PERSPECTIVES ON TERRORISM

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Recidivism After Terrorism Convictions in Belgium: Insights from Survival Analysis

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Abstract: Quantitative research on terrorist recidivism remains surprisingly limited, despite heightened concern among policymakers, practitioners, and the general public. Several factors contribute to this situation, including restricted access to sensitive data and the difficulty of assembling samples large enough to support robust statistical analyses, given the inherent rarity of terrorist offending. In Belgium, more than 650 individuals were convicted of terrorism-related offences between 2006 and 2024. Drawing on Belgium's Central Criminal Record, this study examines post-conviction trajectories of this population. Building on a first wave of research published in 2025, it benefits from an extended observation period (2006–2024) and a larger, more homogeneous analytical sample. The study pursues two objectives: first, to provide a detailed description of recidivism patterns—prevalence, timing, and offence types—within this population, and; second, to identify factors associated with reoffending using survival analysis and Cox proportional hazards models. Findings show that terrorist recidivism is exceedingly rare (2.5%; n = 10), whereas general recidivism (18.7%) predominantly concerns common criminal offences (e.g., traffic violations). Survival analysis indicates that the instantaneous risk of recidivism peaks within the first five years after conviction, followed by a sharp decline. Factors associated with recidivism include both classic criminological factors (e.g., prior convictions, gender) and variables specific to terrorism-related offenders (e.g., organisational affiliation and role). Criminal career duration also emerges as a key determinant of recidivism. The article concludes by discussing the study's methodological limitations and the implications of the findings for prevention, risk assessment, and policy development.

Keywords: terrorism, recidivism, survival analysis, criminal careers, Belgium.

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Introduction

The use of quantitative data in research on terrorist recidivism remains paradoxically limited, despite the considerable concern the issue generates both among the general public and within security and intelligence agencies. Such data—most often drawn from judicial case files or official databases (e.g., criminal records, penitentiary databases)—are typically difficult for researchers to access due to their sensitivity and the ethical and legal constraints surrounding them.[1] Moreover, terrorism constitutes a statistically rare phenomenon, even in countries most affected by it, which complicates the construction of samples large enough to enable robust quantitative analyses. To date, only a small number of studies, conducted primarily in the United States, Western Europe, and Israel, have relied on quantitative data.[2] These relatively recent studies display considerable variation in their operational definitions of recidivism (e.g., new offence, reconviction, reincarceration, or "reengagement"[3] in terrorist activity), in the composition of the samples examined (e.g., prosecuted individuals, convicted offenders, or released prisoners), and in the duration of the follow-up periods during which recidivism is observed. Such heterogeneity complicates cross-national comparisons, especially when one also considers the differing socio-political contexts, legal frameworks, and the variable nature and quality of the data employed.

Despite these disparities, a common finding nonetheless appears to emerge: recidivism among individuals convicted of terrorist offences remains relatively infrequent. Rates of "specific" recidivism (i.e., a new terrorist offence following an initial conviction for such an act) generally range between 1% and 5%.[4] A few exceptions reporting markedly higher rates are generally attributable to methodological particularities—such as the use of autobiographical sources[5] or the inclusion of broader categories of acts classified as terrorism in certain conflict settings.[6] While recidivism rates remain especially low when considering *specific* recidivism, several studies have observed that they tend to increase when *general* recidivism is taken into account, though still at moderate levels overall.[7]

In light of these findings, the literature generally points to a potential neutralisation of recidivism resulting from the combined effects of long prison sentences, restrictive judicial measures, and heightened surveillance.[8] However, few authors draw attention to the possible underestimation of observed rates, due to short follow-up periods, incomplete information on post-conviction trajectories (including death, emigration, individuals still incarcerated or deported, or continued terrorist activity abroad beyond the reach of domestic authorities), deficiencies in the data sources used, and, more broadly, the "dark figure" inherent to all criminological research—that is, offences that go undetected or unprosecuted.[9]

Despite these challenges, several studies have nonetheless sought to identify the factors associated with terrorist recidivism. Their findings suggest that reoffending is shaped by a complex interplay of individual, social, and institutional influences, with results that are sometimes convergent and at other times contradictory. At the individual level, findings on age are mixed: while Altier et al. report a negative relationship between age and the likelihood of reengagement—suggesting that older individuals are less prone to reoffend[10]—Thijssen et al. find no such association, emphasising the need to interpret these results in light of specific samples and methodological approaches.[11] In contrast with traditional criminological assumptions, sociodemographic variables such as gender, marital status, parenthood, or employment generally do not emerge as strong protective factors.[12] Ideological and relational dimensions, however, appear to exert a clearer influence. Strong adherence to radical beliefs and the maintenance of ties with terrorist networks have been consistently associated with higher risks of reengagement, particularly in contexts of violent radicalisation.[13] These findings underscore the continuing impact of ideological commitment and social environments in

shaping post-release trajectories. Evidence regarding prior criminal history is less consistent. Some analyses suggests that previous convictions have little or no predictive power for terrorist reoffending[14] — contrary to what is often observed in the broader criminological literature[15] — whereas Mine et al. find that each additional conviction increases the hazard of reoffending by approximately nine percent.[16] Finally, from a methodological standpoint, Fahey highlights the importance of time since release, noting that longer follow-up periods are naturally associated with higher probabilities of reoffending.[17] This "criminological truism," as she puts it, calls for analytical approaches that adequately account for variations in observation periods across individuals.

Against this backdrop, a recent study conducted in Belgium on the entire population of individuals convicted of terrorism confirmed the rarity of observed terrorist reoffending cases (1.1% and 9.9% for terrorist and general recidivism respectively).[18] This first wave of data collection and analysis, based on the Belgian Central Criminal Record (2006–2020), was specifically designed to address the challenge posed by heterogeneous follow-up periods by applying survival analysis. This method estimates the probability of reoffending before a given time *t* (or, conversely, of not reoffending—that is, of "surviving") while accounting for varying follow-up times across individuals and for censored cases (those who had not reoffended at the time of data extraction). The results of the survival analysis identified several factors influencing both the risk and timing of recidivism. As stated hereinabove, the number of prior convictions increased the likelihood of reoffending. Interestingly, the analysis also suggested that recidivism was influenced by the *nature* of prior criminal activity and by the individual's role within the terrorist organisation. For example, previous convictions related to drug offences and occupying a leadership position appeared to exert a protective effect. Finally, in line with Thijssen et al.,[19] no significant effect was observed for age or gender.

While this first study provided valuable insights, the identification of robust predictors remained partly constrained by the limited sample size and the nature of available data. Despite its methodological advances—particularly in addressing variability in follow-up periods—it faced several limitations. First, the follow-up period was relatively short for a substantial portion of the sample, especially for individuals convicted from 2015 onward. Because data collection ended in October 2020, many of these cases were administratively censored, likely leading to an underestimation of recidivism.[20] Sample heterogeneity posed an additional challenge: individuals convicted *in absentia*—whose post-conviction status is often uncertain (e.g., presumed deceased or emigrated)—may have biased recidivism estimates and reduced analytical precision. Finally, given the overall modest sample size, some subgroups (e.g., drug-related offenders) were too small to yield sufficient statistical power for multivariate analyses.

To overcome some of these limitations and strengthen the robustness of the findings—particularly in light of some unexpected results in the literature (e.g., the lack of effect of gender or prior criminal history on reoffending)—the present study undertakes a new analysis of individuals convicted of terrorism in Belgium. It constitutes a second wave of data collection and analysis based on records from the Belgian Central Criminal Record, extending the observation period to 2006–2024. Compared to the first wave, this dataset includes 33% more convicted individuals and additional recidivism cases. The analytical sample is also refined through the exclusion of individuals convicted *in absentia*, resulting in a more homogeneous population. The analysis focuses primarily on criminal history variables (e.g., type and frequency of prior offences) and basic socio-biographical characteristics (e.g., sex, country of birth, age). Other life-course dimensions—such as employment status, mental health, or substance use—cannot be examined, as they are not systematically recorded in this database. Likewise, the Central Criminal Record does not include information on the execution of sentences, which prevents

accounting for the actual time at risk of reoffending. Overall, this second wave provides a broader and more consistent empirical basis for estimating the prevalence, timing, and determinants of recidivism among terrorism offenders in Belgium. By contrasting its results with those of the first wave, it offers a more consolidated perspective on post-conviction trajectories, contributing valuable insights for reintegration and risk management policies.

Following a detailed description of the methodology and the adjustments applied in this second-wave analysis, the main results are presented and discussed, highlighting their implications, limitations, and avenues for future research.

Method

The present study constitutes the second wave of data collection and analysis on individuals convicted of terrorism-related offences, as recorded in the Belgian Central Criminal Record (data extracted on 14 November 2024). These records contain information on final judgments issued by Belgian jurisdictions, as well as judgments rendered by foreign jurisdictions against Belgian nationals. Available data include demographic characteristics of the offenders (e.g., sex, country of birth, date of birth, date of death), basic offence information (e.g., type of offence, date, location), judicial features (e.g., judgment date, jurisdiction type and country), and sentencing outcomes (e.g., nature and severity of penalties or measures). The database, however, does not provide information on sentences execution, making it impossible to determine if, when, or how sentences were served.

According to the database, 657 individuals aged sixteen and over were convicted of terrorism-related offences between 2006 and 2024.[21] We excluded eight individuals due to missing information on the date of the terrorism offence (i.e. the reference offence). For the remaining 649 individuals, we retrieved data on all offences for which they were convicted throughout their criminal careers. This allowed us to characterise their potential criminal history prior to the reference offence and to identify possible instances of recidivism following it. Offences lacking reliably recorded dates (4.1% of all offences across all subjects) were discarded, as it was not possible to determine with confidence whether they occurred before or after the reference offence. To ensure sufficient data quality for analysis, and following the criterion used in the initial study,[22] individuals for whom 30% or more of their offences had to be discarded were excluded (n=34), resulting in a subsample of 615 individuals.[23] Notably, and in contrast to the previous study, we applied an additional exclusion criterion: individuals convicted *in absentia* were excluded. This decision reflects the specific challenges posed by such cases in terrorism research. Indeed, post-conviction trajectories of such individuals are often difficult to monitor due to factors such as emigration or unreported deaths, which make their potential reoffending behaviour—or death—less observable compared to individuals convicted in person. Including them could introduce bias into both recidivism figures[24] and survival model estimates. Applying this criterion led to the exclusion of 208 individuals (33.8% of the sample), yielding a final sample of 407 individuals convicted of terrorism.

Descriptive statistics were computed to characterise the demographic profiles, criminal histories, and recidivism outcomes of the sample. Recidivism was defined here as a reconviction for an offence initiated after the date of the reference conviction. Time to recidivism was measured as the number of weeks between the reference conviction and the earliest known offence date leading to a new conviction. Individuals were censored if no such offence occurred by the date of data extraction or if they were officially recorded as deceased.

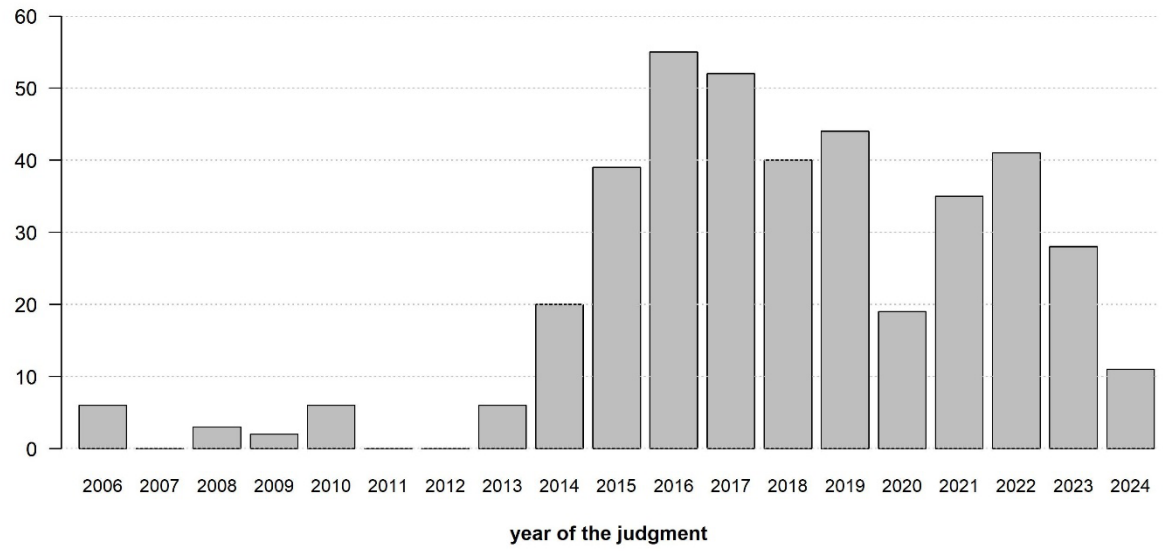
To examine predictors of—time to—recidivism, we employed Cox proportional hazards models. This semi-parametric approach estimates the hazard function—the instantaneous risk of reoffending at a given point in time among those not yet reconvicted. Cox models assess how risk changes over time since the reference conviction and how it is influenced by different covariates. These models are well suited to our context because they handle right-censored data and yield interpretable hazard ratios, assuming that the effect of covariates remain constant over time. In practical terms, a series of Cox proportional hazards models were estimated in R using the *survival* package (version 3.8-3). Due to the low number of specific recidivism cases, all analyses focused on *general recidivism*. These models differed according to the predictors (i.e., the independent variables or covariates) included. Predictors included demographic factors (e.g., gender, country of birth, age at reference offence); criminal history indicators (e.g., onset age, prior convictions,[25] crime mix index,[26] binary indicators of prior offence types[27]); characteristics related to the reference offence (e.g., individual's role:[28] terrorism group leader, member - but not leader - or provider of material assistance; and the delay between criminal career onset and reference offence); other offence types included in the same judgment as the reference conviction (e.g., violent crime, public order offences); and year of the reference conviction.[29] To determine the best-fitting model, we employed both forward and backward stepwise selection based on the Akaike Information Criterion (AIC), which balances model fit and parsimony. In forward selection, predictors were added sequentially to the null model; in backward selection, variables were removed from the full model. The final model retained was the one with the lowest AIC across both procedures and across all series of models.[30] For each predictor with a significant effect in this model, we report the hazard ratio and the p-value obtained from a likelihood ratio test (LRT). We conducted several diagnostic checks to evaluate model validity and robustness. Multicollinearity was assessed using variance inflation factors (VIFs), and the proportional hazards assumption was tested via Schoenfeld residuals. We also examined martingale residuals to assess the functional form of continuous covariates. Sensitivity analyses were performed using dfbeta values, re-estimating models after excluding individuals identified as influential for specific predictors. Finally, the model discriminative ability was evaluated using the concordance index (C-index).

Results

Description of the sample

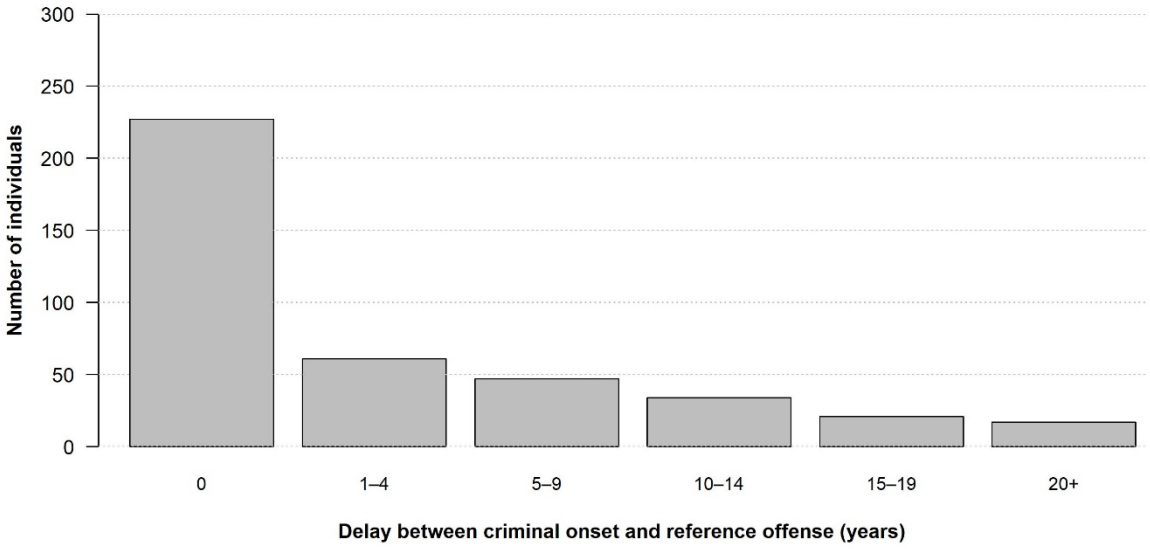
Most of the offenders were male (78.9%), with a median age of 25 at the time of the reference offence (range: 16-72; interquartile interval Q1-Q3: 22-33). The majority were born in Belgium (58%). The terrorist offences occurred between 1997 and 2023, while the corresponding judgments were issued between 2006 and 2024. Most of these judgments were pronounced after 2014 (see Figure 1). Based on the legal classification recorded in the Central Criminal Record, the vast majority of the offenders (82.8%, *n*= 337) were convicted as members of a terrorist group, either as leaders (8.8%, *n*=36) or as active members (74%, *n*=301). A smaller share (5.9%, *n*=24) were convicted for providing material support only. In a minority of cases, additional types of offences were included in the same judgment as the reference conviction. These were primarily public order offences (14.7%), offences categorised as 'other' (13.5%), property offences without violence (9.1%), and violent crimes (6.6%).

Figure 1. Number of individuals convicted for terrorism for the first time, by year of judgment



Regarding criminal history, nearly half of the sample (46.2%) had at least one conviction for an offence committed prior to the reference offence. Among these individuals, the median age at first offence (i.e., onset age) was 20 (range: 9-59; Q1-Q3: 18–23). Across the full sample, the delay between the onset and the reference offence averaged 4 years but varied widely (range: 0-41 years; Q1-Q3: 0-6), as shown in Figure 2. The mean number of prior convictions was 2.5, although the distribution was highly skewed (range: 0-42; Q1-Q3: 0-3). Specifically, 53.8% of individuals had no prior convictions, 27.5% had between 1 and 4, 11.5% had between 5 and 10, and 7.1% had more than 10 prior convictions. The average crime mix index was 1.2 (range: 0-8; Q1-Q3: 0-2), suggesting a low diversity[31] of offences committed prior to the reference offence. The most common category of prior offence was road traffic violations (32.9%), followed by property without violence (e.g., simple theft, shoplifting) (19.2%), violent crimes against persons (e.g., assault, homicide) (16.2%), and public order offences (16%). At the other end of the spectrum, less than 2% were convicted for a sexual offence (1.7%) and fewer than 10% had a drug-related conviction (8.6%).

Figure 2. Time elapsed between criminal onset and reference offence



Recidivism among terrorist offenders

The prevalence of general recidivism, defined as the proportion of individuals convicted for an offence committed after the reference judgment, was 18.7% (n=76), across all offence categories. This represents a substantial increase compared to the rate observed in the first wave of data collection (9.9%).[32] Two main factors explain this difference. First, the observation window was extended by four additional years, providing more time for new offences to occur and for these to result in convictions. Among the 286 individuals from our sample who were already included in the original cohort, 32 new cases of recidivism were identified, bringing the total to 73 cases compared to 43 in the initial study (from which two individuals have since been acquitted). This also highlights the role of the year of judgment, as only 3 out of the 121 newly included individuals—all judged from 2018 onward—had reoffended by the end of the observation period. Second, the final sample here—as opposed to the initial study—excluded individuals judged *in absentia*, for whom detecting recidivism is more difficult. These cases were disproportionately less likely to result in observable reconviction (see endnote 23), which contributed to the lower recidivism rate reported in Mine et al.[33]

The median time interval between the reference judgment and the recidivism offence was 93 weeks (range: 0.1–367 weeks; Q1-Q3: 41–170 weeks). Road traffic violations[34] were by far the most frequent type of recidivism, accounting for 52.6% of first reoffences. Over the entire period following the reference judgment, 60.5% of recidivists were convicted of at least one road traffic violation. As first new offenses, 13.2% of recidivists were convicted of violent crimes against persons and 10.5% of public order offenses (24% when considering such any offense during the follow-up period). Notably, 9.2% of recidivists were reconvicted for a terrorism-related offense as their first new offense, while 13% were convicted of such an offense at any point during follow-up. This corresponds to a prevalence of specific recidivism – defined as reconviction for a terrorism offence – of 2.5% (*n*=10).[35]

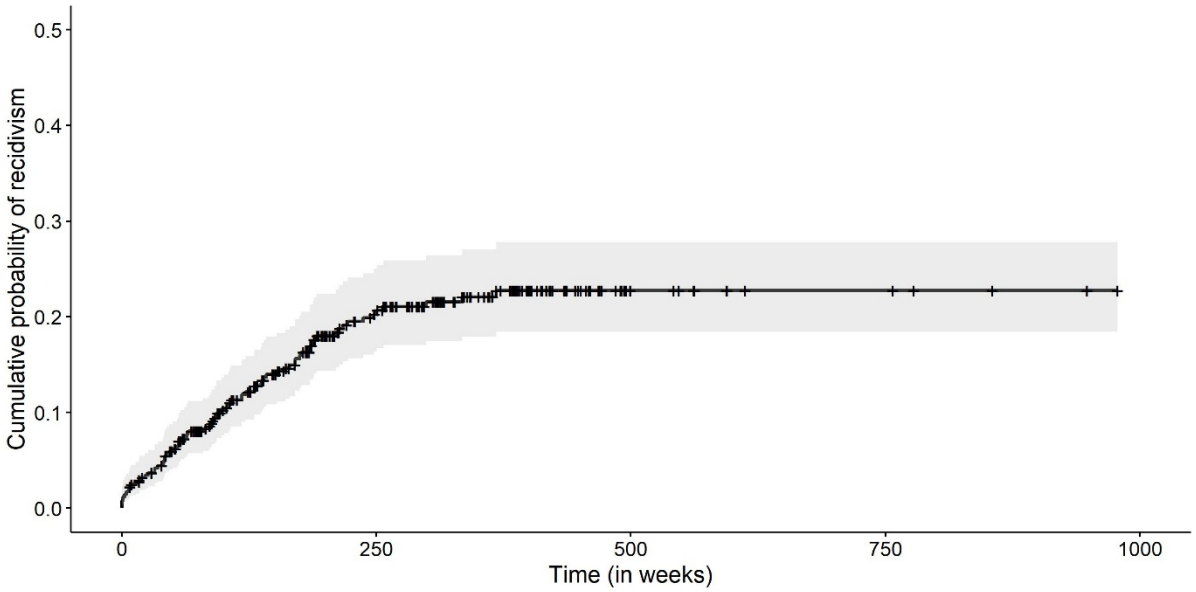
The recidivism figures reported above do not account for the variability in follow-up periods across individuals. To account for this variation and to estimate the probability of recidivism over time, we used the Kaplan-Meier estimation. For each person, follow-up began at the date

of their first terrorism conviction and ended at either their next offence, death, or the date of data extraction – whichever came first. Cases of death or the end of follow-up without a new conviction were treated as censored. Figure 3 shows the cumulative probability of recidivism as a function of time since the reference conviction, with shaded areas indicating the 95% confidence interval and plus signs marking censored cases. The Kaplan-Meier curve suggests that the risk of reoffending remains relatively steady during the first five years after the reference conviction, resulting in a probability of slightly more that 20% of having reoffended after five years (260 weeks). After this point, the curve flattens, suggesting that the risk for those who have not reoffended by then diminishes severely.

Importantly, this curve models the cumulative probability of recidivism following the first conviction, rather than the propensity of reoffending upon release. This distinction is essential, as the model does not directly incorporate information on sentence length or actual time served.[36] Given the incapacitation effect associated with imprisonment—assuming sentences were effectively served in detention—the early portion of the curve is therefore likely to reflect recidivism primarily among individuals convicted of less serious terrorism-related offenses (i.e., those receiving shorter custodial sentences, if any). This interpretation is supported by the distribution of recidivism across sentence length categories (see Table 1 in the Appendix), which indicates substantially lower recidivism among individuals sentenced to more than five years of imprisonment.

A limitation of the Kaplan-Meier estimation is that it does not adjust for differences between individuals. To address this, and to identify factors influencing time to recidivism, we applied Cox proportional hazards models.

Figure 3. Cumulative probability of recidivism over time for first-time convicted terrorism offenders.



+: Censored data. Grey: 95% CI

Factors influencing the risk of recidivism: The survival analysis

Our modelling strategy (see Method) produced a best-fitting model with ten predictors, among which eight[37] were significantly associated with the instantaneous risk of recidivism (i.e. the hazard function): *gender*, *country of birth, year of the conviction, number of prior convictions,*

prior conviction for violent property offence, onset age and *age at the offence,* and *terrorist group status*. This implies that the other variables were not considered to influence the risk of (or time to) recidivism. Model validity, robustness and predictive accuracy were supported by additional diagnostic checks.[38]

Before examining the effect of each factor in detail, it is important to note that the estimates should be interpreted primarily in terms of *direction of influence*—that is, whether a predictor functions as a risk factor or as a protective factor[39]—rather than focusing on the exact hazard ratio values reported. This is because some estimates are less precise, with wide confidence intervals for predictors represented by small subgroups (e.g., female offenders, those with prior violent property convictions). In addition, certain predictors—especially *onset age* and *age at the offence*—showed suppression effects, meaning their estimated impact shifted noticeably depending on which other variables were included in the model.

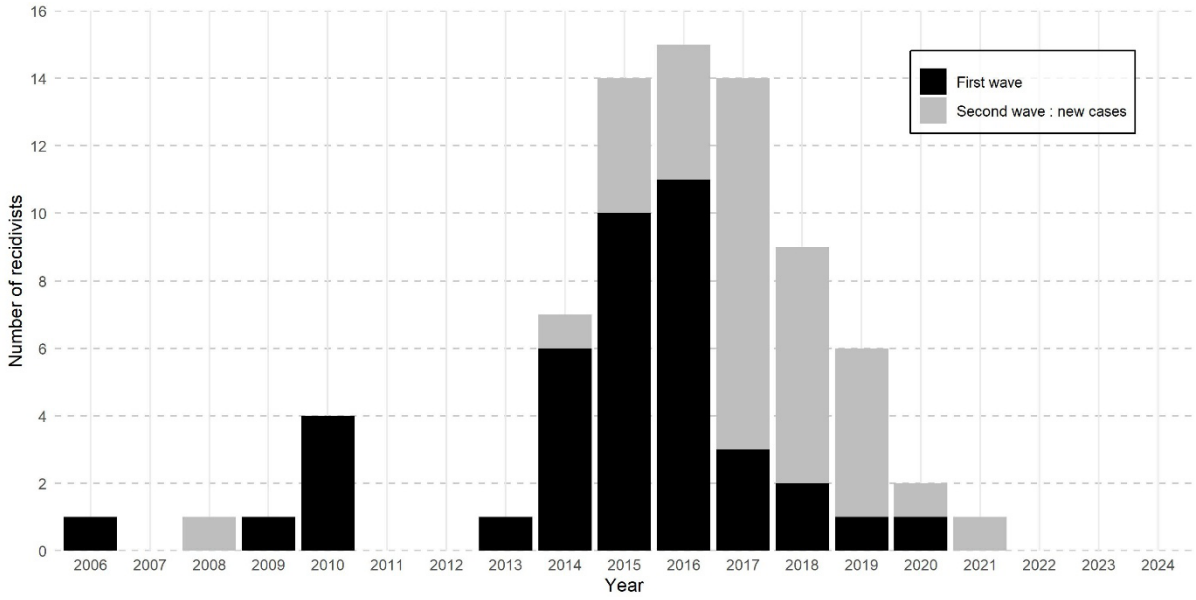
Gender was significantly associated with the risk of recidivism: male offenders had an instantaneous risk of recidivism more than 2.5 times higher than that of female offenders (HR:2.53; 95% CI:1.04-6.14; p =.024). This result mirrors the prevalence rates observed in our sample, where 21.8% of men reoffended compared to 7.1% of women. Such findings are consistent with the broader literature on recidivism, which regularly reports higher reoffending rates among men. However, this gender effect has not been observed in previous research on terrorist offenders' recidivism[40] or in our earlier study.[41] A likely explanation is the longer follow-up in the present study, which made the persistently low recidivism among women more apparent, resulting in a significant gender effect.

According to the model, *country of birth*[42] had a significant effect on the risk of recidivism. Controlling for all other factors, the instantaneous risk of reoffending among foreign-born individuals was 55% lower than among those born in Belgium (HR:0.45; 95% CI:0.26-0.79; p =.004). This result is consistent with the prevalence rates observed in our sample, where 22.8% of Belgian-born offenders reoffended compared to 13.2% of those born abroad. *Country of birth* had also emerged as a predictor in the best-fitting model of the first-wave study,[43] although it did not reach statistical significance there, likely due to limited statistical power. The higher risk for Belgian-born offenders compared to foreign-born individuals may be explained by several factors not captured in the data, such as the (threat of) deportation for non-citizens, differing levels of scrutiny, or distinct social support networks that may buffer against reoffending.

The *year of the conviction* had a significant effect on the instantaneous risk of recidivism (p < .001): according to the model, more recent convictions were associated with a lower instantaneous risk of reoffending. This pattern is largely driven by the complete absence of observed recidivism among individuals convicted in 2022 and later (0 out of 80), as well as by systematically lower prevalence rates in the immediately preceding years (2021: 2.9%; 2020: 10.5%; 2019: 13.6%), compared to the overall sample prevalence. At first sight, one might expect this effect to reflect the reduced time at risk for those convicted more recently. However, this explanation is insufficient, since such differences in exposure time are already accounted for through censoring in the survival model. Instead, as argued in Mine et al.,[44] we interpret this association as a methodological artefact related to the operational definition of recidivism. Specifically, for a re-offence to be registered as recidivism, it must not only be committed but also adjudicated and entered into the Central Criminal Record. The delays inherent in judicial proceedings[45] and subsequent data encoding likely caused many of the more recent re-offences to remain unrecorded, leading to an artificially low estimated risk for recent cohorts. Figure 4 provides additional support for this interpretation, by displaying the number of recidivists

by year of the reference judgment and distinguishing between cases identified in the first wave (black) and those detected only in the present study (grey). As the figure illustrates, the dramatic drop observed for the 2017 cohort in the first wave study has now been substantially corrected by the new data. Furthermore, additional models provide no statistical evidence of temporal changes in the sentencing pattern.[46] In sum, the observed effect of conviction year should not be interpreted as a substantive reduction in recidivism risk, but rather as evidence of underestimation arising from delays in judicial processing and record-keeping.

Figure 4. Number of recidivists by year of judgment for the reference offence.

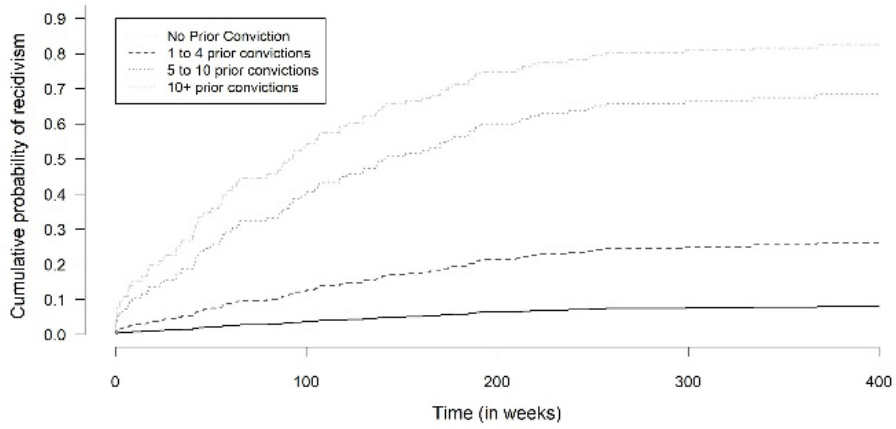


**Black bars represent recidivism cases identified in Mine et al. (2025), while grey bars indicate additional cases identified in the present study.*

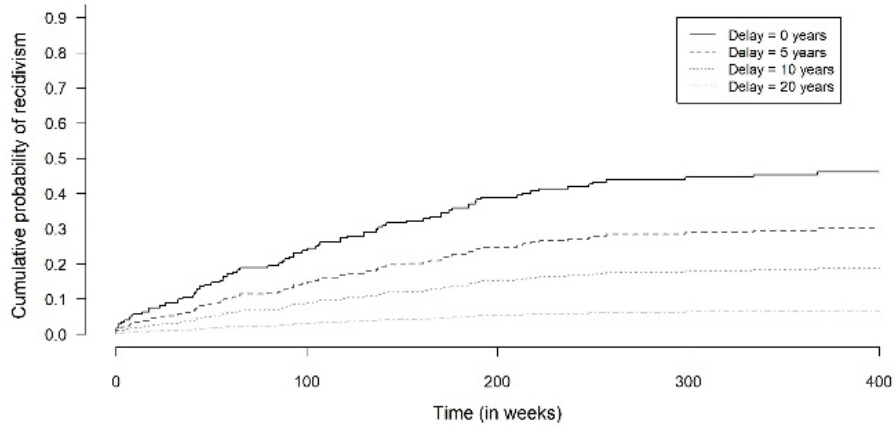
The *number of prior convictions* was strongly associated with the risk of recidivism ($p < .001$). Compared to individuals with no prior convictions, those with 1 to 4 convictions had more than three times the instantaneous risk of reoffending (HR = 3.63; 95% CI: 1.97–6.70). The risk increased dramatically for those with 5 to 10 prior convictions (HR = 13.84; 95% CI: 5.35–35.79) and for those with more than 10 convictions (HR = 20.88; 95% CI: 5.06–86.1). Figure 5a illustrates the substantial impact of these hazard ratios on the cumulative probability of recidivism: after 100 weeks, more than half of the individuals with over 10 prior convictions are expected to have reoffended, compared to just above 10% of those with 1 to 4 convictions. Although confidence intervals are wide, even their lower bounds suggest a very strong effect. This finding is consistent with the broader literature on general recidivism, where criminal history is one of the most robust predictors, and it echoes—while also amplifying—the result observed in the first-wave study.[47]

Figures 5a and 5b. Predicted cumulative probability of recidivism among individuals convicted of terrorism.

Panel (a): ***By number of prior convictions:*** *no prior conviction, 1-4, 5-10 or more than 10 prior convictions*



Panel (b): ***By delay between criminal career onset and reference terrorist offence:*** *0, 5, 10, or 20 years*



All predictions were computed using the final Cox proportional hazards model, holding other covariates at reference values: judgment year = 2018, born in Belgium, male, onset age = 20 years, member (but not leader) of a terrorist group, no prior violent property or concomitant offence. For panel (a), age at the reference offence = 25 years. For panel (b), the number of prior convictions = 1-4.

The Central Criminal Record specify the role attributed to each individual in a terrorist offence. This *terrorist group status* was significantly associated with the risk of recidivism (p = .037). Interestingly, being a leader (HR: 0.27, 95% CI: 0.09–0.83) and, to a lesser extent, being a member of a group (HR: 0.58, 95% CI: 0.31–1.05) appeared to reduce the risk of reoffending compared to providers of material assistance. While this finding may seem counterintuitive, it is consistent with our earlier study in which leadership status was also associated with lower recidivism risk.[48] However, this association is more plausibly interpreted as an artefact of sentencing differences than as evidence of a genuine protective mechanism. Leaders and group members typically received substantially longer prison sentences than providers of material assistance, suggesting a potential incapacitation effect.[49] Under this interpretation, the reduced hazard does not reflect lower underlying propensity to reoffend, but rather reduced opportunity to do so. Nevertheless, this interpretation remains tentative, as our data only record the length of sentences imposed, not the actual time served.

Having a *prior conviction for a violent property offence* was associated with a lower risk of recidivism: their instantaneous risk of reoffending was less than half that of individuals without such a conviction (p = .037; HR: 0.41, 95% CI: 0.17–0.99). As with the effect of terrorist group status, this finding may be explained by longer prison sentences served,[50] although we were unable to directly test this hypothesis given the limitations of our data.

The criminal career *onset age* and the *age at the reference offence* both significantly influenced the instantaneous risk of reoffending, but in opposite directions. Each additional year of age at onset increased the hazard by 17%[51] (p < 0.001; HR: 1.17, 95% CI: 1.08–1.27), whereas each additional year of age at the reference offence decreased it by 12% (p < 0.001; HR: 0.88, 95% CI: 0.81–0.95). These coefficients should be interpreted with caution and not in isolation: removing either variable from the model led to substantial changes in the estimate of the other, suggesting a suppression effect (i.e., that the apparent impact of one predictor depends on whether the other is included). Such effects are not unusual when predictors are moderately correlated, as here (r=0.76, VIF: 2.86). Accordingly, the reported coefficients represent conditional effects, valid only when both variables are included in the model. For the majority of our sample – those whose criminal career began with the reference offence (53.8%) – we can fairly consider that the opposing effects effectively cancel each other out.[52] Thus, for primo-criminals, the age at the terrorist offence does not seem to influence the risk of recidivism, which is in line with the findings of Thijssen et al.[53]

As the delay between criminal career onset and the reference offence is central to interpreting these variables, we estimated an alternative model identical to the best-fitting model except that we replaced age at the reference offence with *the delay* (in years) *between onset and the reference offence*. This new model had a nearly identical AIC (806.1 vs. 805.6), indicating that both models fit the data equally well.[54] In this specification, onset age was no longer significant (p = 0.19), while the delay emerged as a significant protective factor (p = 0.004; HR: 0.90, 95% CI: 0.84–0.96). This suggests that the apparent effects of onset age and age at the reference offence are largely explained by the interval between these two events: each additional year of delay lowered the instantaneous risk of reoffending by about 10%[55] (Figure 5b). In other words, for a given onset age, the later an individual commits a terrorist offence, the lower their instantaneous risk of reoffending, meaning that recidivism—if it occurs—tends to happen more slowly. This finding echoes Altier et al.,[56] who reported lower reengagement rates among older offenders; however, in our case, the effect holds only for those with a prior criminal history before their terrorist offence.

Discussion

This study provides an updated and more comprehensive picture of recidivism among individuals convicted of terrorism-related offences in Belgium, shedding light on their criminal trajectories, reoffending patterns, and the factors shaping them. In the following discussion, we interpret these findings in relation to existing research.

The demographic profile of the cohort—predominantly young, male, and Belgian-born—mirrors patterns widely reported in the literature, which indicates that individuals convicted of terrorism-related offences are most often young males[57] radicalised domestically.[58] Notably, more than half of the sample (53,8%) began their 'official' criminal careers with a terrorism-related conviction, having no prior record. Beyond the distinction between individuals with or without a prior criminal record, our results reveal significant heterogeneity among those who do have one, both in the extent and the nature of their offending. While many had few prior

convictions, a smaller subgroup exhibited extensive criminal histories. Consistent with findings by Thijs et al., these antecedents largely involved relatively "common" offences—such as road-traffic violations, theft, or public-order breaches—rather than serious or organised-crime-related acts.[59] This pattern suggests that prior offending among terrorism convicts is generally neither severe nor ideologically motivated, reinforcing Rodermond and Thijs's argument that there is generally no clear progression from ordinary criminality to terrorism through "criminal skills" or exposure to violence.[60] This finding, corroborated by other international findings,[61] highlights the challenges of early detection and underscores the need for prevention strategies grounded in a multi-agency framework. This approach aims to identify, at an early stage and in an effective manner, individuals who may be at risk of engaging in violent radicalisation by fostering inter-service cooperation, improving information sharing, encouraging joint decision-making, and ensuring coordinated actions.[62]

The specific recidivism rate (i.e., new convictions for terrorism) remains exceptionally low — 2.5% (n = 10) — despite the extended observation period. This finding aligns with the 1%-5% range generally reported in the international literature (see Introduction). The general recidivism rate is significantly higher (18.7%) but the nature of reoffending remains predominantly ordinary (i.e., mainly traffic violations and public order offences). This pattern suggests that subsequent criminal behaviour largely mirrors that of the general offender population. From the perspective of recorded crime, they appear more prone to conventional reoffending than to renewed involvement in terrorist activities, although the latter is more difficult to establish due to its clandestine nature. Strikingly, the Kaplan-Meier curve indicates that the instantaneous risk of recidivism peaks within the first five years following conviction before declining sharply thereafter. This pattern is counterintuitive: given that the median prison sentence for terrorism-related offences in Belgium is around five years,[63] one would expect the incapacitation effect of imprisonment to diminish reoffending during this period, at least at the sample level. Yet, most recidivism still occurs within these early years. It is likely that the early portion of the Kaplan-Meier curve primarily captures reoffending among individuals convicted of less serious terrorism-related offences, who typically received shorter sentences. By contrast, individuals convicted of more serious offences likely remain incarcerated during much of this high-risk window. As a result, the observed recidivism trajectory may therefore partly underestimate of the true reoffending propensity of the full population. Even so, the pattern suggests that the underlying propensity to reoffend is particularly pronounced in the years immediately following conviction, which is consistent with international literature.[64] Beyond this aspect, the model predicts an asymptotic general recidivism rate slightly above 20%, a figure broadly consistent with that observed in the first wave.

The Cox proportional hazards model reveals a complex set of factors that influence the risk of reoffending, with some findings aligning with established criminological principles and others presenting counterintuitive results that demand deeper interpretation. The identification of these factors is essential for designing evidence-based interventions that effectively reduce the risk of further offending.[65] The results indicate that prior criminal convictions remain the strongest predictor of recidivism, while being male and being born in Belgium also increase risk; conversely, a terrorist leadership role and severe prior offences (i.e. violent property crime) appear to lower risk, likely due to longer incapacitating sentences rather than genuine protective effects.

The interplay between onset age and age at the reference offence is complex. The analysis identifies that the key variable is the *delay* between the two events, in other words, the length of the criminal career at the time of the reference conviction. A longer period between the start of a criminal career and the commission of a terrorist offence is associated with a lower

risk of recidivism. This suggests that individuals with a prolonged, criminal history who only later turn to terrorism may have in this case a "greater capacity" for apparent desistance compared to those who rapidly escalate to terrorism. An explanatory hypothesis could be that the terrorist offence is, in a way, the culmination of their criminal career and marks the possibly end or at least the decline of the person's criminal activity. The lower propensity to reoffend among these individuals could be interpreted through a rational reading of criminal behaviour related to maturity or as the result of a set of mechanisms, whose dynamics remain to be determined, involving push (i.e., negative aspects that drive individuals away) and pull (i.e., positive incentives that attract individuals toward desistance) factors. [66] The combination of push and pull factors at individual (e.g., disillusionment, desire for a stable family life, longing for a peaceful existence outside of terrorism), contextual (e.g., social ties, stigmatisation and others consequences related to repression), and organisational (e.g., conflicts with leaders or members) level may encourage a form of pragmatic desistance, based not necessarily and systematically on ideological change, but on adaptive cost-benefit rationality. That would be in line with desistance theories that emphasise cognitive transformations[67] and life-course transitions as crucial elements in moving away from terrorism and more broadly from crime.[68] According to Cherney and Koehler, "[…] sustained disengagement requires agentic change, a point also made in the criminological desistance literature, which is embedded in the dynamic of cognitive transformation (i.e., it requires shifts in choices, values, goals and motivations)".[69]

Limitations

While this study demonstrates the added value of applying survival analysis to an enriched dataset—offering longer follow-up periods for recent cohorts, more complete identification of recidivism events, and a more homogeneous sample—the interpretation of the findings requires caution. Several limitations may affect the patterns observed and their generalisability.

Because judicial proceedings and the encoding of convictions in the Central Criminal Record involve substantial delays, many reoffending events occurring late in the observation window are unlikely to have been captured under our operational definition of recidivism. This issue is particularly relevant for individuals convicted in 2019 or later, who make up a substantial portion of the sample and were heavily administratively censored within the first five years of follow-up. Consequently, the observed prevalence and the modelled probability of recidivism should be interpreted as conservative lower bounds. The pattern observed—an early peak in reoffending followed by an asymptotic stabilisation of the survival curve around 20–25%—would benefit from further validation through continued longitudinal monitoring. It is likely that the asymptotic value would be somewhat higher with a more extended follow-up period.

The model also yields some counterintuitive findings: individuals identified as leaders of terrorist groups or those with prior convictions for violent property crimes appear to exhibit a lower risk of recidivism. These patterns should not be interpreted as inherently protective. Rather, they almost certainly reflect the incapacitating impact of longer prison sentences, as such individuals typically receive substantially harsher penalties, which physically prevent them from reoffending in the community for extended periods. However, the actual enforcement and modalities of these sentences cannot be verified, because this information is not recorded in the Central Criminal Record.

Importantly, the study focuses on *general* recidivism among individuals convicted of terrorism-related offences, rather than on specific recidivism, despite the latter often attracting greater scholarly and policy interest. The extremely small number of observed specific recidivists precludes robust analyses regarding potential risk or protective factors specific to terrorism-related reoffending at this stage. Moreover, modelling recidivism through reconviction offers

no insight into reengagement in terrorist activities or the processes of deradicalisation—dimensions that are critical for understanding post-conviction trajectories.

These limitations also inform how the types of offences observed among recidivists should be interpreted. Approximately half of first reoffences are road traffic violations. While these are legitimately recorded in the Central Criminal Record and may entail non-trivial risks, they differ substantially in nature and gravity from terrorist acts or violent offences against persons. Their prominence reflects the rarity of serious reoffending within this cohort, rather than a substantive shift in post-conviction trajectories. Accordingly, the predictors identified in the Cox models should be understood as variables associated with *general* reconviction risk, an outcome substantially shaped by road traffic offences, rather than as predictors of terrorism-specific relapse.

The analysis is also limited to individual-level characteristics and does not account for relational or broader social dimensions. In particular, the study cannot account for ideological commitment or ties to violent extremist networks—dimensions that prior research identifies as important risk factors for terrorist re-engagement and recidivism. The Central Criminal Record provides formal criminal history but cannot measure the persistence or evolution of ideological beliefs, organisational affiliations in clandestine networks, or relational factors that may influence post-conviction trajectories. This limitation is substantial, as evidence suggests that ideological variables may be more predictive of terrorist recidivism than general criminological factors.[70]

More generally, the Central Criminal Record lacks information on housing, employment, substance use, mental health, and other socio-economic or psychosocial factors commonly associated with general criminal recidivism. The absence of these dimensions limits the explanatory power of the models. Ideally, our findings should be interpreted within a broader framework that integrate qualitative methods and additional data sources to incorporate such dimensions and provide a more comprehensive understanding of post-conviction trajectories.

Finally, this study was conducted in Belgium on a sample predominantly composed of individuals convicted for Islamist-inspired terrorism. Whether the patterns identified here generalise to other ideological contexts, judicial systems, or countries remains an open question.

Conclusion

The results presented in this paper corroborate those observed in the literature regarding the prevalence of recidivism, the nature of prior convictions, and several socio-biographical characteristics of individuals convicted of terrorism. Notably, this contribution helps reconcile contradictory findings concerning the role of age, by demonstrating that the key factor is not age *per se*, but rather the delay between the onset of the criminal career and the terrorist offence. This finding calls for further investigation into the duration of the criminal careers of individuals convicted of terrorism, as well as the other dimensions that characterise them—such as desistance and persistence, escalation and de-escalation, severity, specificity versus versatility, and acceleration or deceleration. Despite its relevance, research on the criminal careers of individuals involved in terrorism remains markedly underdeveloped and warrants greater scholarly attention. Furthermore, revisiting established criminological frameworks—such as Moffitt's taxonomy distinguishing adolescence-limited from life-course-persistent offenders[71]—through terrorism contexts could provide a theoretically robust foundation for differentiated deradicalisation and reintegration programmes. Such approaches would allow policymakers to allocate resources more efficiently by targeting interventions toward individuals most likely to persist in criminal or extremist behaviour.

Methodologically, several improvements could strengthen the assessment of recidivism and enhance its policy relevance. Redefining follow-up periods to begin at release rather than conviction would yield a more accurate picture of post-custodial behaviour. Incorporating complementary measures[72]—such as rearrest, new prosecutions, and reincarceration—alongside socio-biographical and dynamic variables (employment, housing, mental health) would also allow for a more refined understanding of risk factors and intervention needs. Harmonising operational definitions of recidivism, for example by excluding traffic offences, would help avoid distortions that may misguide resource allocation or programme design. These developments would pave the way for evaluating the effectiveness of imposed sentences and measures, as well as rehabilitation programmes.

Finally, the observed stabilisation of recidivism rates and the persistent bias affecting recent cohorts underscore the need for extended longitudinal research that integrates individual, relational and contextual dimensions. Such evidence would not only refine theoretical models but also support the development of evidence-based policies aimed at reducing reoffending and enhancing reintegration outcomes, thereby contributing to broader public safety and counterterrorism objectives.

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20 This bias stems from the operational definition of reoffending based on reconviction: when the observation period is short, some reoffences may not yet have resulted in a recorded conviction due to the length of judicial proceedings.

21 In comparison, the previous study (2006-2020) identified 482 individuals, of whom 463 were retained in the final sample after applying exclusion criteria. It is interesting to note that the number of convictions for terrorism has remained relatively high in recent years (i.e., 31 in 2020, 69 in 2021, 57 in 2022, 32 in 2023 and 13 in 2024), even though the trend appears to be slowly declining.

22 Mine et al., "Recidivism Among People Convicted of Terrorism: A Survival Analysis Based on the Belgian Central Criminal Record, Terrorism and Political Violence".

23 Of the 34 individuals excluded due to substantial missing offense date information, only one was reconvicted of a terrorist offense. This individual would nevertheless have been excluded from the analytical sample, as the index conviction was adjudicated *in absentia*.

24 The prevalence of general recidivism is 2.4% (5/208) in the individuals convicted in absentia vs 18.7% (76/407) in our final sample.

25 This variable was used in three versions: as binary variable (i.e., had a prior conviction or not), as a continuous variable (i.e., the number of prior convictions) or as a categorical variable (4 levels: 0,1-4,5-10, +10 convictions).

26 The number of distinct offence categories that led to a conviction prior to the reference offence, with a maximum score of eight.

27 The seven categories were: drugs, property offence without violence, public order, traffic, violent crime, violent property crime and other. The category "sex offence" was not included as a predictor in the model, as it was too rare in the sample (1.7 % of the sample).

28 This refers to the variable *Terrorist group status* in the model.

29 This variable was included to capture potential temporal effects, either reflecting changes in jurisprudence across years or methodological biases introduced by the time required to complete judicial procedures for the reference offence or potential recidivism offence. We tested different specifications (linear term; splines with 3, 4, and 5 knots) and retained the 4-knot spline as providing the best model fit.

30 The rationale for estimating separate series of models was twofold: first, to account for the conceptual and statistical overlap between certain predictors—for example, we did not include both the crime mix index and the binary indicators of offence categories in the same model—and second, to allow flexibility in the mathematical specification of variables, such as testing different codings of prior convictions (e.g., binary, continuous, or categorical).

31 We have categorised the prior offences into eight distinct categories: drugs, other, property without violence, property with violence, public order, sex crime, road traffic, violent crime. The crime mix index corresponds to the number of different categories of offences for which an individual had been convicted before the reference offence. Its value therefore ranges from 0 to 8.

32 Mine et al., "Recidivism Among People Convicted of Terrorism: A Survival Analysis Based on the Belgian Central Criminal Record, Terrorism and Political Violence".

33 Ibid.

34 These traffic offences recorded in the Criminal Record involve criminal prosecution before a court. In other words, they are legally considered as serious and dangerous violations in terms of public safety.

35 This represents five additional cases compared to the first wave of data collection.

36 Custodial sentences vary considerably within the sample: 65.8% of individuals received prison terms of five years or less, 15.0% were sentenced to more than five years, and 19.4% received no custodial sentence. This disparity is likely even greater when considering time actually served, as full or partial suspension is substantially less common among sentences exceeding five years (7%) compared with shorter sentences (69%).

37 The predictors *Prior public order conviction* (p=0.14) and *Convicted for an offence of category 'Other' in the reference judgment* (p=0.09), while improving the predictive power of the model, failed to reach significance, probably due to a lack of power.

38 The model demonstrated good discriminative ability, with a concordance index (C) of 0.796, indicating that approximately 80% of the time, the model correctly ranked individuals in terms of their risk of being reconvicted.

39 To be more precise, these are putative risk and protective factors in the sense that "there is evidence to suggest that they play a role, through correlational data operating in the theorised direction, but for which the evidence does not meet the established criteria for classifying them as risk or causal risk factors." Michael Wolfowicz, Yael Litmanovitz, David Weisburd, and Badi Hasisi, "A field-wide systematic review and meta-analysis of putative risk and protective factors for radicalization outcomes", *Journal of Quantitative Criminology*, 36, (2020): 408. https://doi.org/10.1007/s10940-019-09439-4.

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42 The variable *Country of birth* was used as a binary variable in our analyses, distinguishing those born in Belgium versus those born in a foreign country.
43 Mine et al., "Recidivism Among People Convicted of Terrorism: A Survival Analysis Based on the Belgian Central Criminal Record, Terrorism and Political Violence".
44 Ibid.
45 In our sample, the mean interval between the recidivism offence and its corresponding conviction was 1.6 years (*SD*=1.5). This interval exceeded one year in 63.2% of cases, two years in 22.4%, and three years in 11.9%. No information was available on the additional time required for data entry into the Central Criminal Record.
46 According to a logistic model predicting the probability of being sentenced to prison, as well as linear and partial proportional odds model of sentence length, the year of judgment has no statistically significant effect on sentencing outcome.
47 Based on the estimates from the study of Mine et al. (2025), hazard ratios of approximately 1.4, 2.4, and 5.6 would be expected for individuals with 4, 10, and 20 prior convictions, respectively, compared to those with no prior convictions. The stronger effects observed in the present study likely reflect differences in model specification: here, prior convictions were treated as a categorical variable with four levels, which provided a markedly better fit to the data (AIC = 805.6) than a model using a continuous predictor (AIC = 820.6).
48 Ibid.
49 In our sample, 69% of leaders were sentenced to more than 5 years (90% to more than 3 years). Among group members, 50% received sentences longer than 3 years (11% longer than 5 years). By contrast, fewer than 29% of providers of material assistance were sentenced to more than 3 years.
50 31.8% of individuals with a prior conviction for a violent property offence were sentenced to more than 5 years in prison, compared to 13.1% of individuals without such a conviction.
51 For example, an individual who began his criminal career at age 25 has about 87% higher risk than someone beginning at 21 (calculated as 1.17 × 1.17 × 1.17 × 1.17 = 1.87).
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Appendix

Overall recidivism by length of prison sentence

	No prison	0-1 year	1-3 years	3-5 years	5-10 years	10+ years	Unknown[1]
Recidivists	11	7	26	26	4	1	1
Not reconvicted	67	21	67	117	28	28	3
Total	78	28	93	143	32	29	4
Recidivism rate (%[2])	14.1	25.0	28.0	18.2	12.5	3.4	25.0

Timing of first re-offence (frequency)

Timing[3] since conviction	No prison	0-1 year	1-3 years	3-5 years	5-10 years	10+ years	Unknown
During the first year	3	3	9	9	1	0	0
Between year 1 and 2	3	2	7	3	1	0	0
Between year 2 and 3	2	0	7	4	0	0	0
Between year 3 and 4	3	2	1	5	0	0	0
Between year 4 and 5	0	0	1	3	2	1	1
After 5 years	0	0	1	2	0	0	0

Notes:

1. "Unknown" indicates individuals for whom sentence length could not be retrieved from the judicial record.
2. Percentages represent the proportion of individuals in each sentence-length category who were reconvicted at least once during follow-up.
3. Timing refers to time elapsed since reference conviction, not time since release.

About

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