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RESEARCH REPORT

The Relationship between Length of Incarceration and Recidivism

2017 N° R-389

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The Relationship between Length of Incarceration and Recidivism

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Executive Summary

Key words: *specific deterrence, sentence length, recidivism, re-offending, community supervision, offence severity*

There is considerable debate in the literature regarding the link between sentence length and recidivism. Consistent with a specific deterrence perspective, some research findings support the perspective that longer sentences will deter future re-offending. In contrast, others have found either no link or criminogenic effects, whereby longer sentences result in more re-offending.

Data collected by Correctional Service Canada offer a unique opportunity to systematically explore the relationship between sentence length and recidivism using data from a Canadian federal penitentiary context. This study examined recidivism occurring both before and after warrant expiry. Before warrant expiry, there was a weak relationship between number of months served incarcerated and revoking with an offence, when controlling for age at release, Indigenous ancestry and criminal risk. For each additional month of incarceration, there is a one percent decrease in the risk of revocation with an offence. No relationship was found after warrant expiry. Both before and after warrant expiry, the relationship between time served and recidivism was not moderated by the severity of the offence(s) on the sentence being examined.

In addition to examining the central question about sentence length and recidivism, this study also investigated whether time served is predictive of the severity of re-offences. The findings demonstrated that as length of time incarcerated increased, so too did the severity of post-warrant expiry re-offences. In contrast to the post-warrant expiry results, there was not a significant relationship between time served and severity of the re-offence that occur before warrant expiry. These results suggest that the influence of time served on the severity of re-offences depends on whether the offender is under supervision. Behaviours post-warrant expiry are not scrutinized by a parole officer or others involved in offenders' supervision. As such, offenders' behaviours following warrant expiry seem to reflect their unencumbered likelihood of engaging in criminal behaviour. This suggests that community supervision mitigates the criminogenic effects of time served incarcerated and dissuades more severe forms of re-offending.

Analysis of the aforementioned relationships also revealed unexpected findings pertaining to Indigenous ancestry. Whereas Indigenous offenders tended to have higher rates of returning to custody (with or without an offence), our results suggest that the severity of the offences leading to these returns were lower for Indigenous offenders than non-Indigenous offenders, particularly in the pre-warrant expiry period. Possible explanations for this finding include different case management strategies applied based on Indigenous ancestry, Indigenous offenders re-offending in ways that are carry more certainty of re-incarceration (despite their lower severity) and less opportunity for engaging in severe re-offending for Indigenous offenders due to their shorter supervision periods. Future research is needed to explore these findings.

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Introduction

The impact of imprisonment is a topic of great debate. Central to this debate is the question of whether incarceration has a *specific deterrence* effect or a *criminogenic* effect. From the specific deterrence perspective, it is argued that the experience of incarceration should deter an offender from engaging in future criminal behaviour because the severity of the punishment will offset the perceived benefit of engaging in criminal behaviour. This is a cost-benefit perspective that assumes individuals will make rational decisions in order to avoid incarceration (Becker, 1968; Cook, 1980), the harshest form of deterrence found in most Western societies (Lab, 2007). Hence, proponents of this perspective argue that as the harshness of incarceration conditions increase the perception that the benefits of criminal behaviour will outweigh the discomfort of incarceration decrease (Lynch, 1999; Nagin, 1998).

Conversely, it has been argued that incarceration has a criminogenic effect rather than a deterrent effect. From the criminogenic effect perspective, incarceration exposes individuals to a broad range of negative influences, isolates them from positive social networks, and creates associations among prisoners based on their shared experiences and commonalities (Petersilia, 2003; Travis, 2005). Additionally, there is a negative stigma associated with having been incarcerated that is experienced by offenders upon release, which makes it difficult for them to procure work and develop meaningful relationships, aspects that are important to successful reintegration (Sampson & Laub, 1993; Gendreau, Goggin, & Cullen, 1999; Petersilia, 2003; Travis, 2005). Thus, spending time in prison, particularly for lengthy periods of time, is expected to increase the likelihood of re-engaging in criminal activities.

The existing literature on the impact of imprisonment has largely focused on the harshness of conditions within the incarcerating facility, the use of a custodial sentence as opposed to a non-custodial sentence, and sentence length. The central focus of the present study is to better understand the relationship between sentence length and post-release recidivism.

Does Sentence Length Influence Recidivism?

In recent years, there has been an increase in the use of deterrent approaches to prevent criminal behaviour and recidivism. Within Canada, under the Corrections and Conditional Release Act (CCRA, 1992), this trend has taken the form of increases to mandatory minimum sentences and lengthier maximum penalties (Gabor & Crutcher, 2002) as well as a reduction in

credits allotted to pre-sentence custody and restrictions on the use of conditional sentences (Healy, 2013; Pomerance, 2013). Similarly, recent changes to the Youth Criminal Justice Act include a specific deterrent-based rationale for sentencing: “to hold a young person accountable for an offence through the imposition of just sanctions that have meaningful consequence for the young person” (p.37; Youth Criminal Justice Act, 2002; see also Doob, Webster & Garner, 2014).

Despite these substantial changes, there has been relatively little research examining the relationship between sentence length and recidivism with a Canadian offender population. What little research exists tends to focus on specific groups of offenders. For example, Nunes, Firestone, Wexler, Jensen and Bradford (2007) examined a sample of sex offenders in Canada with sentence lengths varying between one month and 120 months¹ and found that sexual recidivism was not significantly related to length of incarceration. Weinrath and Gartrell (2001) found deterrent effects of longer sentences on preventing repeated drunk driving offences among Canadian offenders in provincial custody. However, they suggest that sentences longer than six months are not effective at deterring repeat drunk driving. Therefore, Weinrath and Gartrell’s findings have less applicability within a federal corrections context, which only applies to sentences that are two years in length or longer.

Within Correctional Services Canada (CSC), Johnson and Grant (2000) compared release outcomes across offender groups who had varying sentence lengths. They found that fewer offenders who had served an indeterminate sentence were convicted of a new offence within a seven-year follow up period than those who had served a determinate sentence. In addition, offenders who had served shorter determinate sentences (i.e., sentences of less than ten years) were more likely to reoffend within the first 12 months (20%) and two years (30%) after release than offenders with long-term determinate sentences (i.e., sentences ten years or more; 10% and 5%, respectively). These findings may provide some support for the argument that incarceration has a specific deterrence effect on offenders. However, as this research was not designed to test the impact of sentence length on recidivism, it did not have the proper design or controls to empirically conclude that longer sentences deter recidivism.

Meta-analytic reviews concerning the link between sentence length and recidivism have

¹ Hence, this sample would be comprised of sex offenders who have been incarcerated in either/both Canadian provincial or federal institutions.

produced varied results. Gendreau and colleagues (1999) concluded that incarceration does not reduce recidivism. In fact, they found that offenders who spent more time in prison had higher rates of recidivism after release than offenders who spent less time in prison. These findings were replicated in another meta-analysis that focused on the effects prison and community sanctions have on juveniles, females, and minority groups (Smith, Goggin, & Gendreau, 2002). Further, no differences were found between these subgroups in terms of the effect of sanctions on recidivism.

Conversely, Jonson (2010) found that sentence length was, in fact, associated with a deterrent effect in her meta-analysis. Specifically, serving longer sentences was associated with a 5% decrease in recidivism. However, she cautioned that this slight decrease may not be substantial enough in a cost-benefit analysis to support the costs of lengthy imprisonment. It was also concluded from a later ballot box review² that there is no specific deterrence effect or criminogenic effect associated with serving a longer sentence (Nagin, Cullen, & Jonson, 2009). Given the inconsistent findings in the meta-analytic research literature, it remains unclear whether longer prison sentences produce a specific deterrence effect, whereby recidivism is decreased, or a criminogenic effect, whereby recidivism is increased.

Research conducted since the aforementioned meta-analyses continue to produce mixed results. Opposing the deterrence perspective, some researchers have found that incarceration does not have a specific deterrence effect (Freiburger & Iannachione, 2011). Others have concluded that any specific deterrence effect of lengthy prison sentences are limited and may only exist when offenders are incarcerated past a certain length of time (Meade, Steiner, Makarios, & Travis, 2012) or during the year immediately following release (Abrams, 2010). Bay, Liem, and Nieuwbeerta (2012) concluded from their findings that, not only does prison lack a specific deterrence effect, but being imprisoned for a longer period of time actually increases the likelihood of recidivism.

In contrast to the above, research evidence exists that supports the specific deterrence hypothesis. For example, consistent with the findings of Johnson and Grant (2000), Pizarro, Zgoba, and Haugebrook, (2014) found that offenders who served a shorter sentence took less

² Ballot box reviews, also known as vote counting, consist of counting the proportion of positive significant results compared to the proportion expected under the null hypothesis using a binomial or chi-square test statistic (Hunter & Schmidt, 2004).

time to recidivate upon release compared to those who served a longer sentence. Similarly, Pate (2010) found that requiring offenders to serve a minimum of 85% of their sentence before being considered for any type of release reduced their likelihood of recidivism, regardless of time spent in prison. Most recently, Rydberg and Clark (2016) found that being incarcerated for a longer sentence, while positively correlated with a greater speed and likelihood of parole revocations, was also related to a slower occurrence and lower likelihood of gaining a new sentence after release. However, it was noted that incarceration length must be quite long before any potential reductions in recidivism may be achieved (i.e., >48 months). The authors concluded that, in the making of policy, it is important to assess whether minor positive outcomes in the reduction of recidivism outweigh the financial costs associated with longer periods of incarceration (Rydberg & Clark, 2016).

It is also possible that the specific deterrence effect only emerges for those with specific types of offences. For example, Budd and Desmond (2014) found a decreased likelihood of recidivism, but only for specific sub-groups of sex offenders (e.g., child molesters; Budd & Desmond, 2013). The authors further noted that a relationship between sentence length and recidivism also depends on how 'recidivism' is operationalized in research (Budd & Desmond, 2013). That is, whereas no relationship was found between length of sentence and recidivism when recidivism was defined in terms of re-arrests, longer sentence length was found to relate to a higher likelihood of recidivism for the two groups when recidivism was defined in terms of re-convictions.

Methodological Considerations

The use of varying methodologies can explain some of the inconsistency in findings related to the effect of sentence length on recidivism. Maltz (1984) asserts that the study of recidivism is subject to a variety of unique methodological issues that must be accounted for in order to achieve an accurate measure of re-offending. These issues include the type of data used (i.e., self-report vs. official documents), the operational definition of recidivism implemented, the length of follow-up period, and the geographical region studied (e.g., examining in-province re-incarceration and failing to examine out-of-province re-incarceration). Variation in any of these methodologies between studies can lead to drastically different results.

Throughout the literature, various definitions of recidivism have been implemented, creating inconsistency in the domain of recidivism research (Frederique, 2005). Most commonly,

recidivism is defined in terms of re-arrests, revocations, re-convictions, or re-incarceration. Comparisons between these definitions, however, may not be logical given that the level of criminality associated with each is not equivalent. For instance, a re-arrest is far more likely than a re-incarceration. Additionally, even within these categories there is great variation (Maltz, 1984). For example, some researchers may consider engaging in any criminal behavior upon release to be recidivism. Others, only consider an offender to be a recidivist if, upon release, (s)he returned to the same type of criminal behaviour (s)he was previously incarcerated for because, otherwise, that offender has ceased the original harmful behaviour. These types of variations between studies can lead to conclusions that starkly contrast each other (Maltz, 1984).

The mixed results that have emerged from the literature may also relate to the differences in the length of follow-up periods implemented among studies (e.g., Gottfredson, Gottfredson, & Garofalo, 1977; Holland, Pointon, & Ross, 2007; Langan, Schmitt, & Durose, 2003). As would be expected, for example, a researcher who follows offenders post-release for a full year, as opposed to six months, will report higher recidivism rates (Jonson, 2010). Additionally, follow-up periods have been computed from differing time points across different studies of recidivism. For example, in some studies, follow-up has been calculated beginning at release from prison and in others beginning at release from parole (Maltz, 1984).

Differences related to the use of control variables can also impact the results found across studies of recidivism. For instance, variables such as criminal history (Beck & Shipley, 1989; Gendreau, Little, & Goggin, 1996; Langan & Levin, 2002; Loeber & LeBlanc, 1990; Nagin et al., 2009, Nagin & Paternoster, 1991), type of offence (Beck & Shipley, 1989; Councell, 2003; Langan & Levin, 2002; Nagin et al., 2009; Sabol, Adams, Parthasarathy, & Yuan, 2000), gender, race, age (Beck & Shipley, 1989; Cannon & Wilson, 2005; Councell, 2003; Gendreau et al., 1996; Langan & Levin, 2002; Nagin et al., 2009), and various other criminogenic needs (Jonson, 2010) have all been found to relate differently to rates of recidivism. However, not all studies of recidivism consider the influence of these variables, which leads to an ‘apples and oranges’ problem. That is, different research studies that have used differing variables as controls are compared as if they had all used the same methodology (Lipsey & Wilson, 2001). This limits the extent to which researchers and policy makers are able to draw meaningful comparisons between studies (Maltz, 1984).

Despite the fact that methodological variations can explain why there may be such

variation in findings across the research, it is important to acknowledge the possibility that sentence length may not be a robust predictor of recidivism. That is, even when it does emerge as being statistically significant, its substantive importance is still small. Therefore, this creates a volatility in the findings that are not replicable or subject to change based on research design. A robust effect, on the other hand, would demonstrate greater consistency regardless of minor variations in research design.

Present Study

The present study aims to examine the relationship between sentence length and recidivism using data from a Canadian federal penitentiary context. The data collected by Correctional Service Canada offer a unique opportunity to systematically explore this question at a national level. In addition to examining this central question about sentence length and recidivism, this study will also investigate how sentence severity interplays with time incarcerated from a couple of different perspectives.

First, the moderating effects of severity of the index sentence³ on the relationship between sentence length and recidivism will be considered. Offenders are incarcerated for a vast range of offences, described in the CCRA. It is possible that the relationship between the length of time served and recidivism depends on the severity of the offences that led to the incarceration. Most commonly, offence severity is considered by examining the specific deterrence effect of incarceration length within specific offence types. For example, Green and Winik (2010) focused on the link between severity of punishment and subsequent criminal behaviour among those with drug-related charges. Langan, Schmitt and Durose (2003) examined recidivism rates for sex offenders by length of time served in prison. Gottfredson, Gottfredson and Garofalo (1977) examined the link between sentence length and parole success⁴ among various sub-groups of offenders with varying risk of parole failure. In a similar vein, the current study aims to consider whether the severity of the crime(s) committed by the offender might interact with sentence length in the prediction of recidivism. Rather than limit explorations to a specific offence type, the current study will consider offenders' convictions via

³ In this case, "index sentence" refers to the sentence the offender was serving for which he or she was first released between April 1, 2009 and March 31, 2011.

⁴ Parole success is defined as not being returned to prison for a technical violation of parole or a new major conviction.

a severity measure. This allows us to acknowledge that the relationship between sentence length and recidivism may depend on the reason for the incarceration while also considering that many offenders have committed multiple offences leading to their incarceration, each offence carrying its own level of severity.

Second, severity of the re-offence will be examined. Most of the specific deterrence literature focuses on whether some form of recidivism occurs or not. Examining re-offence severity progresses the question from whether or not re-offending occurred to how time served impacts the severity of the re-offence. Separate from this, we would propose that re-offending behaviours are not all created equal and that looking at the severity of convictions provides important information about the link between sentence length and recidivism.

To this point, research that more closely examines the nature of re-offence behaviours tends to consider the type of re-offence and whether it was violent or sexual (e.g., Budd & Desmond, 2014; Nunes et al, 2007). There has been relatively little research on how length of time incarcerated influences the severity of re-offences. Freiburger and Iannocchione (2011) found that length of incarceration was not predictive of recidivism severity. However, these authors defined recidivism severity based on the severity of the punishment (i.e., 1= not convicted of a new offence; 2 = convicted of new offence; 3 = convicted on new offence and sentenced to jail; and 4 = convicted of new offence and sentence to prison) rather than targeting the re-offence itself. The current research will examine the linkage between time served and the severity of convicted re-offence(s).

Method

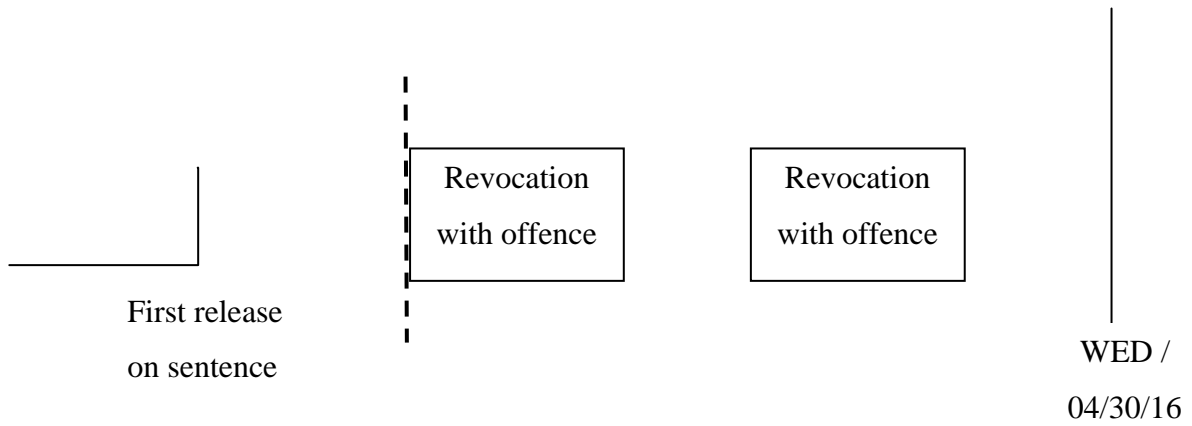
Participants

The initial sample included 9,189 federal offenders who were released from federal institutions on the first term of their sentence between April 1, 2009 and March 31, 2011. This time period was selected in order to obtain a sufficient sample size and follow-up time (in the community and after warrant expiry). Of the total sample, 285 offenders were excluded for a number of reasons, including but not limited to: long term supervision order; unavailability for meaningful follow-up (e.g., deported at release); not admitted into a federal institution.

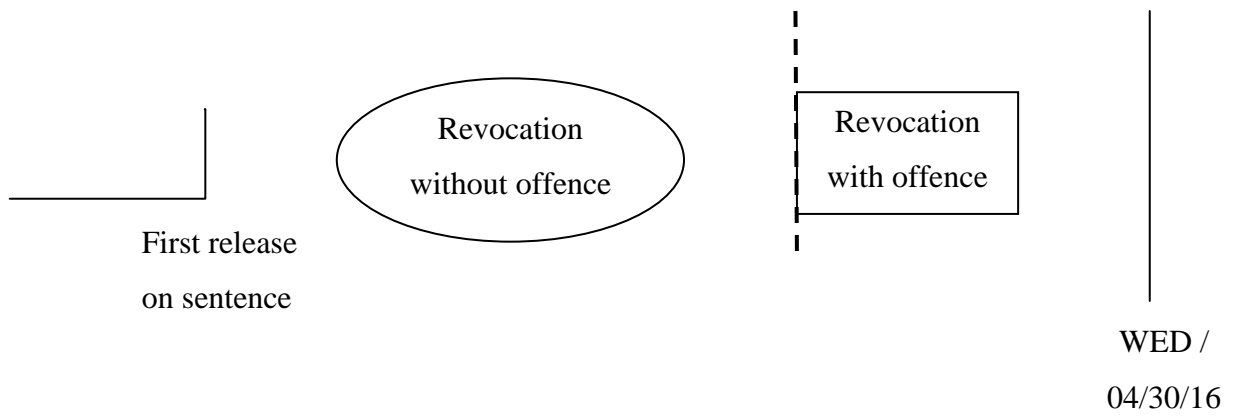
Of the 8,904 offender remaining after initial exclusions, 3,793 offenders returned to custody at least once before their warrants expired. However, 591 of these offenders had their parole revoked due to events that occurred prior to their release, such as being sentenced on an outstanding charge. Therefore, they were excluded. An additional 73 offenders were excluded because they were revoked with an offence that was either quashed or began between their admission date and their first release from incarceration. Hence, this re-offence would not be indicative of the influence of time served on subsequent recidivism. This resulted in 3,128 unique offenders with returns before WED and 5,111 unique offenders who completed community supervision or reached the study end date (April 30, 2016) without a return to custody. In total, there were four patterns of release outcomes (Figure 1).

Figure 1. Patterns of Release Outcomes

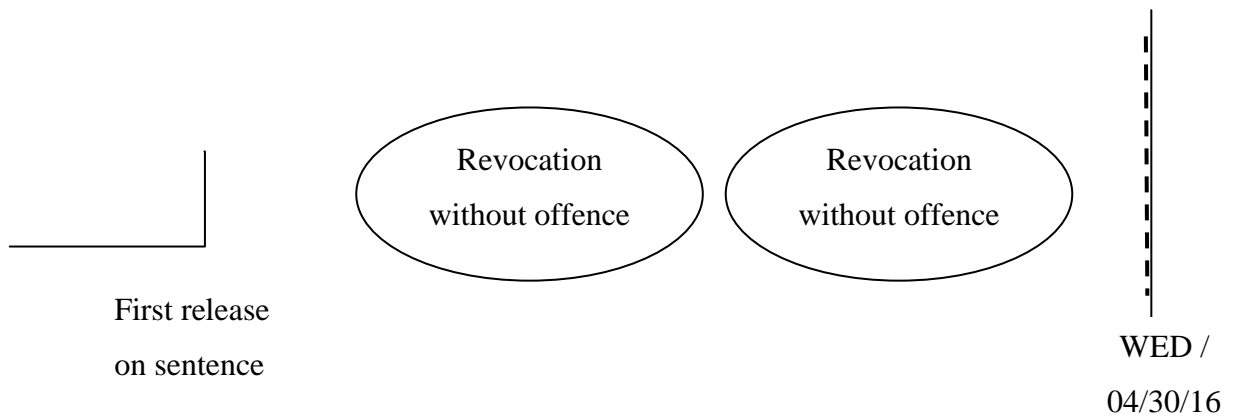
1. Revocation with offence on first return to custody (n = 581)



2. Revocation with an offence following a revocation without an offence (n = 94)



3. All returns were due to revocations without offences (n = 2,453)



4. Parole was not revoked before the warrant expiry or the end of the study period, April 30, 2016 (n = 5,111).



Note: the dashed vertical line represents the end follow-up date. This is the minimum of the date of the first revocation with an offence, the warrant expiry date or the study closure date (April 30, 2016).

Hence, of the 8,239 offenders in our sample, 675 (approximately 8%) had a revocation with an offence. Similarly, 588 offenders (approximately 7%) returned to custody with a new warrant of committal within two years following warrant expiry. The sample included 7,701 men offenders and 538 women offenders; 6,730 were non-Indigenous and 1,509 were Indigenous.

Analytic Approach

As highlighted earlier, the definition of recidivism applied can vary across studies and may impact the likelihood of finding a relationship between sentence length and recidivism. Within CSC, the primary measure of recidivism considers any re-admission to federal custody within a five year follow-up time period after expiry of the warrant of committal. A secondary measure that is also commonly examined is any return (or re-admission) to custody while under supervision in the community that occurs prior to the end of the offender's sentence. Prior to warrant expiry, most offenders will receive conditional or statutory release and spend time under supervision in the community. This time is designed to provide gradual reintegration back into the community following incarceration. However, offenders can have their conditional or statutory release revoked due to a violation of their parole conditions or having committed a new offence. These violations can result in revocations with or without an offence. Given that part of theory behind specific deterrence is that the length of time incarcerated should reduce the

likelihood of re-offending, considering revocations *with* an offence is an important element to assess.

The period following warrant expiry, for those without an indeterminate sentence, was also considered. Juxtaposing results from before and after warrant expiry is particularly important because it provides a longer term view of re-offending. Further, it acknowledges that the process of gradual release offered via community supervision can influence the likelihood of re-engaging in criminal behaviour. That is, for some offenders, their avoidance of criminal behaviour while under supervision may reflect their opportunity to re-offend rather than a deterrent effect of incarceration. For these reasons, new warrants of committals were also examined if they occurred within two years of warrant expiry for the index sentence. A two year follow-up period was selected to ensure that the release cohort being examined was relatively recent in order to minimize the impact of policy changes on obtained results.

A combination of correlational, descriptive and regression analyses were used to explore to the relevance of time served in federal custody in predicting recidivism. Specifically, Cox regression analyses focused on time to revocation with an offence, in the case of pre-warrant expiry date (WED) analyses, and time to a new warrant of committal, in the case of post-WED analyses. The main results reported here are hazard ratios, which represent the predicted change in the hazard (e.g., hazard of recidivating) for a unit increase in the predictor (e.g., month of incarceration).

During the pre-warrant expiry period, it was necessary to account for time unavailable to re-offend due to revocations without offences. This was particularly important for scenarios two and three, depicted earlier (Figure 1). In both of these scenarios, the time available to re-offend was “interrupted” by a return to custody. Therefore, this time had to be accounted for and deducted from the time available to re-offend. As well, only those with at least 30 days of time available to re-offend were included in a survival analysis. The implications this had on the sample size differed for the pre- and post-WED analyses and are reflected in the sample sizes (n) reported in the tables provided in the Results section.

Multiple regression analyses examined linkages between time served and the severity of re-offences during the pre- and post-warrant expiry periods. The main results reported here are beta coefficients, a standardized representation of the relative strength of model predictors. Given that analyses entailed the testing of several Cox and multiple regression models, offenders

who were missing data on main variables were excluded from analysis ($n_{\text{excluded}} = 965$). This was done to ensure that findings across models were not influenced by the presence of different subsamples. Note that offenders with indeterminate sentences ($n = 100$) would be part of the 965 offenders excluded from all analyses because they would not have data pertaining to the post-warrant expiry period.

Material

Data were gathered from the Offender Management System (OMS), an electronic administrative and operational database used to maintain all offender records from sentence commencement to sentence end. Recognizing that age, Indigenous ancestry and risk can have an important influence on recidivism, these variables were included as control variables throughout the analyses.

Age. This variable indicates the age of offenders at the time of their first release on the sentence.

Indigenous ancestry. This variable dichotomized offenders into those who had self-identified as with or without Indigenous ancestry.

Risk. Risk was assessed based on a modified use of the Criminal Risk Index (CRI), a measure that is based on the Criminal History Record (CHR) portion of the Static Factor Assessment (SFA). In past research, the CHR has demonstrated strong associations with measures of recidivism (Helmus & Forrester, 2014). As well, CRI groupings demonstrated moderate to high predictive accuracy of re-offence rates in a three-year follow-up period (unpublished presentation, 2015) and showed convergent validity with the Statistical Information on Recidivism - Revised 1 and Custody Rating Scale (Helmus & Forrester, 2014).

In the current study, the offences committed in the current sentence were used to develop an offence severity measure, described below. Severity of the current offence was hypothesized to moderate the relationships explored. Therefore, it had to be excluded from the CRI. For this reason, a modified CRI was used, based only on previous youth court offences and previous adult court offences. Further, only the total CRI score was used rather than the CRI groupings because cut-off values for groupings were no longer relevant after excluding current offence items.

Time served. In Canada, offenders are admitted to federal prison when they are sentenced to two

or more years or incarceration.⁵ Generally, the length of time served (during the first term of incarceration) will vary depending on sentence length and the type of release granted to the offender. In the current study, time served (also referred to as months incarcerated) is represented as the length of time served during the first term of the sentence under consideration (i.e., number of months between the date of admission and date of release on the first term of the sentence).

Offence severity. Offence severity was calculated for all three time periods under examination: (1) offences leading to the original (index) sentence being examined, (2) offences committed that resulted in a revocation with an offence⁶ and (3) offences committed resulting in a new warrant of committal (i.e., first new warrant of committal following warrant expiry).

The severity of the offence was calculated based on the Police-Reported Crime Severity Index (PRCSI), a tool developed by Statistics Canada that assigns a weight to police-reported crimes based on its seriousness; more serious crimes carry a higher weight than less serious crimes (Statistics Canada, 2009). The weights are based on the sentences handed down by the provincial and territorial courts. Each weight is determined based on the proportion of people convicted of the offence who are sentenced to time in prison and the mean length of the prison sentence for the specific type of offence. As such, time served and offence severity will not be independent of each other.

The PRCSI associates assigned weights with Uniform Crime Report (UCR) Violations codes. UCR Violation codes can be linked to almost every current and past offence identified in the Criminal Code of Canada (1985). Given that most warrant of committals and revocations with offence are linked to a number of offences, offence severity was calculated by considering both the sum of the PRCSI weights for all convicted offences as well as the value of the largest weighted offence. Findings pertaining to both of these offence severity calculations will be presented in the Results section.

⁵ There are some exceptions to this (e.g., provincial inmates admitted to federal prison). However, offenders with these exceptional circumstances were not included in the current study.

⁶ Note that only the first revocation with an offence was included in this study.

Results

A number of questions pertaining to time served and offence severity were explored. The results pertaining to these various questions will be presented in sequence.

Is there a relationship between length of time incarcerated and recidivism?

Predictive modeling approaches were used to explore the interrelations between the main predictor (length of time served in months), moderators (most severe index offence and sum of severity of index offence(s)), covariates (age at first release on sentence, risk, Indigenous ancestry) and dichotomous outcomes before (revocation with offence) and after (new warrant of committal) warrant expiry. A correlation matrix of these variables is provided in Table 1. The bivariate results offer some interesting initial insights into the main variables being examined. The main result to note here is that there is not a significant bivariate relationship between time served and either measure of recidivism before or after warrant expiry. As well, as noted previously, length of the prison sentence is a factor in determining offence severity. Therefore, it is not surprising that their correlation coefficients are relatively high.

Table 1

Bivariate Correlations between Predictors, Moderators, Covariates and Dichotomous Outcomes

Variables	1	2	3	4	5	6	7	8
1. Time served (months)	1							
2. Most severe index offence	0.58***	1						
3. Sum of severity of index offence(s)	0.39***	0.48***	1					
4. Age at first release on sentence	0.12***	0.04***	0.04*	1				
5. Risk	0.08***	-0.12***	-0.02	-0.15**	1			
6. Indigenous ancestry ^a	0.05***	0.02	-0.07***	-0.11***	0.21***	1		
7. Revocation with offence ^b	-0.02	-0.02*	0.01	-0.11***	0.20***	0.09***	1	
8. New warrant of committal ^c	0.00	-0.04*	0.01	-0.06***	0.19***	0.05***	0.07***	1

n = 7275 * $p < .05$ (2-tailed) *** $p < .0001$ (2-tailed)

^a 0 = non- Indigenous, 1 = Indigenous

^b 0 = no revocation with offence, 1 = revocation with offence

^c 0 = no new warrant of committal, 1 = new warrant of committal

As a next step, a Cox regression was conducted to determine whether time served incarcerated was predictive of recidivism after controlling for age at first release on sentence, risk and Indigenous ancestry. As demonstrated in Table 2, the number of months incarcerated is significantly predictive of revocations with an offence.⁷ The parameter estimates are negative, which indicates that longer amounts of time served are predictive of lower levels of recidivism. As demonstrated by the hazard ratios, this is a weak effect (for every additional month of incarceration, there is a 1% decrease in the risk of revocation with an offence), which is corroborated by the non-significant bivariate correlations, presented earlier. This suggests that the association between time served and recidivism only emerges when the covariates are included in the regression and absorb the residual variability in the outcome variable or act as suppressor variables. In the post-warrant expiry period, time incarcerated it is not significantly predictive of new warrants of committal when controlling for age, risk and Indigenous ancestry (Table 2).⁸

Based on the results presented in Table 2, we also see that the control variables, age at release, risk and Indigenous Ancestry are relevant to the prediction of recidivism, but more so in the pre-warrant expiry period. These results show that offenders who are older at release are less likely to recidivate; offenders with greater risk are more likely to recidivate; and Indigenous offenders are more likely to have a revocation with an offence than non-Indigenous offenders.

⁷ This model does not violate the proportional hazards assumption.

⁸ This model does not violate the proportional hazards assumption.

Table 2

Association between Controls and Predictor Variables (Hazard Ratios) with Pre- and Post-Warrant Expiry Recidivism using Cox Regression

Variable	Pre-Warrant Expiry	Post-Warrant Expiry
Age at release	0.97***	0.99*
Risk	1.12***	1.09***
Indigenous ancestry	1.64***	1.07
Months incarcerated	0.99***	1.0
<i>Model fit statistics</i>		
Wald χ^2 (df)	499.90 (4)***	247.62 (4) ***
Total N	6911	7041
N of Events	578	552

* $p < .05$ *** $p < .0001$, df = degrees of freedom, N = sample size

Does the relationship between length of time incarcerated and recidivism depend on the severity of the index offence?

Given the range of offences committed by federal offenders, it is possible that the relationship between time incarcerated and recidivism varies depending on the severity of the index offence. Cox regression analyses with severity and length of time incarcerated, entered as an interaction term, were conducted to explore possible moderating effects of the index offence severity. The severity of the index offence was not a significant moderator of revocations with an offence or new warrants of committal. This holds true when using both the most serious offence (Table 3) and the sum of the offence severity scores as a moderator (Table 4).

Table 3

*Moderating Effects of Most Serious Index Offence Severity Pre- and Post- Warrant Expiry
Recidivism using Cox Regression*

Variable	Pre-Warrant Expiry	Post-Warrant Expiry
Age at release	0.97***	0.99*
Risk	1.12***	1.09***
Indigenous ancestry	1.65***	1.08
Months incarcerated	0.99*	0.99
Severity (Most Serious Offence)	1.00	1.0
Months X Severity	1.00	1.0
<i>Model fit statistics</i>		
Wald χ^2 (df)	498.69 (6)***	249.33 (6) ***
Total N	6911	7041
N of Events	578	552

* $p < .05$ *** $p < .0001$, df = degrees of freedom, N = sample size

Table 4

Moderating Effects of Sum of Index Offence Severity Pre- and Post- Warrant Expiry Recidivism using Cox Regression

Variable	Pre-Warrant Expiry	Post-Warrant Expiry
Age at release	0.97***	0.99*
Risk	1.12***	1.09***
Indigenous ancestry	1.65***	1.09
Months incarcerated	0.99*	1.00
Severity (Sum of Offence(s))	1.00	1.00*
Months X Severity	1.0	1.00
<i>Model fit statistics</i>		
Wald χ^2 (df)	499.87 (6)***	252.66 (6) ***
Total N	6911	7041
N of Events	578	552

* $p < .05$ *** $p < .0001$, df = degrees of freedom, N = sample size

Among those who recidivate, does the length of time served predict the severity of their re-offences?

Multiple regression analyses were conducted using the two subsets of offenders who re-offended before or after warrant expiry.⁹ Rather than focus on whether re-offending occurred, this line of inquiry delves deeper into the severity of the re-offending behaviours. As demonstrated in Tables 5 and 6, the number of months incarcerated was not predictive of the severity of pre-warrant expiry re-offences, both from the perspective of the most severe re-offence or the sum of the severity of all of the re-offences. In contrast, number of months incarcerated was a significant predictor of post-warrant expiry re-offence severity, for both

⁹ Note that only those re-offence events considered in earlier analyses ($N_{\text{pre-warrant expiry}} = 578$, $N_{\text{post-warrant expiry}} = 552$) were included in these analyses.

severity measures. The semi-partial η^2 for months incarcerated is 0.07 for the most serious offence severity and 0.03 for the sum of the re-offence severity measure, both indicating a small effect size.

Table 5

Predicting the Most Severe Re-offence Pre- and Post- Warrant Expiry Recidivism using Multiple Regression

Variable	Re-offences Pre-Warrant Expiry			Re-offences Post-Warrant Expiry		
	B	SE B	β	B	SE B	β
Age at release	-0.99	0.80	-0.05	-8.00	3.48	-0.09*
Risk	-0.56	1.23	-0.02	-6.07	5.29	-0.05
Indigenous ancestry	-51.29	16.94	-0.13*	2.83	74.31	0.00
Months incarcerated	-0.69	0.51	-0.06	15.69	2.49	0.26***
R ²	0.02			0.08		
F	3.53*			11.19		

* $p < .05$ *** $p < .0001$

Table 6

Predicting the Sum of the Severity of Re-offence(s) Pre- and Post- Warrant Expiry using Multiple Regression

Variable	Re-offences Pre-Warrant Expiry			Re-offences Post-Warrant Expiry		
	B	SE B	β	B	SE B	β
Age at release	-0.52	1.74	-0.01	-6.07	6.11	-0.04
Risk	1.89	2.66	0.03	10.16	9.31	0.05
Indigenous ancestry	-139.22	36.68	-0.16*	-269.88	130.63	-0.09*
Months incarcerated	-1.20	1.10	-0.05	16.87	4.37	0.16***
R ²	0.03			0.03		
F	4.02*			4.92***		

* $p < .05$ *** $p < .0001$

These results suggest that among offenders that reoffend, those who serve longer sentences are likely to re-offend more severely when they are no longer under federal custody. Further, this relationship does not appear to be related to the offender's risk level, as this control variable was not predictive of re-offence severity. Differences in the severity of the re-offending behaviour are also evident by comparing the average severity scores before and after warrant expiry. Before warrant expiry, the average most serious offence has a severity score of 148.88. In contrast, after warrant expiry, the average most serious offence has a severity score of 455.37. Similar patterns are found when considering the sum of the re-offence severity scores before (Mean = 254.41) and after (Mean = 1059.57) warrant expiry.

One unexpected result emerged in relation to Indigenous ancestry. In three out of four models, Indigenous ancestry is a significant predictor of re-offence severity (see Tables 5 and 6). Examination of the means (Table 7) demonstrates that in the cases where there is a significant regression coefficient, non-Indigenous offenders' re-offences are more severe than Indigenous offenders. Juxtaposed with earlier results of Indigenous offenders having a greater hazard of re-

offending pre-warrant expiry (Table 2), these results suggest that that while Indigenous offenders may be more likely to recidivate, their re-offences are less severe than non-Indigenous offenders.

Table 7

Means and Standard Deviation of Re-offence Severity by Indigenous Ancestry

Ancestry	Re-offences Pre-Warrant Expiry		Re-offences Post-Warrant Expiry	
	Most Serious Re-offence	Sum of Re-offence Severity	Most Serious Re-offence	Sum of Re-offence Severity
	M (SD)	M (SD)	M (SD)	M (SD)
Aboriginal	113.53 (169.72)	159.71 (267.99)	471.81 (871.39)	918.50 (1000.39)
Non-Aboriginal	165.12 (192.82)	296.48 (449.71)	435.60 (750.51)	1111.73 (1454.75)

Note: Pre-warrant expiry: $n_{\text{indigenous}} = 182$, $n_{\text{non-Indigenous}} = 396$

Post-warrant expiry: $n_{\text{Indigenous}} = 149$, $n_{\text{non-Indigenous}} = 403$

Discussion

Past research has shown considerable inconsistency with regards to the relationship between sentence length and recidivism. As discussed earlier, it is possible that variation in methodologies, definitions and control variables used across studies contributed to whether a relationship was found. Indeed, it appears that this variation contributed to inconsistent findings pre- and post-warrant expiry in the current study. Whereas a weak relationship between number of months incarcerated and re-offending was found in the pre-warrant expiry period, none was found post-warrant expiry.

To be fair, the definition of recidivism employed here was at the more stringent end, compared to what is found in much of the research. To be considered a recidivist in the current study, the offender had to be re-incarcerated at the federal level. This definition may have restricted the range of the outcome variable (e.g., excluding recidivism that is less severe or less likely to result in incarceration), which may have limited our ability to find a relationship between time served and recidivism. Further, more severe re-offending often entails a longer trial period, which is less likely to be completed within the identified follow-up period than less severe re-offending. However, if a robust relationship existed between these variables, one would expect that variations in definitions and methodology should not change the main conclusions.

Hence, the results found here are consistent with those found by other researchers, discussed earlier: there are no consistent findings demonstrating a relationship between sentence length and recidivism and where a relationship exists, it is weak. As demonstrated by the hazard ratio, for every additional month of incarceration, there is a one percent decrease in the risk of revocation with an offence. With this in mind, the question becomes whether the costs associated with lengthier incarcerations are worth this small reduction in risk?

Although no a priori hypotheses were put forward, considering the severity of the index sentence was important to this research because of the range of offences for which offenders are incarcerated at the federal level. The assumption here was that the importance of time served in predicting recidivism would depend on the severity of the crime(s) that resulted in the incarceration. We opted to not limit to specific offence types given that even those offenders with a designated offence type can have a range of other offences on the same sentence. Hence,

sub-groups created based on most severe offence type can be quite diverse in their convicted offences. By using a severity measure that considers total severity of all offences on the sentence, we were able to include and account for a broader range of offences (and the number of times the offender was convicted of each offence).

It is interesting to note that the relationship between time served and recidivism did not depend on the severity of the index offence. One possible reason for this is the methodological requirement that all offenders included in the study have data available before and after warrant expiry. This would exclude indeterminate sentences (i.e., some of the most severe offenders incarcerated) from analysis because they do not have a post-warrant expiry period. As a result, this may have restricted the range of the severity score. Of course, it is also possible that offence severity is not important to this relationship or that the measure used was not sensitive enough or appropriate for this purpose. The latter explanation is plausible as the PRCSI was developed with the primary intention of tracking annual changes in the severity of police-report crime (Statistics Canada, 2009). The current use of this measure in the context of modelling recidivism is novel. Further, the length of the prison sentence is a factor in determining offence severity, which would result in some collinearity between these two variables. Therefore, there may be a fair amount of overlap in the variance accounted for by index offence severity and time served when predicting recidivism. That is, it may be that adding index offence severity to the model does not provide much new information because this variable is similar to the time served variable. Therefore, future research should continue to validate its sensitivity in this and other modelling contexts.

Perhaps the most notable results to come from the current study are the findings pertaining to the severity of re-offences for the subgroup of offenders who recidivated before or after warrant expiry. It appears that there may be a criminogenic effect of time incarcerated on the severity of re-offences that occurred following warrant expiry. That is, as length of time incarcerated increased, so too did the severity of post-warrant expiry re-offences.¹⁰ Future research is necessary to determine whether these results are replicable and, if so, whether there are aspects of incarceration that may be related to this criminogenic effect. As well, future

¹⁰ Since these analyses controlled for risk level, this relationship does not appear to be due to offenders with longer incarceration periods having higher risk levels. Further, whereas the CRI is predictive of re-offending, it is not a significant predictor of re-offence severity.

research could explore to what degree the severity of the re-offence reflect similar types of offending (as the index offence) or an escalation in the severity of offending.

In contrast to the post-warrant expiry results, there was not a significant relationship between time served and severity of the re-offence that occurred before warrant expiry. Juxtaposing the pre- and post-warrant expiry findings here is important because they suggest that the influence of time served on the severity of re-offences depends on whether the offender is under supervision. Behaviours post-warrant expiry are not scrutinized by a parole officer or others involved in offenders' supervision. As such, offenders' behaviours following warrant expiry seem to reflect their unencumbered likelihood of engaging in criminal behaviour. In contrast, offenders under supervision have more conditions and restrictions to abide by, which appear to temper the criminogenic effect of incarceration.

These findings are further corroborated by the fact that re-offence severity scores are higher post-warrant expiry than pre-warrant expiry. The average severity score for the pre-warrant expiry period ($M = 148.88$) would be close to the severity score given to an offender whose most serious offence is "identity theft" or "altering/removing/destroying vehicle identification number" (PRCSI score = 144.51). In contrast, the post-warrant expiry average severity score ($M = 455.37$) would be close to the severity score given to an offender whose most serious offence is "obtains or communicates with a person under 18 for purpose of sex" (PRCSI score = 456.18) or "commit offence for criminal organization" (PRCSI score = 459.53).^{11,12}

On the one hand, these findings suggest that community supervision mitigates the criminogenic effects of time served incarcerated and dissuades more severe forms of re-offending. On the other hand, it appears that the mitigating influence of community supervision may not have an enduring effect, at least for the sub-group of offenders who are re-offending following their warrant expiry.

Although secondary to the current examination, the findings obtained when considering Indigenous ancestry as a control variable in the prediction of re-offence severity were unexpected. Past research has demonstrated higher proportions of Indigenous offenders

¹¹ Of course, as an average score, offenders' actual most serious offences will range.

¹² It is also relevant to note here that it is likely that the more severe new warrants of committal are systematically under-represented in the existing data because severe re-offences, such as homicides, take longer to prosecute and would not appear in OMS data prior to completion of the case. Therefore, only those severe offences that occurred relatively soon after warrant expiry would have made it through the court system and appeared in the data.

returning to custody than non-Indigenous offenders (Farrell MacDonald, 2014) and returning with an offence (Thompson, Forrester & Stewart, 2015). This is consistent with our current results pertaining to returns to custody with an offence. However, we were surprised to find that the severity of the offences leading to these returns were significantly lower for Indigenous offenders than non-Indigenous offenders, particularly in the pre-warrant expiry period. There are various possible explanations for this finding, each requiring further research to shed more light on the issue. For example, Indigenous and non-Indigenous offenders may have different parole case management strategies. Potentially, they may experience higher frequency and/or intensity of contact with their parole officers, making their likelihood of being caught offending greater, despite not engaging in highly severe criminal behaviours. Indigenous offenders' rates of technical violations (i.e., revocations without offences) are consistently more than twice that of non-Indigenous offenders (CSC, 2016), which could be suggestive of differences in the intensity and frequency of supervision across cultural groups. However, recent CSC research (Farrell MacDonald, Curno, Biro & Gobeil, 2015) showed minimal differences in the percentage of Indigenous men (81%) and women (80%) having high contact with their parole officers¹³, compared to non-Indigenous men (77%) and women (72%;).

Another possible explanation is that the nature of Indigenous offenders' re-offending may be more susceptible to being charged with further offences. For example, Yessine and Bonta (2009) found that Indigenous offenders with chronic offending experienced higher risks associated with substance abuse, family problems and associating with criminals. Potentially, these risk factors carry a higher likelihood of re-incarceration than other risk factors. Similarly, Farrell MacDonald (2014) found that Indigenous offenders consistently had higher rates of alcohol- and drug-related supervision conditions, a condition that can be more easily tested (e.g., through urinalysis) than other conditions.

A third possible explanation pertains to the opportunity to engage in severe re-offending behaviours. Indigenous offenders with determinate sentences have the shortest supervision periods (Parole Board of Canada, 2016). As such, their opportunity to become involved in more severe re-offending behaviours may be limited. There is some evidence for this possibility in the obtained results (Table 7). Namely, the average severity scores based on the most serious offence are more similar across the cultural groups than the average severity scores based on

¹³ 4-8 times per month

the sum of the severity scores. This suggests that Indigenous offenders did not receive as many re-convictions as non-Indigenous offenders, possibly due to having less time to engage in criminal behaviours while on parole.

Conclusions

The current findings pertaining to the specific deterrence effect of sentence length offer little to contest the state of the literature. Any evidence we found that longer sentences deter recidivism was not robust and susceptible to volatility due to relatively minor methodological and contextual factors. These findings call into question whether the costs associated with lengthier incarceration (e.g., loss of freedom, disruption of family units, financial cost to tax payers) are worth a small and inconsistent reduction in re-offending (see also Jonson, 2010; Rydberg & Clark, 2016).

Perhaps the most interesting results to arise from this research come from the extension of the deterrence literature into an exploration of re-offence severity. This line of inquiry found possible criminogenic effects of time served on re-offence severity, but that a structured release into the community may mitigate these effects. Further, the new information obtained by considering (re)offence severity suggests that going beyond questions about whether recidivism occurs or not and delving more deeply into offence severity may be a fruitful avenue for further research.

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