Research Brief
Evaluating literacy and numeracy progressions in custody and desistance from crime: Evidence from Western Australia

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Abstract

This study investigates the impact of prisoners' participation in literacy and numeracy courses while in custody on desistance from crime using administrative data on custodial stays in Western Australian adult prisons from 2000 to 2024. Participation in literacy and numeracy courses is found to be associated with around a 9-percentage point reduction, from 49 to 40 percent, in the probability of a prisoner returning to prison within two years of release, relative to prisoners who did not participate in any courses. Participation in other types of courses is estimated to have a similar effect. Key results are robust to alternative specifications of time to recidivism, and the modelling provides evidence on how other prisoner characteristics affect recidivism. Separate estimates for key subgroups show the effect of course participation to be larger for more educated prisoners and more serious offenders, but much smaller for female Aboriginal prisoners.

Objective

Reducing the rate at which prisoners reoffend and return to custody offers potentially large budgetary savings, plus direct benefits to those prisoners, their families, and wider society. International evidence indicates prisoner participation in learning activities is associated with reduced rates of reoffending and positive outcomes in other domains (Davis et al. 2013).

The Western Australian Department of Justice's (the Department) Education, Employment and Transitional Services unit delivers a wide range of courses to WA prisoners. These include Adult Basic Education (ABE) aimed at addressing low levels of literacy and numeracy among the prison population.

The main objective of this research is to evaluate the effect of prisoners' participation in those ABE courses on desistance from crime. The analysis is based on a large confidentialised dataset derived from administrative records provided by the Department (see Dockery and Vu, 2025).

Data

The data used in the analyses are sourced from administrative records on all custodial stays in WA prisons with a discharge date from 1 January 2000; and records for each class a prisoner participated in. Unique, anonymised identifiers allow classes to be linked to custodial stays and, in turn, those stays matched to individuals. As many individuals had multiple custodial stays over this timeframe, the data are in the form of a panel, with repeat observations on stays for individuals. An average of 2.24 stays were recorded per prisoner, ranging to a maximum of 28 stays.

The key outcome indicator is a measure of recidivism, based on whether a prisoner commences a further custodial sentence within two years of release, which can be observed for stays with a release date up to late 2022. The dataset available for estimating the main model includes almost 100,000 observations on completed prison stays by around 43,000 individual prisoners.

For 41 percent of those completed prison stays, the person was observed to return to custody in a WA prison within two years of release. In around 17 percent of stays the prisoner participated in at least one ABE class, in 40 percent the prisoner participated in only non-ABE classes, and in the remaining 44 percent of stays prisoners did not participate in any classes.

Methods

The data are modelled as a panel, with custodial stays as the unit of observation and allowing for multiple observations (stays) for individuals.

With the outcome defined in binary form – the prisoner either did or did not return to custody within two years of the end of custodial stay – a multivariate binary logistic regression model is

estimated. This allows us to estimate the effect of participation in courses, along with the effect of other control variables such as gender and length of sentence, on the probability of a prisoner returning to custody within two years of release.

A simple evaluation design would compare recidivism outcomes for prisoners who participated in ABE courses with the outcomes for prisoners who did not participate. However, modelling the effect of ABE courses is not so straight-forward because prisoners typically participate in multiple courses - both ABE and non-ABE courses - during a custodial stay. On average, prisoners participated in seven classes in total per stay, and 0.7 ABE classes.

In order to capture the effect of participation in ABE classes, stays are classified into three mutually exclusive categories:

- The prisoner attended at least one ABE class during the stay (and may also have participated in other courses).
- The prisoner attended only non-ABE classes during the stay.
- The prisoner did not participate in any courses during the stay.

The third 'non-participant' group represents the 'reference' or omitted category against which participants are compared to in the modelling.

To test the sensitivity of the results to this approach, models are estimated for the likelihood or recidivism after one year of release, and after five years of release. Survival models are also estimated in which the duration of post-release spells out of prison is modelled as a continuous variable, avoiding the need to pick an arbitrary post-release reference point at which to measure recidivism.

Models are also estimated for key sub-groups within the population: by gender; education level, seriousness of offence, and Aboriginal status. This allows for the possibility that the effects of participation in classes, and the effects of other covariates, may vary between groups.

Results

The modelling results indicate that participation in an ABE class is associated with a reduction in recidivism after two years of release by 9 percentage points: from 49 percent for non-participants to 40 percent for ABE participants. Put another way, the likelihood of recidivism is around 20 percent lower for ABE participants. Participation in only other (non-ABE) classes is estimated to be associated with a slightly larger reduction in recidivism.

The key results relating to class participation and to other control variables are robust to alternative specifications. Upon release, prisoners remain out of prison for an average duration of 5.5 years. Compared to spells in which the prisoner did not participate in any classes, the survival models indicate individuals remain out of prison for 70 percent longer if they had participated in an ABE course during their spell, and twice as long if the prisoner participated only in non-ABE courses.

These estimates are highly significant in the statistical sense, meaning we can very confidently reject the null hypothesis of no association between participation in classes and recidivism. However, that does not establish causation between class participation and lower recidivism. Even if participation in classes has no causal impact on recidivism, an association may be observed if participants and non-participants differ in ways that have not been controlled for in the model ('omitted variables'). A special case of this is 'selection bias', where there are unobservable attributes that make some prisoners more likely to participate in classes and also less likely to reoffend upon release. Examples maybe be prisoners' levels of motivation or sense of self-efficacy; or bias in the processes by which prisoners are given access to classes.

A number of steps are taken to attempt to address the question of causation. The fact that we have multiple observations on custodial stays for individuals allows us to control for fixed unobservable characteristics of prisoners. This is done by estimating the main recidivism model as a panel model using both the random-effects and fixed-effects estimators. The fixed-effects estimator most rigorously controls for unobserved individual effects, and returns smaller but still substantial and highly significant impacts of participation in ABE classes and non-ABE classes on recidivism.

We also tested a Heckman two-stage model, which adds a correction for selection in the model of recidivism after first modelling selection into

ABE-classes (see Heckman 1974). While we are not confident in the validity of the instruments tested to model selection, the key findings are also robust to this approach. We certainly cannot claim to have established causation, however the analysis goes further than in most observational studies in attempting to address potential omitted variables and selection bias.

Effects of other covariates on recidivism

The results for other control variables included in the models are in line with findings in the existing literature (see, for example, National Academies of Sciences, Engineering, and Medicine 2022, Ooi 2021, Payne 2007). Recidivism rates are markedly higher for men compared to women, for younger prisoners, and for those with relatively low prior educational attainment. Longer custodial stays are associated with higher subsequent rates of recidivism. Aboriginal prisoners also have much higher rates of recidivism. This result must be understood in the context of the many factors that contribute to the over-representation of Aboriginal Australians in the criminal justice system in the first place, including the effects of trauma and marginalisation associated with the impacts of colonisation, forced removal, and other injustices, and the likely compounding of these effects by the experience of incarceration (Tamatea 2017, Trudgett et al. 2024, Young et al. 2025).

Estimates for sub-groups

When models are estimated separately for sub-groups of the prison population, we find that the estimated benefits of participation in ABE and in non-ABE classes are substantially larger for men than for women; are similar for younger and older prisoners; and are much larger for prisoners with higher levels of educational attainment. The benefits associated with course participation are also lower for Aboriginal prisoners, and this applies particularly to Aboriginal female prisoners. Factors contributing to this result may include Aboriginal prisoners' shorter average custodial spells, lower initial levels of literacy and numeracy, and potential cultural misalignment in program delivery. There is some evidence that participation in classes has a larger impact for prisoners convicted of more serious crimes: the estimated effect of participation in ABE classes on recidivism is insignificant for prisoners convicted of a range of more minor offences.

Pathways from participation to desistance from crime

Alternative outcome measures are modelled as a way to investigate potential causal links between participation and recidivism, and in order to move beyond recidivism to capture other dimensions of desistance from crime. These included prisoner progressions in literacy and numeracy, the incidence and timing of in-prison offences, and whether a returning prisoner was charged with a more serious offence than in the prior completed spell. However, these exercises were largely unsuccessful in shedding further light on how participation in ABE and other classes might lead to desistance from crime. Against expectations, in-prison offending appears to be positively correlated with participation in ABE classes and in non-ABE classes. We also modelled the number of classes a prisoner participates in, and found the act of having participated at all is what matters most, rather than the 'dose'.

Implications

A full cost-benefit analyses of ABE and other training provided in prisons would require additional information on the cost of providing classes. Even then, such an analysis would be challenging given the conflation of the types and number of classes prisoners undertake, and uncertainty around the extent to which participation has a causal effect on recidivism. However, we can calculate that the reduced days of imprisonment associated with a prisoner participating in ABE classes, as opposed to not participating in any classes, equates to savings of around $0.5 million per participant.

Our exploration of potential causal pathways between participation in ABE courses and desistance from crime proved inconclusive. Some results are suggestive of 'identity-based' mechanisms in which class participation leads to a more positive sense of self-identity rather than 'control-based' mechanisms whereby participation raises prisoners' skills and competencies and, thereby, increases control over their outcomes. These include evidence that participation in itself is as important or more important than the number of classes undertaken,

the effect of participation being larger for more educated prisoners, and for more serious offenders. In contrast, the evidence of positive effects of participation on post-release desistance from crime, but not on in-prison offences, is more suggestive of 'control-based' mechanisms.

The results suggest there may be value in reviewing the content and delivery of classes for prisoners with lower levels of education and for female Aboriginal prisoners. In terms of improving our understanding of the links between course participation and desistance from crime, improved data on prisoners' initial literacy and numeracy skill levels, and how these progress over time with participation, would be of particular benefit for future research and evaluation.

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