first year of implementation. Young people who entered Youth on Track in the first annual cohort were 2.8 p.p. less likely to reoffend within 12 months and 10.3 p.p. less likely to enter custody, with the latter result being statistically significant. Outcomes were worse for the second and third cohorts. The reasons for this cohort effect are not immediately clear. Examination of program data revealed few differences over time in terms of interventions received, completion rates or program duration. There was some suggestion that the risk profile of Youth on Track participants changed over time, with a greater proportion of young people assessed as medium-high and high risk in later Youth on Track cohorts, but similar data was not available for the Fast Track group making it difficult to verify this explanation.

There are other issues associated with implementation that we could not observe directly but remain potential explanations for the diminishing effects of Youth on Track over time. First, the same caseworkers delivered both Youth on Track and Fast Track. While this design minimises any effect of caseworkers on reoffending (e.g., through enhanced skills or training), there is a risk of spillover[19] in service delivery across the two groups. That is, caseworkers and managers, as they become more familiar with Fast Track and its limitations (or benefits), inadvertently deliver some aspects of Youth on Track to Fast Track

19 There is evidence of spillover effects in many other settings. This includes policing where Braga et al. (2020) found that the adoption of body-worn cameras also reduced complaints for officers that did not have body cameras, and health, where Fletcher and Marksteiner (2017) found substantial spousal spillovers for many health interventions.

participants (or vice versa), resulting in two treatments which closely resemble each other in terms of key characteristics. This risk was minimised by specifying clear treatment protocols for each intervention at the outset of the study, particularly with regard to the interventions that could be delivered and the length of the program, as well as through routine monitoring of performance indicators by Youth Justice staff. Nevertheless, spillover effects may have contributed to treatment dilution. Secondly, the length of Youth on Track funding contracts varied significantly over the course of the trial. In the initial stages of the study, Youth on Track was funded for 3 years until 30 September 2019. After this initial investment, however, Youth on Track funding was extended only for short intervals of between three and 12 months, with at times only weeks' notice. It is possible that these shorter contract terms created uncertainty amongst staff and stakeholders regarding the scheme's longevity. This may in turn have impacted staff motivation and led to problems with staff retention, and/or the ability of service providers to attract well qualified and experienced caseworkers. Some site managers reported experiencing this issue.

The available data does suggest that there were significant variations in both implementation and outcomes achieved across the six different treatment sites included in the trial. Substantial variations across sites were observed in the proportion of Youth on Track participants who received behavioural interventions, the average number of referrals to services and in completion rates. While some of these differences may be due to differences in participant profiles across the Youth on Track locations, the fact that the site scoring highest on these implementation measures was also the site associated with better reoffending and incarceration rates suggests that implementation may have affected outcomes. Caution is necessary when interpreting the significance of these site-specific treatment effects given the analysis was severely restricted by the small sample sizes. Nevertheless, these findings are consistent with other evaluations of youth offender programs and highlight the challenges faced when implementing large-scale interventions in community-based settings. For example, early evaluations of Multi-Systemic Therapy showed it to be an effective method for reducing criminal activity and anti-social behaviour when it was delivered in clinical settings under well controlled conditions by highly qualified therapists. However, these positive results were not replicated in studies of MST interventions delivered by institutions in community-based treatment settings (Henggeler, 2012; Littell et al., 2021; van der Stouwe et al., 2014). Poor treatment fidelity and lack of organisational support was thought to account for some of these weaker or null effects (Henggeler, 2011; Siegle et al., 2014). Further qualitative research within each of the Youth on Track sites may assist in isolating the mechanism for the enhanced outcomes achieved in certain locations, and in so doing help to refine best practice in early intervention.

Future research should also consider whether any improvements could be made to the Youth on Track model to increase its effectiveness, as some aspects of the scheme have a limited evidence base. The YLS-CMI/AA, the risk assessment tool used to determine the length and intensity of Youth on Track, is one possible area for review. Previous studies examining recidivism among young offenders in the community in NSW have shown that the YLS-CMI/AA has an acceptable level of predictive accuracy for non-Aboriginal young people but its predictive accuracy for Aboriginal young people is well below the acceptable threshold (Nelson, 2017; Thompson & McGrath, 2012). Since more than half (53%) of the young people participating in the Youth on Track scheme identify as Aboriginal and that the tool has never been validated in an early intervention cohort, these results suggest that alternative risk assessment tools may need to be developed to ensure that the level of services a young person receives is accurately matched to their risk level.[20] The YLS-CMI/AA tool should be validated among the population that the Youth on Track scheme is targeting – young people in NSW with short criminal histories, to ascertain how accurate it is in assigning risk levels.

Another key feature of the Youth on Track scheme is the CHART behavioural intervention. In fact, for the majority of Youth on Track participants, CHART was the only structured intervention they received as only 11% of participants received a family intervention. However, there is limited evidence for CHART's

20 The Youth on Track scheme uses the YLS-CMI/AA to determine the length and intensity of Youth on Track (risk assessment), and as a case management tool to assist the caseworker to determine which services and interventions a young person may need. In this paragraph, we make no comment on the effectiveness of the YLS-CMI/AA as a case management tool.

effectiveness in the Youth on Track context. CHART incorporates many features of youth interventions that have been found to reduce offending (see Table A1), including cognitive behavioural therapy. However, CHART has never been evaluated. This is important because the majority of the "what works" literature from which CHART is developed is international[21] and these results may not necessarily be generalisable to the Australian context given the heterogeneity of our population (Butcher et al., 2020). Further, as discussed previously, many evidence-based interventions like MST were found not to be effective because of the way they were implemented. Rigorous evaluation is therefore essential to confirm that these interventions can be successfully transferred to other settings. Furthermore, work by Nastaly (2019) found a very high rate of program attrition amongst young offenders in NSW who were required to participate in CHART as part of their supervision order. These non-completers were also found to have much higher rates of recidivism. As only 52% of participants completed Youth on Track, further research into factors that influence treatment retention may also be beneficial.

An alternative explanation for the small differences in reoffending outcomes between Youth on Track and Fast Track is that the shorter, less intensive program may have been sufficient to meet the needs of some of the young people referred to the scheme. This is consistent with evidence from the broader substance abuse literature showing that brief interventions with young people can modify behaviour and achieve beneficial outcomes (Kaner et al., 2009; Spirito et al., 2004; Tait & Hulse, 2003). A briefer intervention is an attractive policy option not only from an investment perspective, but also because it has the potential to improve accrual rates into Youth on Track. Currently only 50% of eligible young people referred to the scheme engage with the program. If Fast Track (or something similar) is available and perceived as more attractive by some young people, their families and/or referrers, the overall number of young people engaging with services in the Youth on Track sites may rise. The limited timeframe also allows caseworkers to work more efficiently through waitlists. These potential advantages of Fast Track were previously identified in BOCSAR's process evaluation report, with some stakeholders commenting that Fast Track was more effective for lower risk young people. However, these same stakeholders also stressed that discretion should ultimately remain with the caseworker as to which service a young person receives as they are best placed to assess the young person's needs, backgrounds and circumstances (Trimboli, 2019b). Moffitt (2003) reaches a similar conclusion in his review of the literature, suggesting that there is a group of high-risk young people who will not desist from offending and will therefore need a longer, more intensive, and earlier intervention in order to decrease their risk of future involvement in crime.

It is important to acknowledge that the results presented in this bulletin are the marginal benefits of Youth on Track over a minimal service model. This was an intentional feature of the RCT given the ethical concerns surrounding withholding treatment from young people referred to the scheme. Unfortunately, however, it precludes any conclusions regarding the effectiveness of the Youth on Track scheme in reducing reoffending and imprisonment relative to no service at all. A simple comparison of the unadjusted reoffending or custody rates of Youth on Track and Fast Track with the unadjusted rates of other population groups would not be effective because participants in the Youth on Track scheme are highly selective, especially those referred to the program by schools or the police. Further, our measure of reoffending is broader than those reported by other agencies, such as the AIHW which measures reoffending as a return to a supervision order. A further limitation of our study is that it considered only a narrow set of indicators of a young person's wellbeing (i.e., accommodation and participation in community activities) and no measures of family functioning, both of which were expected to be positively impacted by participation in Youth on Track. Further research using the NSW Human Services Data Set (NSW Department of Communities and Justice, 2021) is therefore being undertaken by BOCSAR to compare outcomes for Youth on Track participants with young people who are observably similar but who have not received any services or interventions from Youth Justice. The HSDS is a population-based longitudinal dataset that encompasses all children residing in or born in NSW since 1990. It links administrative data from numerous state government departments, thereby enabling better identification of counterfactuals for program evaluation and the development of more comprehensive measures of

21 For example, the Australian Institute of Criminology conducted a systematic review to find effective characteristics of youth justice programs. Only 9 out of 44 were conducted in Australia and the vast majority of those did not involve direct evaluations of CBT interventions (Pooley, 2020).

service usage, outcomes and life events. Unlike the current study, the matching approach that will be employed in this research does not allow for causal interpretations but will provide further evidence regarding the extent to which Youth on Track achieves its aims of reducing a young person's reoffending, improving their wellbeing, increasing their engagement with education/employment, and building more positive family connections.

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APPENDIX

CHART program

Table A1 shows a summary from Harris (2008) of the characteristics of effective youth justice treatment programs according to the "what works" literature. She also lists the components for effectiveness of the CHART program. This allows readers to compare the similarities and differences between CHART and other youth justice interventions.

Table A1. Characteristics of effective treatment programs and CHART

Components of Effective Treatment Programs	Components for Effectiveness of CHART
• Indiscriminate targeting of treatment programs is counterproductive in reducing recidivism: medium-to high risk offenders should be selected and programs should focus on criminogenic targets. • The type of treatment program is important, with stronger evidence for structured behavioural and multimodal approaches than for less focussed approaches. • The most successful programs, while behavioural in nature, include a cognitive component to focus on attitudes and beliefs. • Treatment programs should be designed to engage high levels of offender responsivity. • Treatment programs conducted in the community have a stronger effect than residential programs. While residential programs can be effective, they should be linked structurally with community-based interventions. • The most effective programs have high treatment integrity in that they are carried out by trained staff and the treatment initiators are involved in all the operational phases of the treatment programs.	• Based on a sound conceptual and theoretical framework that provides a clear rationale for the application of methods and is supported by empirical research (social learning/cognitive-behavioural) • Targets moderate to high-risk offenders • Focussed on criminogenic needs • Responsive to and congruent with the learning styles of most young offenders (active, participatory) • Uses a planned, structured and cognitive-behavioural approach; is multi-modal and skills-oriented • High intervention integrity when the ingredients of the program are delivered as planned by trained staff • Multiple components that recognise the spectrum of difficulties encountered by young offenders that may be conducive to crime.

Source: Harris (2008)

Youth on Track program logic

Figure A1 shows how the Youth on Track program was intended to achieve its outcomes.

Figure A1. Youth on Track Program Logic

YOUTH ON TRACK PROGRAM LOGIC

Need: The Government's aims to focus on prevention and early intervention to address youth crime, in line with strong evidence that supports the effectiveness of these approaches. An early intervention for 10 to 17 year olds who are at risk of becoming persistent offenders, but who have not progressed far enough into the justice system to receive a supervised order, was needed. This group has been found to be responsible for a disproportionate amount of crime. An evidence-informed intensive intervention is not otherwise provided until the young people progress further into the criminal justice system after several formal cautions or charges.

Inputs	Outputs		Outcomes - Impact		
	Activities	Participation	Short (~ 3-12mths)	Medium (12 months)	Long (2 + years)
> Funding for 7 sites & YoT Unit > Youth on Track early intervention model > Implementation Committee > Regional Governance Committees > YoT referral agencies > YoT service providers > Experienced and qualified staff/management > YoT staff who meet Mandatory Training Requirements > YoT Performance Framework > Quality Assurance Process > YoT Portal	> YP are referred by NSW Police YLO's & local schools/ automatically referred > Eligible YP are referred to local YoT Providers > Consent obtained from YP and carer > YP screened for cognitive disabilities (CAIDS-Q) > Risk & needs assessment conducted (YLS/CMI-AA) > Individualised case plans > Evidenced-informed behaviour and family criminogenic interventions > Provision of brokerage support where required > Referral to additional programs and services > Exit plans developed for each YP	> % of eligible referrals that are accepted > % of eligible referrals that lead to young people consenting to participate > Amount (1-6 hrs/week) & length (3-12 mths) of support provided per yp as determined by risk level > Participation in offered interventions: o Family o Behavioural o Other > % of exited and completed participants engaged in the scheme for the minimum timeframe based on their initial YLS/CMI risk level > Equal participation by Aboriginal young people.	> Reductions in YLS/CMI scores at 3mths, 6mths & completion > Increased access to safe & stable accommodation > Increased participation in employment > Increased participation in education & training > Increased participation in community activities	> Reduction in formal contact with police. > Increased level of positive family behaviours and improved family support > Increased connections with positive peers > YP and their families are satisfied with the YoT scheme	> Reduction in reoffending by young people > Improved levels of wellbeing > Increased participation and achievement in education or employment > Increased positive family behaviours and improved family support > YoT funded and provided state-wide.

Evaluation

Process evaluation (BOCSAR), Social Outcome Evaluation (CIRCA), Reoffending Evaluation (BOCSAR), Cost benefit analysis (BOCSAR)

Ex-post power calculations

The randomised sample size of 732 was determined using pre-specified power analyses which showed it would be possible to detect a reduction of 9 percentage points (p.p.) at 80% power. Table A2 shows the minimum effect size that could be detected (i.e., minimum detectable effect (MDE)) for our realised sample size, based on the proportion of young people that reoffended and entered custody in our control group (i.e., Fast Track). The minimum effect size is the percentage point reduction in the probability of reoffending or entering custody for Youth on Track participants relative to Fast Track participants which can be detected as a statistically significant effect at different levels of power. These calculations indicate that when examining the full sample, we would only be able to detect a 9.2 p.p. reduction in reoffending by Youth on Track participants compared to Fast Track participants at 70% power and a 7.1 p.p. reduction in custody entries at 70% power. Our sample is smaller when measuring the probability of reoffending and entering custody within 24 months and hence the MDE increases to 10.8 p.p. for reoffending and 9.5 p.p. for entering custody at 70% power.

Table A2. Minimum detectable effect sizes for the realised sample size

	Power		
	70%	80%	90%
Full sample (12 months)	**Minimum detectable effect (percentage points)**		
Reoffending	9.2	10.3	11.9
Custody	7.1	7.9	9.0
24 months			
Reoffending	10.8	12.2	14.1
Custody	9.5	10.6	12.1

Tables accompanying figures

Table A3. Reoffending estimates for Figure 3

	12 months reoffending			24 months reoffending		
	(1)	(2)	(3)	(4)	(5)	(6)
Youth on Track	0.0295	0.0270	0.0235	-0.0175	-0.0331	-0.0315
	(0.0373)	(0.0376)	(0.0367)	(0.0429)	(0.0432)	(0.0432)
Demographic controls	No	No	Yes	No	No	Yes
Offending controls	No	No	Yes	No	No	Yes
Site FEs	No	Yes	Yes	No	Yes	Yes
R squared	0.00086	0.0096	0.10	0.00032	0.023	0.090
Observations	725	725	725	519	519	519

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A4. Custody estimates for Figure 4

	12 months custody			24 months custody		
	(1)	(2)	(3)	(4)	(5)	(6)
Youth on Track	-0.00841	-0.0191	-0.0274	-0.00201	-0.0226	-0.0346
	(0.0304)	(0.0299)	(0.0282)	(0.0404)	(0.0394)	(0.0375)
Demographic controls	No	No	Yes	No	No	Yes
Offending controls	No	No	Yes	No	No	Yes
Site FEs	No	Yes	Yes	No	Yes	Yes
R squared	0.00011	0.063	0.21	0.0000048	0.084	0.23
Observations	725	725	725	519	519	519

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A5. Employment estimates for Figure 6

	Employment (p.p.)			Weekly hours		
	(1)	(2)	(3)	(4)	(5)	(6)
Youth on Track	0.0949***	0.0884***	0.0623**	1.390**	1.456***	0.998*
	(0.0309)	(0.0287)	(0.0282)	(0.614)	(0.547)	(0.557)
Demographic controls	No	No	Yes	No	No	Yes
Offending controls	No	No	Yes	No	No	Yes
Site FEs	No	Yes	Yes	No	Yes	Yes
R squared	0.013	0.18	0.27	0.0071	0.23	0.28
Observations	725	725	725	725	725	725

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A6. Education estimates for Figure 7

	Education (p.p.)			Weekly hours		
	(1)	(2)	(3)	(4)	(5)	(6)
Youth on Track	-0.0187	-0.0123	0.00192	-0.268	-0.00281	0.628
	(0.0364)	(0.0308)	(0.0315)	(0.936)	(0.725)	(0.735)
Demographic Controls	No	No	Yes	No	No	Yes
Offending Controls	No	No	Yes	No	No	Yes
Site FEs	No	Yes	Yes	No	Yes	Yes
R squared	0.00037	0.30	0.34	0.00011	0.42	0.45
Observations	725	725	725	725	725	725

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A7. Social outcomes estimates for Figure 8 and 9

	Community activity			Stable accommodation			Out of home care		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Youth on Track	-0.0205	-0.00525	0.0107	-0.00200	-0.00582	-0.00863	-0.0087	-0.0151**	-0.0124
	(0.0361)	(0.0330)	(0.0335)	(0.0146)	(0.0141)	(0.0145)	(0.0141)	(0.00730)	(0.00758)
Demographic controls	No	No	Yes	No	No	Yes	No	No	Yes
Offending controls	No	No	Yes	No	No	Yes	No	No	Yes
Site FEs	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
R squared	0.00045	0.19	0.24	0.000026	0.097	0.13	0.00052	0.74	0.74
Observations	725	725	725	725	725	725	725	725	725

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Robustness check: Excluding potential misallocations

Tables A8 and A9 examine our reoffending and custodial results but excluding the 31 young people who were misallocated or whose allocation we could not verify and the two young people who were rereferred to Youth on Track for an offence that they committed before their original consent date (see method). The results are equivalent to Figures 3 and 4 except for the aforementioned exclusions. Comparing the estimates in Table A8 with Figure 3, when examining reoffending within 12 months the estimates are virtually identical. However, our estimates are slightly larger in Table A8 when compared to Figure 3 when examining a 24-month follow-up period. For example, our fully adjusted estimate in column (6) shows a 3.6 p.p. reduction in reoffending for Youth on Track participants compared to 3.2 p.p. in Figure 3. However, no estimates are statistically significant. Similarly, when comparing Table A9 to Figure 4, the magnitude of estimates is slightly larger for Table A9. For example, our fully adjusted estimate in Table A9 shows Youth on Track participants are 3.6 p.p. less likely to enter custody within 12 months, while the corresponding estimate in Figure 4 is 2.8 p.p. Similarly, column 6 of Table A9 shows that within 24 months, Youth on Track participants are 4.9 p.p. less likely to enter custody, while the corresponding reduction in Figure 4 is a 3.5 p.p. reduction. Either way, neither estimates in Table A9 nor Figure 4 are statistically significant.

Table A8. Reoffending estimates excluding misallocations

	12 months reoffending			24 months reoffending		
	(1)	(2)	(3)	(4)	(5)	(6)
Youth on Track	0.0240	0.0219	0.0227	-0.0298	-0.0405	-0.0363
	(0.0381)	(0.0384)	(0.0375)	(0.0443)	(0.0446)	(0.0447)
Demographic controls	No	No	Yes	No	No	Yes
Offending controls	No	No	Yes	No	No	Yes
Site FEs	No	Yes	Yes	No	Yes	Yes
R squared	0.00057	0.0082	0.100	0.00093	0.019	0.080
Observations	692	692	692	490	490	490

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A9. Custody estimates excluding misallocations

	12 months custody			24 months custody		
	(1)	(2)	(3)	(4)	(5)	(6)
Youth on Track	-0.0239	-0.0318	-0.0355	-0.0268	-0.0435	-0.0490
	(0.0310)	(0.0304)	(0.0288)	(0.0414)	(0.0405)	(0.0387)
Demographic controls	No	No	Yes	No	No	Yes
Offending controls	No	No	Yes	No	No	Yes
Site FEs	No	Yes	Yes	No	Yes	Yes
R squared	0.00086	0.061	0.20	0.00086	0.076	0.21
Observations	692	692	692	490	490	490

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A10 to A12 examine our estimates of Youth on Track's impact on our social outcomes if we exclude misallocations and young people who were rereferred for an old offence. Our employment estimates are slightly lower than in Figure 6, where column 3 estimates that Youth on Track increases employment by 5.0 p.p. compared to a 6.2 p.p. increase, which is the corresponding increase in Figure 6. Similarly, column 6 of Table A10 estimates an increase of 0.94 hours a week in employment whereas Figure 6 estimates an increase of 1 weekly hour.

Table A10. Employment estimates excluding misallocations

	Employment (p.p.)			Weekly hours		
	(1)	(2)	(3)	(4)	(5)	(6)
Youth on Track	0.0772**	0.0715**	0.0496*	1.295**	1.321**	0.944*
	(0.0311)	(0.0286)	(0.0282)	(0.618)	(0.551)	(0.561)
Demographic controls	No	No	Yes	No	No	Yes
Offending controls	No	No	Yes	No	No	Yes
Site FEs	No	Yes	Yes	No	Yes	Yes
R squared	0.0088	0.18	0.27	0.0063	0.23	0.27
Observations	692	692	692	692	692	692

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The education estimates in Table A11 are very similar to our estimates for the sample in Figure 7, and so are the estimates for community activity and stable accommodation shown in Table A12 and Figure 8, respectively. Our estimates for Youth on Track's impact on OOHC are slightly larger in Table A12 compared with Figure 9 (a 1.6 p.p. reduction compared to a 1.3 p.p. reduction). Overall, no results are substantially different when we exclude misallocations compared to the main results.

Table A11. Education estimates excluding misallocations

	Education (p.p.)			Weekly hours		
	(1)	(2)	(3)	(4)	(5)	(6)
Youth on Track	-0.0198	-0.0139	-0.00316	0.0544	0.328	0.867
	(0.0372)	(0.0314)	(0.0321)	(0.950)	(0.731)	(0.741)
Demographic Controls	No	No	Yes	No	No	Yes
Offending Controls	No	No	Yes	No	No	Yes
Site FEs	No	Yes	Yes	No	Yes	Yes
R squared	0.00041	0.30	0.33	0.0000048	0.42	0.46
Observations	692	692	692	692	692	692

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A12. Social outcomes excluding misallocations

	Community activity			Stable accommodation			Out of home care		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Youth on Track	-0.0271	-0.0112	0.00627	-0.00335	-0.00613	-0.0088	-0.0133	-0.0182***	-0.0161**
	(0.0368)	(0.0336)	(0.0342)	(0.0153)	(0.0146)	(0.0150)	(0.0142)	(0.00700)	(0.00723)
Demographic controls	No	No	Yes	No	No	Yes	No	No	Yes
Offending controls	No	No	Yes	No	No	Yes	No	No	Yes
Site FEs	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
R squared	0.00078	0.19	0.23	0.000070	0.11	0.14	0.0013	0.76	0.77
Observations	692	692	692	692	692	692	692	692	692

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Aboriginal reoffending outcomes

This section examines our offending outcomes for Aboriginal young people. Aboriginal young people make up more than half the participants of both the Youth on Track and Fast Track programs. In Tables A13 and A14, the coefficient on "Youth on Track" is the impact of Youth on Track on reoffending or custody for non-Aboriginal young people, while the coefficient on "Youth on Track * Aboriginal" is the additional program impact for Aboriginal young people compared to non-Aboriginal young people. The coefficient on "Aboriginal" refers to the differences in Aboriginal rates of offending or custody compared to non-Aboriginal young people across both Youth on Track and Fast Track.

Looking at reoffending within 12 months, our adjusted estimates shows that non-Aboriginal young people in Youth on Track are 0.3 p.p. less likely to reoffend than Fast Track participants, while Aboriginal young people in Youth on Track are 3.7 p.p. more likely to offend than non-Aboriginal young people in Youth on Track. When we examine a 24-month follow-up, non-Aboriginal young people are 2.2 p.p. more likely to reoffend than Fast Track participants. However, Aboriginal Youth on Track participants are 11 p.p. less likely to reoffend than non-Aboriginal Youth on Track participants. This suggests that Youth on Track is more effective for Aboriginal participants compared to non-Aboriginal participants.

Examining custody outcomes, Youth on Track seems to be slightly more effective for Aboriginal participants compared to non-Aboriginal participants for both 12- and 24-month follow-up periods. Column 3 shows that Aboriginal Youth on Track have an additional 4.2 p.p. reduction in the probability of a new custody episode in 12 months compared to the 0.9 p.p. reduction for non-Aboriginal Youth on Track participants. While column 6 shows these numbers are 6.3 p.p. and 0.7 p.p. respectively. However, there is no statistically significant difference between Aboriginal and non-Aboriginal participants in the impact of Youth on Track for either reoffending or custody.

Table A13. Reoffending by Aboriginality

	12 months reoffending			24 months reoffending		
	(1)	(2)	(3)	(4)	(5)	(6)
Youth on Track	0.0134	0.0126	-0.00348	0.0434	0.0261	0.0215
	(0.0538)	(0.0542)	(0.0534)	(0.0623)	(0.0625)	(0.0626)
Aboriginal	0.00685	0.0276	0.0181	0.106*	0.130**	0.0962
	(0.0548)	(0.0559)	(0.0573)	(0.0627)	(0.0641)	(0.0670)
Youth on Track * Aboriginal	0.0304	0.0266	0.0366	-0.117	-0.112	-0.110
	(0.0747)	(0.0750)	(0.0734)	(0.0859)	(0.0858)	(0.0857)
Demographic controls	No	No	Yes	No	No	Yes
Offending controls	No	No	Yes	No	No	Yes
Site FEs	No	Yes	Yes	No	Yes	Yes
R squared	0.000017	0.0099	0.13	0.0044	0.026	0.14
Observations	725	725	725	519	519	519

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A14. Custody outcomes by Aboriginality

	12 months custody			24 months custody		
	(1)	(2)	(3)	(4)	(5)	(6)
Youth on Track	0.0160	0.0120	-0.00861	0.0333	0.0264	-0.00699
	(0.0439)	(0.0429)	(0.0407)	(0.0589)	(0.0570)	(0.0546)
Aboriginal	0.0616	0.109**	0.0846*	0.0330	0.104*	0.0582
	(0.0447)	(0.0442)	(0.0437)	(0.0592)	(0.0585)	(0.0585)
Youth on Track * Aboriginal	-0.0480	-0.0615	-0.0415	-0.0670	-0.0932	-0.0629
	(0.0609)	(0.0593)	(0.0560)	(0.0811)	(0.0784)	(0.0747)
Demographic controls	No	No	Yes	No	No	Yes
Offending controls	No	No	Yes	No	No	Yes
Site FEs	No	Yes	Yes	No	Yes	Yes
R squared	0.000017	0.0099	0.13	0.0044	0.026	0.14
Observations	725	725	725	519	519	519

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Cohort treatment effects

In the results section we found larger differences between Youth on Track and Fast Track when reoffending and entry to custody was measured over a 24-month period rather than a 12-month period. This may be due to: (1) young people who entered the trial earlier achieving better outcomes; (2) Youth on Track having greater impact on reoffending over the longer term; or (3) some combination of these two. To explore the first of these explanations, we examined our reoffending and custody outcomes separately for three annual cohorts:

- Cohort 1: Young people who entered Youth on Track or Fast Track between 9th August 2017 – 8th August 2018;
- Cohort 2: Young people who entered Youth on Track or Fast Track between 9th August 2018 – 8th August 2019; and
- Cohort 3: Young people who entered Youth on Track or Fast Track between 8th August 2019 – 4th June 2020.

Figure A2. Treatment effects for reoffending and custody (within 12 months) by cohort

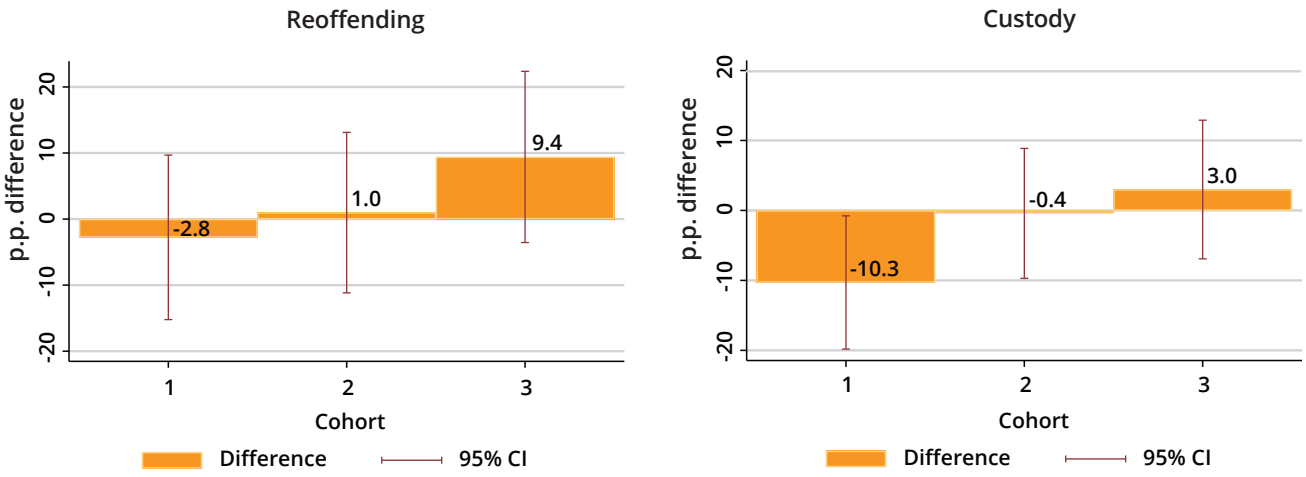

Figure A2 presents the estimated treatment effect of Youth on Track on reoffending and custody separately for the three annual cohorts. The treatment effect refers to the difference between Youth on Track and Fast Track in the probability of reoffending or a new custody episode. For this analysis we use a 12-month follow-up period to avoid excluding any observations. Figure 10 shows that young people who entered Youth on Track in the first cohort were 2.8 p.p. less likely to reoffend within 12 months and 10.3 p.p. less likely to enter custody. In the second cohort the differences in both outcomes are essentially zero and are slightly positive in the third cohort. Only the reduction in custody for the first cohort is statistically significant. However, there is a clear pattern that Youth on Track was more effective for young people in the first cohort relative to the later cohorts.

This suggests that any difference in the 24-month results compared to the 12-month results is due to differences in cohorts rather than any longer-term impact of Youth on Track. The next section will examine whether there were any differences in how Youth on Track and Fast Track were run between cohorts.

Implementation of Youth on Track across cohorts

Figure A2 suggests that Youth on Track was more effective in its first year compared to its second and third years. This may be because the intensity, as measured by our indicators, of Youth on Track and/or Fast Track varied over time. Table A15 examines this possibility by presenting, for each annual cohort, the proportion of Youth on Track participants who received different types of interventions, the proportion of Youth on Track participants who completed the program, the average duration of Youth on Track and the risk profile of Youth on Track participants. These data do not support a decline in the intensity of Youth on Track in later cohorts. In fact, more young people in the later cohorts received a behavioural intervention[22] and more young people completed Youth on Track. Participants also spent slightly longer in Youth on Track if they entered the trial after August 2018. Later Youth on Track cohorts also had a greater proportion of young people with a medium high YLS/CMI-AA and high YLS/CMI-AA. However, this may simply reflect the lower proportion of young people with a YLS/CMI-AA that was not recorded (i.e., missing), in later cohorts.

Table A15. Interventions, completion rates, program duration and YLS/CMI-AA scores for Youth on Track participants by cohort

	Cohort 1		Cohort 2		Cohort 3	
	Proportion	Count	Proportion	Count	Proportion	Count
Panel A: Implementation						
Behavioural interventions	0.66	125	0.76	140	0.72	126
Family interventions	0.13	125	0.09	140	0.13	126
Number of services (mean)	1.99	125	2.04	140	2.08	126
No services or interventions	0.12	125	0.09	140	0.09	126
Completed	0.46	125	0.54	140	0.56	126
Referred on if not completed	0.21	67	0.28	64	0.29	55
Duration (mean)	204.94	125	213.31	140	216.41	126
Panel B: YLS/CMI-AA						
Low	0.02	125	0.04	140	0.02	126
Medium	0.33	125	0.31	140	0.29	126
Medium high	0.46	125	0.52	140	0.59	126
High	0.05	125	0.06	140	0.08	126
Missing	0.14	125	0.07	140	0.03	126

Table A16 examines these same program characteristics by cohort for Fast Track. Unfortunately, the screening version of the YLS/CMI-AA, (which was used in Fast Track) does not provide enough detail to categorise participants as High, Medium or Low risk. Therefore, this information could not be compared across the different cohorts. Table A16 shows no evidence that implementation of Fast Track varied significantly over the course of the trial, with the exception of a small decline in completions and an increase in the proportion of young people that received no services or interventions in later cohorts.

22 It is possible that any differences in the rate of behavioural interventions could simply be a difference in how it was recorded as mentioned previously.

Table A16. Interventions, completion rates and program duration for Fast Track participants by cohort

	Cohort 1		Cohort 2		Cohort 3	
	Proportion	Count	Proportion	Count	Proportion	Count
Panel A: Implementation						
Behavioural interventions	0.01	120	0.00	115	0.02	99
Family interventions	0.00	120	0.00	115	0.02	99
Number of services (mean)	1.86	120	1.31	115	1.31	99
No services or interventions	0.14	120	0.36	115	0.30	99
Completed	0.83	120	0.83	115	0.77	99
Referred on if not completed	0.24	21	0.37	19	0.17	23
Duration (mean)	43.74	120	40.17	115	41.88	99

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