Post-release outcomes of lethal and non-lethal offenders: Recidivism and participation in employment or education

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ABSTRACT

This study examines post-release outcomes of former prisoners convicted of severe violence. We use random intercept models to compare recidivism and participation in employment or education among Finnish offenders convicted of homicide ($n = 509$), attempted homicide ($n = 800$), or aggravated assault ($n = 1714$). A matching algorithm is used to adjust for observed preexisting differences among the three offender groups.

Within 3 years post-release, 52% (95% CI: 48–56%) of homicide, 57% (95% CI: 54–61%) of attempted homicide, and 79% (95% CI: 77–81%) of aggravated assault offenders engaged in general recidivism. Violent recidivism rates were 27% (95% CI: 23–31%), 36% (95% CI: 33–39%) and 52% (95% CI: 49–54%), respectively. At the end of the 3-year period, 24% (95% CI: 20–28%) of homicide, 20% (95% CI: 17–23) of attempted homicide, and 16% (95% CI: 14–19%) aggravated assault offenders participated in employment or education. When matched based on pre-incarceration characteristics, disparities in post-release outcomes between the offenders convicted of completed versus attempted homicide were attenuated and no longer statistically significant.

Despite homicide representing the most severe form of violence and leading to substantially longer prison sentences compared to non-lethal violence, homicide offenders do not exhibit worse post-release outcomes than those convicted of attempted homicide or aggravated assault.

1. Introduction

In the Western countries, the typical sanction for homicide is a prison sentence (Campbell, 2012). Completed offenses usually result to longer sentences than failed attempts – although the distinction between completed and attempted homicide is determined by *the outcome* of a violent conflict, rather than *the intention* of the offender (e.g Yaffe, 2010). Offenders convicted of attempted homicide are – according to court judgement – deemed to have a lethal intent, just as offenders convicted of completed homicide. Regardless, for instance in Finland, the average prison sentence for completed homicide is more than two times longer than the average sentence for attempted homicide (Lappi-Seppälä & Niemi, 2018). In other words, homicide offenders can be understood as receiving a greater "dose" of the criminal sanction.

Prior research has shown that post-release recidivism is relatively common among homicide offenders (Baay, Liem, & Nieuwbeerta, 2012; Liem, Zahn, & Tichavsky, 2014; Neuilly, Zgoba, Tita, & Lee, 2011; Roberts, Zgoba, & Shahidullah, 2007), but studies comparing the

recidivism rates between lethal and non-lethal offenders have been rare. Two studies – Durose, Cooper, and Snyder (2014) and Langan and Levin (2002) – have indicated that homicide offenders tend to recidivate less often than offenders of assault, robbery and rape. However, it is not known whether the observed differences reflect preexisting differences between lethal and non-lethal offenders, the effect of incarceration, or the fact that due to the longer sentences, homicide offenders tend to be older at the time of release, and therefore more likely to desist from offending simply because of aging (Piquero, Jennings, Diamond, & Reingle, 2015). Overall, while scholars have reported poor post-release outcomes of former inmates in general, the evidence of the causal effect of the imprisonment, or the dose–response relationship between imprisonment and subsequent crime, has been indecisive (e.g., Doleac, 2023; Nagin, Cullen, & Jonson, 2009).

This study contributes to the lack of research by analyzing the post-release outcomes of former inmates sentenced to prison of differing periods of time for committing three types of violent crimes: completed homicide ($n = 509$), attempted homicide ($n = 800$), and aggravated

assault ($n = 1714$). We draw from a nationally representative sample of former inmates released from Finnish prisons between 2006 and 2014 and use administrative registers to examine their life-course before and after the imprisonment. We examine whether completed homicide offenders manifest higher rates of post-release recidivism and poorer labor marker outcomes than offenders convicted of attempted homicide and aggravated assault. To reduce the impact of the preexisting differences among the offenders, we use a matching algorithm to construct a suitable comparison group for completed homicide offenders. In particular, we take into account the demographic characteristics (gender, age, and immigrant background), release year, incarceration history, economic activity, education, and family situation preceding the prison term. We then apply multilevel linear probability models to analyze the post-release outcomes using both the full and the matched sample. In addition, inverse probability weighting with regression adjustment is used as a robustness check.

2. Prior research

2.1. Comparison of recidivism rates of lethal and non-lethal offenders

Comparisons of the post-release offending rates between lethal (referring to completed homicide) and non-lethal offenders have been scarce. Prior studies focusing exclusively on the offenders of completed homicide have reported the prevalence of general recidivism of 51–54%, regardless using differing follow-up times (Baay et al., 2012; Liem et al., 2014; Neuilly et al., 2011; Roberts et al., 2007). Considering violent recidivism only, the analogous prevalences have been 7–16% (Baay et al., 2012; Liem et al., 2014; Neuilly et al., 2011; Sturup & Lindqvist, 2014). More recently, a West Australian study lumping together offenders convicted of either attempted or completed homicide observed that, within the average follow-up time of ten years, 40% of the offenders arrested were re-arrested for any new offense, and 19% for a serious offense (Broadhurst, Maller, Maller, & Bouhours, 2018). In all of the aforementioned studies on recidivism, only a few offenders committed new homicide (3% or less).

To our knowledge, only two studies have explicitly compared recidivism of lethal offenders with non-lethal offenders: Durose et al. (2014) followed former inmates from 30 US states and reported that, within five years from their release, completed homicide offenders had lower re-arrest rates (51%) than individuals convicted of robbery (77%), assault (77%), or rape (60%). A prior US study by Langan and Levin (2002) followed US inmates up to three years from their release and, similarly, recidivism was less prevalent among completed homicide offenders (41%) than former inmates convicted of robbery (70%), assault (65%), or rape (46%). Yet, no prior studies have explicitly compared the recidivism rates between offenders of completed homicide with the offenders of attempted homicide. In addition, prior research has demonstrated that the methodological choices considering the choice of the offender sample, measure of recidivism and length of the follow-up period (Andersen & Skardhamar, 2017; see also Yukhnenko, Sridhar, & Fazel, 2020), as well as the treatment of parole violations (Ostermann, Hyatt, & DeWitt, 2020), have substantial effects on recidivism rates, complicating between-study comparisons. Moreover, since criminal offending is highly age dependent, and – due to longer sentences – homicide offenders tend to be older at the time of release, the comparisons of post-release outcomes must take into account the effect of age (see Nagin et al., 2009).

2.2. The effect of incarceration on recidivism and employment

The rationale for the use of imprisonment is to prevent future crime by incapacitation and rehabilitation. Yet, prior reviews comparing custodial and non-custodial sanctions are mixed, reporting that incarceration has a non-existent (Villettaz, Gillieron, & Killias, 2015; Villettaz, Killias, & Zoder, 2006), null, mildly criminogenic (Nagin et al.,

2009), or criminogenic (Lipsey & Cullen, 2007) impact on future offending. However, most studies on the effect of incarceration do not analyze the association between sentence length and future offending, although the optimal length of the sentences are widely debated. Nagin et al. (2009) reviewed studies on the effect of incarceration per se and on the possible dose–response relationship between confinement and re-offending and found little evidence of sentence length having an impact. In addition, a large majority of the studies conducted have relied on observational research designs and are therefore vulnerable to various selection effects.

Recently, research designs using instrumental variables (Angrist, 2006) such as random assignment to judges with large sentencing disparities, or policy shocks introducing exogenous variation in the severity of the sanction, have enabled causal inference between incarceration and various subsequent outcomes. Such studies have reported preventive (Bhuller, Dahl, Løken, & Mogstad, 2020), criminogenic (Aizer & Doyle Jr, 2015; Mueller-Smith, 2015) and null effects (Al Weswasi, Sivertsson, Bäckman, & Nilsson, 2022; Loeffler, 2013; Nagin & Snodgrass, 2013) for recidivism, and beneficial (Bhuller et al., 2020), adverse (Aizer & Doyle Jr, 2015; Mueller-Smith, 2015) and null effects (Loeffler, 2013) for employment or education. Considering the sentence length specifically, a U.S. study by Mueller-Smith (2015) discovered that in Texas, a longer exposure to jail or prison increased the probability of future offenses and decreased future income and probability of employment. In contrast, a Danish study exploiting policy shock increasing the average length (by approx. 7 days) of the imprisonment of violent offenders concluded that the longer imprisonment resulted in lower rates of unemployment and increased earnings for the released inmates (Landersø, 2015). Similarly, a Swedish study utilizing policy reforms found that longer imprisonment decreased recidivism and provided substantial health improvements as well as short-term benefits regarding the labor market status among released offenders (Hjalmarsson & Lindquist, 2022). Instead, another Swedish study using the same policy reforms but focusing on first-time prisoners, reported null results on recidivism (Al Weswasi et al., 2022).

Besides the different research designs, the inconsistent findings regarding the effect of incarceration on post-release outcomes may reflect the differences between the criminal justice systems and the national contexts. Nordic countries are welfare states with universalistic social policies (e.g., Esping-Andersen, 1999) and have less punitive penal policies than the majority of European countries, and in particular, the USA (Lappi-Seppälä, 2011; Pratt, 2008). Moreover, Mears, Cochran, and Cullen (2015) have suggested that the incarceration effect may not be uniform but may depend on the individual prison experience and have heterogeneous effects for different types of offenders.

To summarize, there appears to be a lack of knowledge on the recidivism rates of homicide offenders compared to other offenders of serious violence, and the impact of imprisonment length on post-release outcomes. We aim to fill this gap by comparing the post-release recidivism and participation in employment or education of homicide offenders with offenders convicted of attempted homicide or aggravated assault. Specifically, we ask whether offenders convicted of completed homicide – and thus serving considerably longer prison sentences – have a higher prevalence of general and/or violent recidivism and worse labor market outcomes after the imprisonment compared to offenders convicted of attempted homicide or aggravated assault.

2.3. Data and analytic strategy

Our data come from the Finnish Prison Register of the Criminal Sanctions Agency (also known as the Prison & Probation Service) and the dataset comprises all Finnish inmates released during 2006–2014 who were serving a prison term (index prison term, henceforth) and whose most severe violent offense resulting to index prison term was *completed homicide*, *attempted homicide*, or *aggravated assault*. The same database provided the number of prison terms served before the index

prison term. Information on post-release recidivism was based on criminal convictions and acquired via the research database on crimes and sentencing maintained by the Institution of Criminology and Legal Policy, University of Helsinki and available until the end of 2017. Data on mortality, demographics (gender, age, and immigrant background) of the individuals as well as the information regarding the education, economic activity, and family situation recorded annually from 1987 to 2015 were provided by Statistics Finland, which combines information from different administrative registers, such as the Population Register Centre and various national employment, taxation and student registers. Statistics Finland performed the linking of the datasets based on personal identification codes and anonymized the data.[1] Since our interest was to capture the effects of long incarceration periods, we excluded individuals whose prison term was <365 days long. Since the annual data on education and family situation was available only from 1987 onward, we excluded offenders whose prison term had started before 1988. Moreover, we restricted the analysis to the working age population who were between 18 and 61 years old at the end of the release years (and therefore up to 64 years old at the end of the three-year following period).

The sampling unit was the index prison term resulting from any of the selected violent crimes (completed homicide, attempted homicide, or aggravated assault), and same individuals could serve more than one term during the selected timeframe between 2006 and 2014. Yet, each individual could only be released from one prison term at a time, and throughout this study, *sample size N* refers to a unique combination of ID and the last day of the prison term. This final dataset included 2792 unique IDs and 231 (7.6%) individuals who had served more than one prison term and were thus released more than once between 2006 and 2014. The unique combinations of ID and the ending date of each prison term were treated as separate research units and are henceforth referred to as individuals ($N = 3023$).

2.4. Measures

2.4.1. Severity of the violent offense

The category *completed homicide* referred to Finnish penal code (21:1 §) provisions of intentional homicides: "a person who kills another shall be sentenced for *manslaughter*", where the sanction is imprisonment of at least eight years. If the manslaughter is "to be deemed committed under mitigating circumstances, the offender shall be sentenced for *killing* to imprisonment for at least four and at most ten years" (21:3 §).[2] Manslaughter is convicted as *murder*, if it is "premeditated, committed in a particularly brutal or cruel manner, committed by causing serious danger to the public, or committed by killing a public official on duty maintaining public order or public security, or because an official action, and the offense is aggravated also when assessed as a whole" (21:2 §). For adult offenders, the sanction for murder is life imprisonment. In Finland, most of the prisoners serving a life sentence are eventually released: among inmates released from life sentence between 2010 and 2013, the average length of the imprisonment was 15.0 years (Kaijalainen, 2014). An inmate serving a life imprisonment can be conditionally released at the earliest when at least twelve years – or at least ten years if the offender was <21 years old at the time of the incident – of the prison sentence has been served. In the resulting dataset, the majority of completed homicide offenders were convicted of manslaughter

(86.1%, $n = 438$), whereas murder (13.0%, $n = 66$) and especially killing (1.8%, $n = 9$) were substantially less prevalent.[3]

Attempted homicide referred to the attempt to commit manslaughter, murder or killing. Regarding attempted homicides, nearly all of the offenders convicted of attempted homicide were convicted of attempted manslaughter (95.3%, $n = 762$). The dominance of manslaughters reflects the long-term characteristics of lethal violence in Finland where typical homicides are often described as drunken brawls between friends and acquaintances (Liem et al., 2013), rather than premeditated acts.

Aggravated assault referred to the case in which"grievous bodily injury or serious illness is caused to another, or another is placed in mortal danger, the offense is committed in a particularly brutal or cruel manner, or a firearm, edged weapon or other comparable lethal instrument is used, and the offense is aggravated also when assessed as a whole" (Finnish penal code 21:6 §). The sentence for aggravated assault is imprisonment between one and ten years. According to the Finnish penal code (6:9 §), a sentence of imprisonment for a fixed term of a maximum of two years may be conditional, if the "seriousness of the offense, the guilt of the offender as manifested in the offense, or the criminal history of the offender" do not require the imposition of a prison sentence. When a sentence of imprisonment is imposed conditionally, the enforcement of the sentence is postponed for a probation period (Finnish penal code 2b: 3 §) and offenders can thus serve their sentences outside the prison. Since the dataset consists of former inmates, offenders who committed aggravated assault but were not sentenced to prison are not included.[4] Hence, aggravated assault offenders selected to this study tend to have more severe criminal histories, and/or committed the assault in a crueler manner than an average offender convicted of aggravated assault.

In practice, the prison terms actually served are considerable shorter than the maximum sentences prescribed by the penal code (Sutela, 2020). Furthermore, if offenders have not been sentenced to prison within the three years preceding the offense, they are requested to serve only half of the sentence in custody, and the rest of the sentence on parole (Finnish penal code 2c:5 §). This applies to all offenses except murder. In this study, all of the above-mentioned crime categories included also cases where the sentence was determined in accordance with a mitigated penal latitude which refers, for instance, to the young age or minor role of the offender (Finnish penal code 6:8 §).

Since one prison term can be – and often is – a sanction of multiple criminal offenses, we classified the individuals based on the most severe violent offense they were convicted of (completed homicide > attempted homicide > aggravated assault). Hence, an individual serving time for one homicide and two homicide attempts would be classified as a homicide offender since completed homicide is regarded as a more severe offense, and the most serious crime usually has the largest impact on the length of the prison term. The resulting sample ($N = 3023$) consisted of 509 completed homicide offenders (CHOs, henceforth), 800 attempted homicide offenders (AHOs, henceforth), and 1714 aggravated assault offenders (AAOs, henceforth).

2.4.2. Background characteristics

The length of the index prison term (months) includes the pre-trial incarceration and – when used – probationary liberty under supervision (back-door electronic monitoring), which is served outside the prison and can be initiated for at most six months before conditional release. The offender's incarceration history in Finnish prisons was described by a continuous variable the *number of prior prison sentences.*

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[1] Research permit TK-53-937-18. Due to data protection rules of Statistics Finland, a cell-specific threshold rule of three observations is applied, and in case of rare values, the variables are re-classified to broader groups in figures and tables.

[2] Infanticide, referring to cases in which women "in a state of exhaustion or distress caused by childbirth" kill their baby (21: 4 §), was included in the sampling criteria of the offenders, but since these incidents are extremely rare, our sample did not include any infanticides or their attempts.

[3] The percentages do not add up to 100 since a few individuals were convicted of more than one type of homicide. In the following analyses, all homicide offenders will be treated as one group.

[4] For instance, between the years 2015–19, 50.0% of the offenders convicted of aggravated assault or the attempt were sentenced to prison (Statistics Finland 2021).

We categorized the variable to the following 5 classes: 1 = No prior imprisonment, 2 = 1–2 prior prison sentences, 3 = 3–4 prior prison sentences, 4 = 5–7 prior prison terms, 5 = >7 prior prison terms. *Year of release* (release year, henceforth), varying between 2006 and 2014, refers to the year when the index prison term ended. *Demographic characteristics* included gender (1 = Male, 2 = Female), age at the end of the release year (age, henceforth), and immigrant background (1 = Yes, 0 = No) based on the individual's country of birth. *Mortality* of the offenders was measured at the end of each year.

The economic activity, education, and family situation preceding the index prison term were measured by Statistics Finland annually at the end of each year from 1987 to 2015. Offender's *economic activity* classifies the offenders based on their economic activity in the last week of each year by combining information from various administrative registers. The process is conducted stepwise by Statistics Finland and starts by grouping individuals to "less than 15 years" or to "elderly persons over 74 years", and then proceeds by classifying individuals to "unemployed people" (individuals signed to the job seeker register), "at military or non-military service", "entrepreneurs", "wage and salary earners", "students", "pensioners", and finally persons who do not fulfill any of the previous criteria and are thus classified as "others outside the labor force". We reclassified economic activity to five broader categories: 1 = Working or studying (incl. Those at the military or non-military service), 2 = Unemployed, 3 = Pensioner (including disability pension), and 4 = Other outside the labor market. The individuals whose economic activity was not known ($n = 19$, 0.6%), as well as the individuals less than 15 years old ($n = 7$, 0.2%) were classified to the category "Other outside the labor market". Since the legal processes are often long and arrest or pre-trial custody may impact in the offender's employment situation already before the beginning of the index prison term, the information on economic activity used in matching was recorded at the end of the last year before the index prison term.

Offender's *education* (1 = Basic education or less, 2 = Secondary education or higher) and *family situation* (1 = Living with partner and/or child(ren), 2 = Living with parent(s), 3 = Living alone, 4 = Unknown situation) is recorded at the end of the year preceding the year when the index prison term started. Statistics Finland classifies individuals living in institutions (prison, hospital) to either "outside family" or "unknown family situation", and individuals without an official address to "unknown family situation".

2.4.3. Outcome variables

The two outcome variables measuring post-release criminal behavior were dichotomous and separately measured whether individual had committed a new offense leading to conviction of *general recidivism*[5] (1 = Yes, 0 = No) or *violent recidivism*[6] (1 = Yes, 0 = No). The following time started the first day after the prison term and lasted until the end of the third full calendar year after the release year. The following period was thus at least three years for all individuals – longer for offenders released in January than December – but for simplicity, we will use the term three-year following period. The post-release indicator of *participation in employment or education* (1 = Yes, 0 = No) was based on the aforementioned information regarding the offender's economic activity. As with the measures on recidivism, the individuals were followed starting from the release year until the end of the third year after the prison term. Since the information on economic activity was available only between 1987 and 2015, and some of the former inmates were

released in 2014 ($n = 309$, 10.2%) or 2013 ($n = 323$, 10.7%), the participation in employment or education was coded as missing for individuals for whom the following period ended earlier. In addition, considering the individuals who died during the following period ($n = 209$, 6.9%), the outcome variables were coded missing for their year of death until the end of the following period. Former inmates who died within the release year ($n = 35$, 1.2%) were omitted from all the models analyzing post-release outcomes.

2.5. Analyses

2.5.1. Matching

To minimize the discrepancy of the observed characteristics between CHOs, AHOs, and AAOs, we used a matching procedure which provides functions for finding optimal covariate balance based on automated, iterative search algorithm (Diamond & Sekhon, 2013; Sekhon, 2011). We used CHOs ($n = 509$) as the treatment group and sought suitable matches separately for AHOs and AAOs. Matching was done based on offender's gender, age, immigrant background, incarceration history, economic activity, education, and family situation preceding the index prison term. The rationale for choosing these variables was their relevance for criminal offending: male gender, young age, history of prior crimes, social disadvantage, and lack of social ties are among the most robust correlates of violent offending (e.g., Farrington, Loeber, & Berg, 2012; Gendreau, Little, & Goggin, 1996). In addition, in the Nordic countries, immigrant background is associated with increased criminal offending (Martens & Holmberg, 2005; Skardhamar, Aaltonen, & Lehti, 2014). Matching was conducted using the library *Matching* (Sekhon, 2011) in *R*3.6.2. Balance of the categorized variables was tested by χ^2-tests and for continuous variables, we applied either variance analysis or non-parametric Kruskal-Wallis test.

2.5.2. Multilevel models

For comparing the probabilities of recidivism and participation in employment or education after the incarceration, we adopted a regression framework. Since our dataset had a panel structure with repeated measures nested within persons, multilevel models were used to take into account the dependency between observations across time (e.g., Gelman & Hill, 2006). We fitted three linear probability models with random intercepts separately for general recidivism, violent recidivism, and participation in employment or education. The two levels consisted of responses (level 1) within individuals (level 2). We allowed the individual-level intercepts to vary at the baseline and different slopes for the three different offender groups. To assist in the interpretation of the estimates, we report the predicted probabilities of outcome variables and 95% confidence intervals (CIs, henceforth) at each measurement point and fix all of the covariates at their mean values. Stata 17.0 (StataCorp., 2021) was used for the multilevel models. The complete models are displayed in Appendix 1–2.

2.5.3. Robustness checks

We tested the robustness of our main results by using inverse probability weighting with regression adjustment (IPWRA), a doubly robust method combining regression and propensity score methods (Funk et al., 2011). IPWRA models both the outcome (general recidivism, violent recidivism, and participation in employment or education), and the selection to the "exposure" (being convicted of completed homicide vs. non-lethal crime). The probabilities derived from the exposure models are then used to weight the observations in the regression models estimating the outcome. We used the full sample and estimated the selection to the exposure by binary logistic models (CHOs vs. AHOs and CHOs vs. AAOs) using the same covariates as in the matching. We used linear probability models for estimating the average treatment effects on the treated (ATT), separately for each outcome at each measurement point. IPWRA models were estimated by Stata 17.0 (StataCorp., 2021).

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[5] Conviction of any criminal offense against the Finnish penal code.
[6] Conviction of any of the following penal code provisions: assault; petty assault; aggravated assault; manslaughter; murder; killing; infanticide; negligent and grossly negligent homicide when in conjunction with assault offenses; robbery; aggravated robbery; violent resistance to a public official; resistance to a person maintaining public order (Finnish penal code 21: 1–9, 12; 31:1–2; 16: 1; 17:6). Attempts were included when punishable.

3. Results

3.1. Characteristics of lethal and non-lethal offenders

Descriptive statistics are displayed in Fig. 1 (full sample) and Table 1 (full and the matched sample). As demonstrated in Fig. 1, there is considerable variation in the sentence lengths both within and between the three offender groups. For instance, none of the non-lethal offenders served a sentence >14 years, yet for a few CHOs, the index prison term lasted less than two years. This is likely to reflect the offender's young age or alternatively a minor role in the violent act. As displayed in Table 1 (leftmost bars), the average length of the index prison term of CHOs (70.1 months, SD: 34.2) is more than twice longer the sentences served by AHOs (30.8 months, SD: 15.8) and AAOs (23.5 months, SD: 12.0). These differences prevailed in the matched sample (rightmost bars) also. Compared to the two other inmate groups, mortality of the CHOs was slightly higher, although the difference was not statistically significant before or after the matching.

Regarding one's life-course before the index prison term, the results suggested that CHOs were slightly less marginalized than the other two groups of offenders – AAOs in particular. For instance, the share of first-timers was substantially greater among CHOs (56.4%) than AHOs (49.8%), and – in particular – AAOs (25.9%). This finding is likely to reflect the legal system: since approximately half of the offenders convicted of aggravated assault do not receive a prison sentence, the AAOs who do end up in prison are a highly selected group and tend to have a more serious history of violent crimes. After the matching procedure, a satisfactory balance was reached. Small but statistically significant differences prevailed regarding two variables: the CHOs were only slightly older (+1.2–1.6 years, $p = 0.046$) compared to the other two groups, and slightly more often born aboard (3.1%, compared to 1.7 and 0.9%, $p = 0.032$). However, we do not interpret these differences threatening the validity of our results; the <2-year age difference is hardly relevant considering offenders in their late thirties, and overall, very few of the offenders were born abroad.

3.2. Predicted probabilities for recidivism and participation in employment or education

Predicted probabilities calculated from linear probability models with random intercepts are displayed in Fig. 2 (the N's refer to the number of individuals in the first measurement points; for full models, see Appendix 1–2). Models A, B and C are based on the full sample and adjusted only for the release year. Both general and violent recidivism were rather common in the sample. Considering general recidivism rates, CHOs (51.7%, 95% CI: 47.6–55.9%) and AHOs (57.5%, 95% CI: 54.2–60.8%) largely resembled each other, whereas the AAOs (78.9%, 95% CI: 76.6–81.1%) were substantially more likely to recidivate. The prevalence of violent recidivism was lower, but again, AAOs were most likely to recidivate (51.6%, 95% CI: 49.4–53.7%), compared with AHOs (35.9%, 95% CI: 32.8–39.0%) and particularly CHOs (27.1%, 95% CI: 23.2–31.1%). At the end of the following period, participation in employment or education was slightly more common among the CHOs (24.4%, 95% CI: 20.5–28.4%) compared to the AHOs (19.9%, 95% CI: 16.7–23.1%) and AAOs (16.4%, 95% CI: 14.2–18.5%). The differences between CHOs and AHOs were rather small and the confidence intervals largely overlapping. Yet, regarding violent recidivism, the difference was greater and also statistically significant.

When examining the Models D, E and F estimated from the matched sample, the differences between the three offender groups were considerably attenuated. Yet, the likelihood to engage in general or violent recidivism were still greater among AAOs compared to AHOs and CHOs. The differences between AHOs and CHOs, instead, were not statistically significant in any of the models. Moreover, as displayed in Model F, the participation in employment or education did not largely differ between the three groups.

As robustness checks, we re-estimated the prior results by IPWRA models using the full sample. Unlike matching, IPWRA keeps all the observations but assigns them varying weights to improve the covariate balance between the offender groups. In the models comparing CHOs and AHOs, a satisfactory covariate balance was reached, but the balance was less optimal in the models comparing CHOs and AAOs.[7] The predicted probabilities for each outcome are shown in Appendix 3. Despite the different modeling choice, the results support our prior findings using the matched sample: specifically, the differences in rates of general recidivism, violent recidivism, and participation in employment or education between CHOs and AHOS are negligible whereas AAOs consistently emerge as the most crime-prone group.

4. Discussion

Former inmates convicted of serious violent crimes generally exhibit rather poor post-release outcomes: they tend to have high rates of recidivism and weak attachment to formal employment and education. To our knowledge, this was a first study to explicitly compare the post-release outcomes between offenders convicted of completed homicide (CHOs), attempted homicide (AHOs), and aggravated assault (AAOs). Prior studies focusing only the CHOs had reported general recidivism rates between 50 and 54% (Baay et al., 2012; Liem et al., 2014; Neuilly et al., 2011; Roberts et al., 2007), and thus bear considerable similarity with our results. Violent recidivism, on the other hand, was substantially more common in our sample (27%) compared to prior studies reporting the prevalence between 7 and 16% (Baay et al., 2012; Liem et al., 2014; Neuilly et al., 2011; Sturup & Lindqvist, 2014). Yet, differences in the measurement of crime and the length of the following periods complicate the between-country comparisons (Andersen & Skardhamar, 2017; Ostermann et al., 2020; Yukhnenko et al., 2020). In general, the post-release outcomes of CHOs and AHOs showed only moderate differences – although when disparities were observed, it was always to the same direction describing AHOs as a slightly more problematic group. This is noteworthy, especially given that CHOs tend to serve considerably longer prison terms. However, compared to CHOs and AHOs, AAOs manifested the most crime-prone and marginalized group.

The examination of preexisting differences revealed that CHOs were more often serving their first prison sentence and had somewhat less disadvantaged background than the two other groups, particularly AAOs. This finding is likely to reflect the sampling procedure applied in our study: given that not all aggravated assaults result in imprisonment, those AAOs who are incarcerated tend to be more highly selected within that crime category. Considering the preexisting differences between CHOs and AHOs, prior studies comparing Finnish offenders suspected of completed versus attempted homicide did not find systematic evidence of greater criminal propensity among AHOs (Suonpää, Aaltonen, & van der Geest, 2020; Suonpää, Kivivuori, & Aaltonen, 2018). However, a Dutch study using the conviction data reported that AHOs were more likely to have violent backgrounds compared to CHOs (Ganpat, Liem, van der Leun, & Nieuwbeerta, 2014). In general, prior research have indicated that individuals rarely specialize in violent offending (Piquero, Jennings, & Barnes, 2012). Only a small share of crimes tends to be violent, and an even smaller fraction is lethal. Situational factors and pure chance can impact whether a violent incident results in the death of a victim (Felson, 2017; Ganpat, van der Leun, & Nieuwbeerta, 2017). Given this, the relative similarity of the post-release outcomes of CHOs and AHOs does seem logical.

The results based on the matched sample taking into account some of the above-noted preexisting differences between the three groups found negligible differences in the general recidivism rates of AHOs and CHOs, regardless of the longer prison sentences of the latter group. As in the crude models, AAOs recidivated more often than the two other groups,

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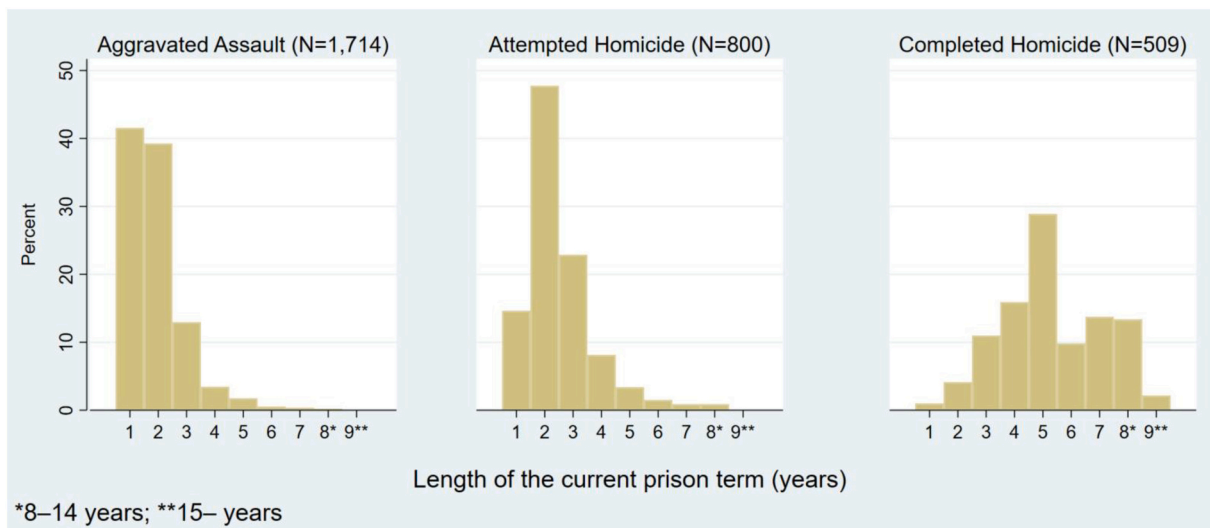[7] The results of the balance tests are available upon request.

Fig. 1. The average length of the index prison term for offenders convicted of completed homicide, attempted homicide, or aggravated assault.

Table 1
Descriptive statistics of the full and the matched sample.

	FULL SAMPLE ($N = 3023$)			MATCHED SAMPLE ($N = 1442$)		
	AAO	AHO	CHO	AAO	AHO	
N	1714	800	509	466	467	Diff.[c]
Avg. length of the prison term, mos. (SD)	23.46 (12.02)	30.75 (15.78)	70.11 (34.25)	21.84 (12.10)	30.05 (15.61)	$p < 0.001$
Avg. release year (SD)	2009.82 (2.57)	2010.04 (2.62)	2009.77 (2.59)	2009.99 (2.55)	2009.88 (2.63)	$p = ns$
Died within 3 yrs. after the release (%)	6.94	6.38	7.66	5.36	5.78	$p = ns$
MATCHING VARIABLES						
Female (%)	7.70	12.38	11.79	10.73	11.56	$p = ns$
Avg. age at the end of the release year (SD)	35.65 (8.96)	36.97 (11.07)	39.66 (10.90)	38.42 (9.89)	38.03 (11.11)	$p = 0.046$
Born abroad (%)	4.08	2.38	3.14	1.72	0.86	$p = 0.032$
Incarceration history (%)						$p = ns$
No prior imprisonment	25.85	49.75	56.39	53.22	56.10	
1–2 prior prison sentences	24.85	20.25	16.11	16.95	15.63	
3–4 prior prison sentences	16.86	9.75	8.84	10.30	8.57	
5–7 prior prison sentences	16.45	10.63	11.20	11.59	11.35	
>7 prior prison sentences	15.99	9.63	7.47	7.94	8.35	
Economic activity[a] (%)						$p = ns$
Employed or studying	18.03	28.63	32.81	29.61	33.19	
Unemployed	35.76	32.13	34.18	35.19	33.83	
Other outside the labor market	46.21	39.25	33.01	35.19	32.98	
Education[b] (%)						$p = ns$
Basic education or less	75.38	67.50	62.28	62.45	64.03	
Secondary education or higher	24.62	32.50	37.72	37.55	35.97	
Family situation[b] (%)						$p = ns$
With partner and/or child(ren)	24.39	21.88	26.52	27.04	24.41	
With parent(s)	7.00	11.38	14.54	10.94	13.70	
Alone	41.02	49.38	42.04	44.64	44.97	
Unknown	27.60	17.38	16.90	17.38	16.92	

AAO = Aggravated assault offender, AHO = Attempted homicide offender, CHO=Complete homicide offender; [a]Measured two years before the prison term; [b]Measured year before the prison term; [c]Comparison of AAOs, AHOs and CHOs in the matched sample.

although the differences were diminished. Considering employment and education, the analysis conducted with a matched sample did not reveal large differences between the three groups. Similar results were reported in our sensitivity analyses. Since the differences between AAOs and the other two groups considerably attenuated when we adjusted for the background characteristics, it is likely that the post-release differences between the groups largely reflect the greater selection among AAOs. However, a weaker rehabilitative effect of shorter sentences for AAOs cannot be completely excluded. It is possible that the longer sentences enable more effective treatment for substance abuse, or other kinds of interventions (Hjalmarsson & Lindquist, 2022; Landersø, 2015). At least in the Nordic context, our results thus challenge the perception of the effects of imprisonment as solely harmful.

Yet, there are several caveats against the causal interpretation of the associations between sentence length and post-release outcomes. First and most importantly, even though offenders were matched based on certain characteristics, this research setting fails to provide causal identification: it is reasonable to expect that some differences between offenders convicted of different crimes remained, regardless of the matching or inverse probability weighting. Individuals' personal characteristics, motivation, substance abuse, or social networks, for instance, were not measured. Moreover, it is possible that the prison experience depends on the severity of the crime conducted. For instance, in Finland, the availability of rehabilitation programs, or opportunities to engage in studying or working during incarceration vary between prisons (Obstbaum & Tyni, 2015; Tyni & Blomster, 2012). Since offenders are
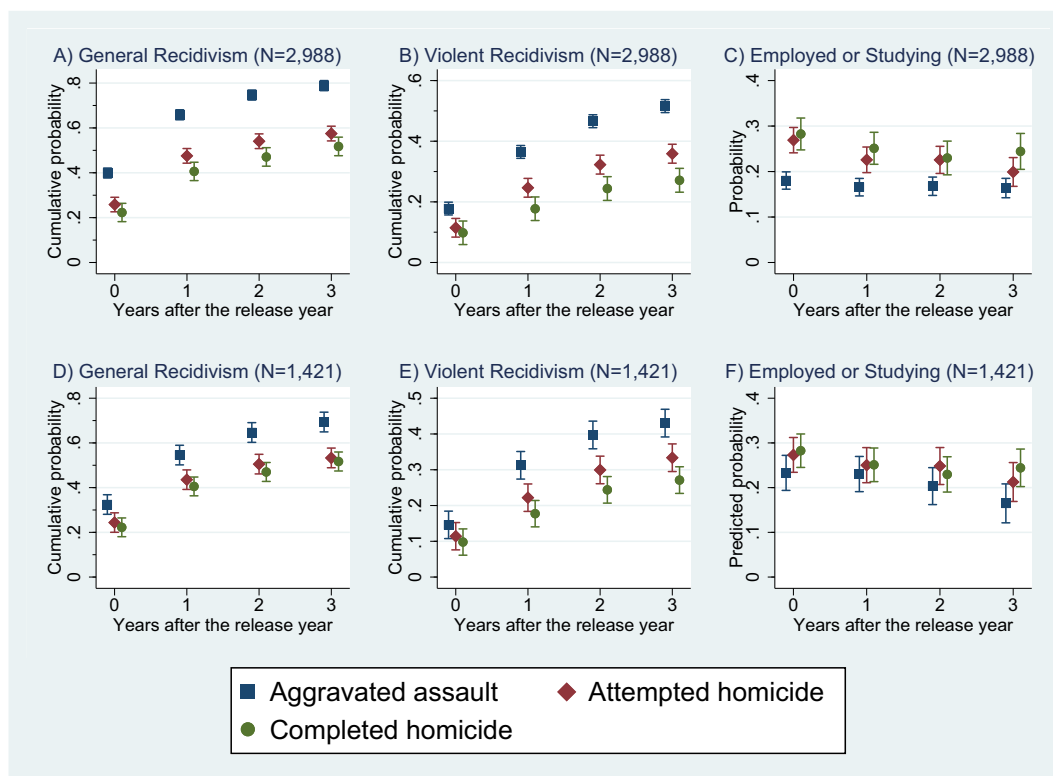
Fig. 2. Predicted probabilities for recidivism and participation in employment or education of former inmates in the original (2A, 2B, 2C) and in the matched sample (2D, 2E, 2F).

not randomized to different institutions nor to different rehabilitation programs, it is possible that homicide offenders are targeted by different interventions – in other words, receiving different kinds of treatment. Therefore, research designs enabling causal inference are needed in the future. However, the limitations regarding the causality of our findings do not threaten the validity of the descriptive findings on the recidivism rates of the three offender groups.

Another limitation relates to the data used in the study. Since our measure of crime is derived from conviction data and does not include hidden crimes, our measure of recidivism is bound to be underestimated. However, in our view, the strength of the administrative data outweighs the weaknesses by providing a rich dataset with a low rate of non-responses or attrition (Lyngstad & Skardhamar, 2011). Considering the analysis of homicide in particular, self-reported longitudinal datasets tend to include only a few lethal offenders (e.g., Farrington et al., 2012; Loeber et al., 2005).

It is important to note that since the following period of post-release outcomes started after the completion of the prison term, our study did not assess incapacitation effect, which is – in addition to rehabilitation – another important rationale of the custodial sentences. Therefore, the real-life impact of imprisonment would include both the crimes prevented by incarceration (during imprisonment) and the crimes prevented by rehabilitation (after the imprisonment). From the robust association between age and desistance, it logically follows that longer prison sentences would – ceteris paribus – result in offenders who are older at the time of release and therefore more likely to "age out" of criminal behavior. After all, eventually virtually all convicts desist from criminal offending (e.g., Laub & Sampson, 2003). Yet, incapacitation may be a double-edged sword since it – by definition – prevents not only offending but also employment (outside the prison) during imprisonment. Thus, the incapacitation effect among this group of offenders requires further research.

Finally, the generalizability of the results raises important questions. A typical Finnish homicide occurs in a private sphere and results from a

drunken dispute between friends, family, or acquaintances, who tend to be unemployed, middle-aged men (e.g., Liem et al., 2013), which stands in stark contrast to the large body of criminological theory developed in the USA, where lethal violence is associated with youth gangs, urban ghettos, illegal drug markets, gun violence, and ethnic discrimination (Savolainen, Lehti, & Kivivuori, 2008). In addition to differences regarding homicide offenders, the content of the custodial sanction is likely to differ between institutions, jurisdictions, and cultures (Liebling, 2011). Finland is a country with a relatively lenient penal policy (Lappi-Seppälä, 2011; Pratt, 2008) and both the prison population rate and the average sentence length well below the European median (Aebi & Tiago, 2021). In our sample, the average length of a prison term served by CHOs lasted less than six years (5.8 years, SD: 2.8) and only seven percentage of them served longer than ten years. It is thus possible that the number of inmates receiving very long sentences was not large enough to observe the harmful consequences of long sentences. Overall, it is possible that the similarity of the post-release outcomes between CHOs versus AHOs is typical for Finnish society and would not replicate in other samples from different contexts. As discussed in more detail in the prior research section, natural experiments have found favorable (Hjalmarsson & Lindquist, 2022; Landersø, 2015), null (Al Weswasi et al., 2022) and adverse (Mueller-Smith, 2015) effects of the longer sentences to later life-course. Moreover, unlike most prior studies analyzing sentence length (except Landersø, 2015), we focused solely on violent offenders.

In addition to differences in prison populations and penal cultures, the labor market of the surrounding society outside the prison are likely to matter to post-release integration. Compared with Denmark, Sweden, and Norway, the Finnish prison population manifests clearly weaker labor-market attachment both before and after the prison term (Aaltonen et al., 2017). Even the individuals desisting from crime term are unlikely to sustain a continued streak of employment (Aaltonen, 2016). The Finnish labor market is characterized by low demand for the unskilled work force (Kalenius, 2014). Prior studies from Finland

([Virtanen, Aaltonen, Tyni, & Kivivuori, 2020](#)) and the USA (meta-analysis by [Ellison, Szifris, Horan, & Fox, 2017](#)) have indicated that educational programs delivered within prison may be beneficial for the post-release employment of former inmates. Overall, social support both during and after the prison term is needed for securing better post-release outcomes.

5. Conclusion

Our results confirm that the post-release outcomes of former inmates convicted of severe violence tend to be poor. Homicide offenders, however, do not seem to recidivate or remain outside formal employment or education more often than offenders convicted of attempted homicide or aggravated assault, regardless of being convicted of the most serious form of violence and serving longer sentences. Conversely, offenders convicted of aggravated assault displayed more problematic post-release outcomes than the other two groups. However, these differences were considerably attenuated – and considering participation in employment or education, no longer statistically significant – when the preexisting differences were adjusted for. In the future, rigorous studies utilizing (quasi)causal designs are needed, and these studies should analyze both the incapacitation and rehabilitation effects of custodial sentences.

Funding

Appendix

Appendix 1
Full statistics of the models 2A, 2B and 2C. The full sample.

	General recidivism			Violent recidivism			Employed or Studying		
	B	95% C.I.		B	95% C.I.		B	95% C.I.	
		Lower	Upper		Lower	Upper		Lower	Upper
Offense (Ref. Completed homicide)									
Aggravated assault	0.18	0.13	0.22	0.08	0.04	0.12	−0.10	−0.14	−0.06
Attempted homicide	0.04	−0.02	0.09	0.02	−0.03	0.07	−0.01	−0.06	0.03
Release year	−0.01	−0.01	−0.00	−0.01	−0.02	−0.01	−0.00	−0.01	0.00
Year after the prison term (Ref. Year 0)									
1st year	0.18	0.15	0.22	0.08	0.05	0.11	−0.03	−0.07	0.01
2nd year	0.25	0.21	0.28	0.15	0.11	0.18	−0.05	−0.09	−0.01
3rd year	0.29	0.26	0.33	0.17	0.14	0.20	−0.04	−0.08	0.00
Offense x year after the prison term									
Aggravated assault x 1st year	0.08	0.04	0.11	0.11	0.07	0.14	0.02	−0.03	0.06
Aggravated assault x 2nd year	0.10	0.06	0.14	0.14	0.11	0.18	0.04	−0.01	0.09
Aggravated assault x 3rd year	0.10	0.06	0.13	0.16	0.13	0.20	0.02	−0.03	0.07
Attempted homicide x 1st year	0.03	−0.01	0.08	0.05	0.01	0.09	−0.01	−0.06	0.04
Attempted homicide x 2nd year	0.03	−0.01	0.08	0.06	0.02	0.10	0.01	−0.04	0.06
Attempted homicide x 3rd year	0.02	−0.02	0.06	0.07	0.03	0.11	−0.03	0.09	0.02
Intercept	14.48	3.17	25.79	29.71	18.93	40.49	7.49	−1.11	16.10
Random intercept	0.38	0.37	0.39	0.37	0.36	0.38	0.25	0.24	0.26
Wald chi^2	3365.10			2466.46			71.4		
P-value	0.000			0.000			0.000		
Log likelihood	−4305.75			−3654.72			−4461.58		
Number of individuals	2988			2988			2988		
Number of observations	11,590			11,590			10,690		

Appendix 2
Full statistics of the models 2D, 2E and 2F. The matched sample.

	General recidivism			Violent recidivism			Employed or studying		
	B	95% C.I.		B	95% C.I.		B	95% C.I.	
		Lower	Upper		Lower	Upper		Lower	Upper
Offense (Ref. Completed homicide)									
Aggravated assault	0.10	0.04	0.16	0.05	−0.01	0.10	−0.05	−0.10	0.00
Attempted homicide	0.02	−0.04	0.08	0.02	−0.04	0.07	−0.01	−0.06	0.04
Release year	−0.01	−0.02	0.00	−0.01	−0.02	−0.01	−0.00	−0.01	0.00
Year after the prison term (Ref. Year 0)									
1st year	0.18	0.15	0.21	0.08	0.05	0.11	−0.03	−0.07	0.01
2nd year	0.25	0.22	0.28	0.15	0.12	0.17	−0.05	−0.10	−0.01
3rd year	0.29	0.26	0.33	0.17	0.14	0.20	−0.04	−0.08	0.01
Offense x year after the prison term									
Aggravated assault x 1st year	0.04	−0.01	0.08	0.09	0.05	0.13	0.03	−0.03	0.09
Aggravated assault x 2nd year	0.07	0.03	0.12	0.11	0.06	0.15	0.02	−0.04	0.08
Aggravated assault x 3rd year	0.07	0.03	0.12	0.11	0.07	0.15	−0.03	−0.09	0.03
Attempted homicide x 1st year	0.01	−0.04	0.05	0.03	−0.01	0.07	0.01	−0.05	0.07
Attempted homicide x 2nd year	0.01	−0.03	0.06	0.04	0.00	0.08	0.03	−0.03	0.09
Attempted homicide x 3rd year	−0.01	−0.05	0.04	0.05	0.00	0.09	−0.02	−0.09	0.04
Intercept	21.46	4.36	38.56	29.48	14.54	44.43	7.30	−6.22	20.82

(continued on next page)

Appendix 2 (*continued*)

	General recidivism			Violent recidivism			Employed or studying		
	B	95% C.I.		B	95% C.I.		B	95% C.I.	
		Lower	Upper		Lower	Upper		Lower	Upper
Random intercept	0.40	0.39	0.42	0.35	0.34	0.37	0.28	0.26	0.29
Wald chi^2	1305.81			869.42			28.51		
P-value	0.000			0.000			0.005		
Log likelihood	−1987.61			−1310.23			−2401.81		
Number of individuals	1421			1421			1421		
Number of observations	5539			5539			5102		

Appendix 3

The probabilities of general recidivism, violent recidivism and participation in employment or education. The estimates from inverse probability weighting with regression adjustment (IPWRA).

	Completed homicide	Attempted homicide (ref. CHO)	Aggravated assault (ref. CHO)
General recidivism ($N = 2988$)			
Year 0	0.22	0.22	0.28*
Year 1	0.41	0.42	0.48**
Year 2	0.47	0.49	0.58***
Year 3	0.52	0.51	0.63***
Violent recidivism ($N = 2988$)			
Year 0	0.10	0.09	0.13
Year 1	0.18	0.21	0.26***
Year 2	0.25	0.28	0.35***
Year 3	0.27	0.31	0.39***
Employed or Studying ($N = 2988$)			
Year 0	0.28	0.28	0.24
Year 1	0.25	0.23	0.23
Year 2	0.24	0.24	0.22
Year 3	0.25	0.21	0.19*

CHO = Completed homicide offender. ***$p < 0.001$; **$p < 0.01$; *$p < 0.05$. The N's refer to the first measurement point (the year of the release from prison).

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