



# Does crime count? Investigating the association between neighbourhood-level crime and recidivism in high-risk parolees

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## ABSTRACT

The neighbourhood contexts in which former offenders live following their release from prison has been relatively neglected in recidivism studies. Moreover, the relationship between neighbourhood-level crime and parolee recidivism has received little scholarly attention. This oversight is of concern since high-crime neighbourhoods may influence newly-released prisoners' ability to assimilate and reintegrate effectively within society. In this study, we examine whether neighbourhood-level crime across four different categories (dishonesty, violence, property damage, and drugs and anti-social) predicts individual-level short-term recidivism. Using data from 280 high-risk male parolees returning to neighbourhoods throughout New Zealand between 2010 and 2013 we examine whether neighbourhood-level crime is associated with their reconviction. Results showed no significant associations between crime and short-term recidivism after controlling for various potential individual- and neighbourhood-level confounds. We contrast the surprising results of the research with the predominantly US-centric recidivism literature, and identify and discuss possible explanations for our non-significant findings.

## 1. Introduction

Studies of offenders have only recently begun to examine the influence of neighbourhood-level factors, or geography, on recidivism. Using mainly social disorganisation theory as a framework, studies have increasingly found how the central tenets of the theory, namely social deprivation, residential mobility, and ethnic heterogeneity can be used to explain increased risk of recidivism in neighbourhoods (see Hipp, Petersilia, & Turner, 2010; Kubrin & Stewart, 2006; Morenoff, 2011). Fewer studies have examined the role that a criminogenic environment in and of itself may play in parolee recidivism: that is, whether the criminogenic context as indicated by existing rates of crime in the neighbourhoods to which offenders return or relocate on release from prison predicts their risk of short-term recidivism. Some recent prior research has indicated that localised crime opportunities may play a role (see Miller, Caplan, & Ostermann, 2016a; Miller, Caplan, & Ostermann, 2016b) but the relevance of the broader neighbourhood criminogenic context for recidivism has been less considered. The present study examines whether neighbourhood-level crime is associated with recidivism among a cohort of high-risk parolees. The

geographical focus area for this study is New Zealand (population 4.7 million) located in the south-western portion of Australasia, with analysis undertaken using data from 280 high-risk male parolees released into correctional supervision between 2010 and 2013. Uniquely, the study is nationwide and provides a novel international comparison to the plethora of mainly US-based studies investigating spatial patterns and predictors of recidivism.

## 2. Predictors of recidivism

A large number of studies have sought to identify factors that predict an increased likelihood of recidivism. Initial research in this area focussed almost exclusively on identifying individual characteristics of offenders and their offences to determine the correlates of recidivism. Youth, being male, and ethnic minority status have all been identified as significant risk factors for recidivism, after controlling for confounds (Gendreau, Little, & Goggin, 1996; Lipsey & Derzon, 1998; Listwan, Sundt, Holsinger, & Latessa, 2003; Spohn & Holleran, 2002). Other individual-level factors related to education (Bravo, Sierra, & del Valle, 2009), employment (Cuervo & Villanueva, 2015; Makarios, Steiner, &

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Travis III, 2010), and personality/psychological traits (Grana, Garrido, & Gonzalez, 2006; Viljoen, Elkovitch, Scalora, & Ullman, 2009) have also been found to be important. In terms of the latter, Contreras, Molina, and Cano (2011) found that personality factors such as low self-control, and a poor tolerance to frustration were related to higher levels of recidivism, while both Cockram (2005) and Holland and Persson (2011) found that offenders with intellectual disabilities had significantly higher rates of re-arrest and re-incarceration.

Individual-level lifestyle factors, particularly related to past and current substance abuse, have also been found to increase the risk of re-offending. For example, Indig, Frewen, and Moore (2016) found that heavy drinkers were more than three times more likely to be re-incarcerated within 18 months of release, while Håkansson and Berglund (2012) found an increase in the risk of criminal relapse among released offenders using amphetamine and heroin, after controlling for type and severity of crime. Finally, short-term changes in offenders' residential situations or local life circumstances have also been found to be relevant. For example, Meredith, Speir, Johnson, and Hull (2003) found that the likelihood of re-arrest increased 25 percent each time parolees in the US state of Georgia changed addresses, while in Ohio, Steiner, Makarios, and Travis (2015) found that offenders who moved more frequently were more likely to recidivate, but that living situations also mattered; offenders who lived with their spouse, parent, other relative, or in a residential program in the year post-release were less likely to recidivate.

In contrast, far fewer studies have considered neighbourhood characteristics when studying recidivism. This omission is of concern because the social and economic structure of neighbourhoods may affect offenders' ability to assimilate and reintegrate effectively within communities. The reasons for the lack of attention on neighbourhood contexts in recidivism research are myriad, but generally thought to be related to the belief that the risk for reoffending is individually determined (Kubrin & Stewart, 2006), alongside a very extensive body of meta-analytic research establishing the predictive validity of individual factors, especially psychological characteristics (Bonta & Andrews, 2016). Although individual level factors undoubtedly play an important role in recidivism, increasing evidence indicates that individual behaviours—not only criminal—are also, to some extent, determined by social forces within an individuals' wider environment (see Breetzke & Pearson, 2014; Kim & Wang, 2015; Wuerzer & Mason, 2015).

The majority of studies that have investigated the relationship of neighbourhood contextual variables to recidivism have used social disorganisation theory as a framework to understand why recidivism may be higher in areas characterised by high residential mobility, high ethnic heterogeneity, poverty, and low informal social control: the central tenets of the theory (Sampson & Groves, 1989; Shaw & McKay, 1942). Research has most often found that the main propositions of social disorganisation theory increase risk of recidivism. For example, Kubrin and Stewart (2006) found that offenders returning to deprived neighbourhoods were at an increased risk of one-year recidivism after controlling for various individual-level attributes. Their results also suggested that neighbourhoods with large concentrations of affluent families served a critical protective function in reducing recidivism. However, Baglivio, Wolff, Jackowski, and Greenwald (2017) later found for youth that the extent of risk reduction in relationships and alcohol/drugs domains moderates the protective effect of neighbourhood affluence. Other community contextual factors related to social disorganisation theory and their influence on recidivism have been investigated, with results largely supporting the general premises of social disorganisation theory, independent of individual-level risk factors, albeit there are a number of exceptions (see Stahler et al., 2013; Tillyer & Vose, 2011; Wehrman, 2010; Wright & Rodriguez, 2014).

### 3. Crime and recidivism

Although the above research has identified a number of individual

and neighbourhood-level factors that are important in relation to recidivism, very little is known about whether and how crime within neighbourhoods affects re-offending. Parolees released into neighbourhoods with existing high rates of crime may struggle to resist crime opportunities prevalent within these neighbourhoods, which could increase their risk of recidivism. At the individual-level, previous research has mainly focussed on an offender's past criminal behaviour (e.g., number of past offences; Mulder, Brand, Bullens, & van Marle, 2012); severity and type of crime (Iborra, Rodriguez, Serrano, & Martinez, 2011); length of criminal career (Mbuba & Grenier, 2008) and how these factors impact on recidivism. From a neighbourhood perspective, researchers have most often examined the effect that returning parolees have on neighbourhood crime (Hipp & Yates, 2009; Raphael & Stoll, 2004), or examined how neighbourhood mass re-entry of parolees influences individual reoffending (Chamberlain & Wallace, 2016; Stahler et al., 2013). We are aware of only two studies that have specifically examined how local crime opportunities may influence parolee recidivism. The first is by Miller et al. (2016a) who examined whether potentially criminogenic places such as bars, liquor stores, restaurants, public transport hubs located within a 1240-foot radius of parolees' residences predicted their rearrest or revocation. The researchers found little evidence that these factors increased the risk of failure. Using similar methods, the same authors found few significant associations between local crime hotspots (again within 1200 feet of an offender's residence) and parolee recidivism (see Miller et al., 2016b). In both instances, the researchers questioned whether their measures of crime opportunities were entirely valid and advocated for broader criminogenic risk factors outside the immediate home environment of offenders to be considered in future recidivism research.

### 4. The current study

Within the social disorganisation framework, the current study examines whether neighbourhood-level crime predicts recidivism. We use multi-level logistic regression models to examine whether each of four different types of neighbourhood-level crime (dishonesty, violence, property damage, and drugs and anti-social) increases the likelihood of one-year recidivism among a cohort of 280 released high-risk male parolees in New Zealand. Our hypothesis is that offenders released into neighbourhoods with existing high rates of crime will be more likely to recidivate in the year after release than those in neighbourhoods with lower crime rates, after controlling for other individual- and neighbourhood-level risk factors. Importantly, we are not concerned with understanding *why* neighbourhoods have existing high or low rates of crime—this could be the result of a plethora of factors exhaustively outlined in the environmental criminological literature—the focus here is on examining their relationship to parolee recidivism.

### 5. Material and methods

#### 5.1. Offender data

Data for 280 high-risk parolees were obtained as part of a larger project of independent research conducted with the New Zealand Department of Corrections (see Polaschek, Yesberg, Bell, Casey, & Dickson, 2016). Parolees were defined as high-risk using a static actuarial tool (see Bakker, Riley, & O'Malley, 1999); the sample mean score on this instrument was 0.74 ( $SD = 0.11$ ), which translates to a probability of 74% of returning to prison for a new conviction within the five years following release. Each sample member was released on parole at some point between 1 July 2010 and 30 June 2013 after one or more appearances to an independent parole board. All of the offenders were originally sentenced to two or more years in prison, which under New Zealand law means that those who are released after serving their entire imprisonment sentence have a further six months oversight with a probation officer upon release and other parole conditions to

complete. Those released before sentence end have the remainder of the given sentence on parole supervision plus the additional six months. The sample was a mix of men released at the end of their prison sentence, and those who were released at some point before the end but after parole eligibility (completion of one-third of the time to serve). The addresses to which the 280 parolees returned after their incarceration were recorded by the Department of Corrections and geocoded and matched with a census areal unit (CAU). A CAU is the second smallest unit of dissemination of census data in New Zealand and usefully approximates a neighbourhood, with each CAU normally containing a population of between 3000 and 5000. The 280 offenders resided in 220 distinct CAUs throughout New Zealand. Other individual-level data pertaining to the 280 released offenders such as age, ethnicity, the number of days served in prison, the number of parole conditions, among others, were also obtained from the New Zealand Department of Corrections or from the offenders themselves, when they were recruited to the study, just prior to release from prison.

## 5.2. Crime data

The data used to measure neighbourhood-level crime in New Zealand were obtained from New Zealand Police's national crime database (National Intelligence Application (NIA)). The vast majority (86% in the study period) of offences recorded in NIA fall into the four broad crime types used in this study: dishonesty, violence, property damage, and drugs and anti-social. Dishonesty (49% of all offences in the study period) include crimes such as burglary, theft and receiving stolen property; violence (14% of all offences) include crimes such as homicide, assault, kidnapping, threats, and harassment; property damage (13% of all offences) include arson, and intentional and wilful damage; while drugs and anti-social (10% of all offences) include crimes such as possession, sale and manufacturing of illegal drugs and low-level disorder offences. Whilst broad groupings of crimes may differ internationally, the constituent crimes appear comparable across jurisdictions (e.g. [Federal Bureau of Investigation, 2013](#); [Home Office, 2017](#); [New Zealand Parliament, 2000](#)). Other crimes (14% collectively) such as sexual offences, fraud, and administrative and miscellaneous offences were excluded due to low frequency. The information obtained included the location (x, y coordinate) and date for each crime incident for the years 2009–2010 for the whole country. A total of 153,417 incidents of crime in these four categories were recorded as occurring in New Zealand over this two-year period in the 220 neighbourhoods to which the released parolees returned ( $M$  per neighbourhood per year = 87.17;  $SD$  per neighbourhood per year = 114.61). Data used in the construction of other neighbourhood variables were obtained from Statistics New Zealand's census of 2013.

## 5.3. Dependent variable

Recidivism is a complex and multi-faceted term that can be measured in a number of ways. The focus of this study is on recidivism among men released from prison on parole. Our dependent variable measured whether an offender was re-incarcerated for an offence or parole violation committed within a year of being released (1) or not (0). A total of 113 offenders ( $n = 41\%$ ) were resentenced to prison within a year of release. Reimprisonment was for new offending in most cases, but for six offenders (2% of the sample) it was solely for a breach of their parole conditions, including technical violations such as the refusal to participate in community-based treatment, changing residences without permission or losing employment due to poor behaviour.<sup>1</sup>

<sup>1</sup> During the period in which this research was conducted, probation officers' decisions to request that charges be laid for parole violations were discretionary, and usually only proceeded if there were other indicators that the

## 5.4. Independent variables

Crime rates in neighbourhoods prior to the release of the cohort of offenders were used as a proxy for the magnitude of criminal opportunities that exist within neighbourhoods. Rates were calculated as the number of crimes per 1000 population per CAU, for each of the four crime categories.

## 5.5. Covariates

We included a number of individual- and neighbourhood-level covariates that may confound the relationship between neighbourhood-level crime and recidivism. Five individual-level variables were employed, including *Age* which measured the age of the offender upon their release from prison. Previous studies have generally found that younger offenders are more likely to recidivate (see [Griffin & Armstrong, 2003](#); [MacKenzie, Browning, Skroban, & Smith, 1999](#)). *Ethnicity* was coded as a dichotomous variable (Māori = 1; non-Māori = 0). Currently Māori comprise just under 15% of New Zealand's population although more than half the prison population identify themselves as Māori ([Wright, 2016](#)). Moreover, Māori are more likely to be reconvicted within two years than non-Māori ([New Zealand Department of Corrections, 2015](#)). *Age at first conviction* measured the age of the parolee at the time of their first offence leading to an officially recorded conviction while *Days served* measured the number of days the parolee served before their release. *No of parole conditions* measured the number of conditions listed in the parole warrant by the New Zealand Parole Board at the time of granting parole.

Seven neighbourhood-level variables were used in the study. These variables are informed by social disorganisation theory and include *NZDep* which is a measure of neighbourhood socio-economic deprivation calculated by Statistics New Zealand using nine variables from the New Zealand census. The index reflects eight dimensions of deprivation including income, access to transport and communication services, home characteristics, and education. The higher the score, the more deprived the neighbourhood. Neighbourhood-level deprivation has been found to be positively associated with recidivism (see [Hipp et al., 2010](#); [Kubrin & Stewart, 2006](#)). *Percentage unemployed* was also used as a measure of economic deprivation in neighbourhoods. Two variables were included to represent residential mobility: the *percentage of residents who had moved in the last five years*; and the *percentage of residents who live in their own home (i.e., non-renters)*. Highly mobile communities can inhibit the development of prosocial networks and decrease involvement in other conventional activities that might otherwise protect against recidivism. Three measures of racial/ethnic heterogeneity were included in the analysis: first, a *diversity index (DI)* (see [Meyer & McIntosh, 1992](#)) was calculated as the probability that any two people chosen at random from a given CAU are of different races or ethnicities. It is measured on a scale of 0–100, with 0 indicating that a CAU is totally homogeneous and 100 stating a CAU is totally heterogeneous. The greater the DI score, the greater the probability of randomly selecting two people with different characteristics. The DI is frequently employed in population studies (see [Johnson & Lichter, 2010](#); [Tam & Bassett Jr, 2004](#)) and is calculated as:

$$\text{Diversity Index} = 1 - (E^2 + M^2 + A^2 + P^2 + \text{MELAA}^2)$$

Where E is the proportion European, M is the proportion Māori, A is the proportion Asian, P is the proportion Pacific people, and MELAA is the proportion Middle Eastern/Latin American/African populations. The DI was then multiplied by 100 in order to deal in whole numbers,

(footnote continued)

parolee was engaging in high-risk behaviour or actual crime. In most cases, when a parolee was convicted for a parole violation, he was given a community sentence.

**Table 1**  
Individual and neighbourhood variables by re-incarceration 12 months post-release.

	Re-incarcerated Mean (SD) n = 113	Not re-incarcerated Mean (SD) n = 167	p-value	Total (n = 280)
<i>Individual variables</i>				
Age	30.5 (8.1)	32.8 (8.8)	0.030	31.9 (8.6)
Ethnicity	0.7 (0.5)	0.6 (0.5)	0.189	0.7 (0.5)
Age at first conviction	16.1 (1.9)	16.0 (1.9)	0.614	16.1 (1.9)
Days served	1308.5 (1112.1)	1679.3 (1907.5)	0.064	1529.6 (1641.5)
No of parole conditions	6.5 (1.9)	7.1 (2.1)	0.009	6.9 (1.9)
<i>Neighbourhood variables</i>				
NZ Deprivation	1062.6 (81.9)	1038.4 (86.8)	0.020	1048.2 (85.5)
% unemployed	6.9 (2.7)	6.1 (2.9)	0.014	6.4 (2.9)
% moved in the last 5 years	54.6 (10.3)	54.9 (11.2)	0.839	54.8 (10.9)
% living in their own home	41.4 (13.8)	43.2 (15.7)	0.333	42.4 (14.9)
% born overseas	20.8 (11.8)	23.1 (12.5)	0.126	22.2 (12.3)
Diversity Index	37.9 (13.1)	35.2 (15.2)	0.121	36.3 (14.4)
Index of Concentration at the Extremes	0.1 (0.4)	0.2 (0.4)	0.051	0.1 (0.4)
<i>Crime variables (rates per 1000 population)</i>				
Dishonesty	67.7 (294.4)	130.8 (462.9)	0.200	105.4 (404)
Drugs and antisocial	21.7 (68.3)	37 (108.8)	0.184	30.8 (94.7)
Property damage	15.9 (42.1)	23.7 (64.6)	0.264	20.6 (56.6)
Violent	40.1 (113.4)	61.1 (180.5)	0.272	52.6 (157)

rather than decimals. Second, a more simplistic measure of heterogeneity was calculated as the *percentage of residents that were born outside New Zealand*. A third, and final measure was an *index of concentration at the extremes (ICE; Massey, 2001)* which measures income inequality within neighbourhoods. The ICE is calculated using the following formula:

$$\frac{[(\text{number of affluent households} - \text{number of poor households}) / \text{total number of households}]$$

Where 'affluent' is defined as households with income above NZ \$100,000 and 'poor' is defined as households below NZ\$30,000 per year. The ICE index ranges from a theoretical value of  $-1$  (which represents extreme poverty, namely, that all households are poor) to  $+1$  (which signals extreme affluence, namely, that all households are affluent). Descriptive statistics within an ANOVA for all the variables used in the analysis are presented in Table 1.

### 5.6. Analytical approach

A correlation matrix was initially constructed to examine the nature of the relationships between the neighbourhood-level independent predictors. A total of five logistic regression models were then run on the data to determine the relationship between the independent (crime) and dependent (recidivism) variables. The first baseline multi-level model examined the relationship between recidivism and the combined individual- and neighbourhood-level control variables. The four crime variables were then each added separately to the baseline model in Models 1 to 4.

## 6. Results

The correlation results are presented in Table 2 and did not exhibit any surprising relationships; the highest correlations were between crime variables and other crime variables. The magnitude of these suggests that certain neighbourhoods in New Zealand exhibit high crime rates across all categories of crime. The seven measures of social disorganisation were most often significantly related to the crime variables and were in the expected direction, with the exception of NZDep, which exhibited no significant crime correlations. Although a number of these correlations were high and posed the risk of collinearity, with the exception of the crime variables only two of the correlation coefficients were greater than 0.80—a common threshold for concern—and all variance inflation factors were below 4.0. The high

correlations exhibited between the crime variables are not of concern, since no two crime variables were included in the same model.

The regression results are presented in Table 3. After controlling for the individual- and neighbourhood-level variables, no neighbourhood crime variable was found to have a significant relationship to recidivism. The inclusion of the crime variables marginally improved the baseline model, while all of the models constructed exhibited a relatively weak fit to the data (Nagelkerke  $R^2$  ranged from 0.11 for the baseline model to 0.12 for the crime models). It is important to note that while these overall values are low this is not uncommon in multi-level recidivism research (see Makarios, Steiner, & Travis, 2010; McGrath & Thompson, 2012), but shows that there is a need to explore the inclusion of predictors from additional domains if we are to more fully account for the occurrence of recidivism in New Zealand.

## 7. Discussion

### 7.1. Individual-level variables

Only one individual-level variable was found to be significantly related to recidivism in the baseline model. Men with a greater number of parole conditions were less likely to recidivate in the first year after release than those with fewer requirements. There is little prior research specifically investigating the impact of number of parole conditions on recidivism with which to compare these results. Extant research suggests that recidivism is associated with different types of conditions in different ways. For example, increased surveillance and enforcement by parole officers has been shown to increase recidivism (Grattet & Lin, 2016), while supportive supervision and active help with rehabilitation and reintegration can reduce re-offending. For example, Wan, Poynton, van Doorn, and Weatherburn (2014) found that offenders who received parole supervision after release took longer to commit a new offence, were less likely to commit a new indictable offence and committed fewer offences than offenders who were released unconditionally into the community, but only for rehabilitation-focused supervision. In contrast, Petersilia (2003) cautioned that it is rather the "unfortunate collateral consequences" of parole such as lack of stable housing, and poor mental and physical health that will largely dictate whether a parolee is successful or not rather than the magnitude and nature of the conditions. In the US, where almost one in 52 adults are on parole or probation (Bureau of Justice Statistics, 2014) the effectiveness of parole is under increasing scrutiny. Indeed, the number and restrictiveness of parole conditions is often seen as a serious

**Table 2**  
Bivariate correlations for the neighbourhood-level independent variables.

	1	2	3	4	5	6	7	8	9	10	11
1. NZ Deprivation	1										
2. % unemployed	0.87**	1									
3. % moved in the last 5 years	0.09	0.17**	1								
4. % living in their own home	-0.62**	-0.68**	-0.68**	1							
5. % born overseas	-0.11	0.01	0.58**	-0.52**	1						
6. Diversity Index	0.44**	0.50**	0.46**	-0.72**	0.58**	1					
7. ICE	-0.83**	-0.64**	-0.22**	0.49**	0.17**	-0.28**	1				
8. Dishonesty crime rate	0.01	0.10	0.45**	-0.33**	0.27**	0.28**	-0.15*	1			
9. Drugs and antisocial crime rate	0.05	0.15*	0.51**	-0.39**	0.32**	0.32**	-0.19**	0.92**	1		
10. Property damage crime rate	0.07	0.16*	0.49**	-0.38**	0.27**	0.30**	-0.20**	0.76**	0.73**	1	
11. Violent crime rate	0.08	0.18*	0.48**	-0.39**	0.28**	0.32**	-0.20**	0.88**	0.91**	0.83**	1

\*\*Correlation is significant at 0.01 level (one-tailed).

\*Correlation is significant at the 0.05 level (one-tailed).

**Table 3**  
Logistic regression models of rates of crimes on reimprisonment 12 months post-release (n = 280).

	Baseline Model	Model 1 (Dishonesty)	Model 2 (DAS)	Model 3 (PD)	Model 4 (Violent)
<i>Individual control variables</i>					
Age	-0.03	-0.03	-0.03	-0.03	-0.03
Ethnicity	0.20	0.21	0.25	0.22	0.22
Age at first conviction	0.05	0.04	0.03	0.04	0.04
Days served	0.00	0.00	0.00	0.00	0.00
No of parole conditions	-0.17*	-0.16*	-0.17*	-0.16*	-0.16*
<i>Neighbourhood control variables</i>					
NZ Deprivation	-0.01	-0.01	-0.00	-0.01	-0.01
% unemployed	0.10	0.12	0.10	0.12	0.13
% moved in the last 5 years	0.01	0.01	0.03	0.01	0.01
% living in their own home	0.01	0.01	0.01	0.01	0.01
% born overseas	-0.04*	-0.04*	-0.04*	-0.04*	-0.04*
Diversity Index	0.03*	0.04*	0.04*	0.03*	0.04*
ICE	-0.21	-0.54	-0.40	-0.53	-0.53
<i>Variables of interest</i>					
Dishonesty rate	-0.00				
Drugs and antisocial rate			-0.03		
Property damage rate p				-0.01	
Violent rate					-0.00
Constant	2.10	4.39	1.81	4.13	4.21
- 2 Log likelihood	353.77	351.33	350.11	351.28	351.23
Nagelkerke R <sup>2</sup>	0.11	0.12	0.12	0.12	0.12

Note. N = 280. Unstandardized coefficients are presented. DAS: Drugs and antisocial; PD: Property damage.

\*p < .05. \*\*p < .01.

impediment to successful offender reintegration (Travis III & Stacey, 2010) with roughly half of parolees failing to complete parole violation-free (Petersilia, 1999); accounting for about one third of all prison re-ceptions (Jacobson, 2005). A series of surveys examining the changes in parole and parole conditions in the US between 1956 and 2010 have largely found parole conditions to be too numerous, vague, redundant and unlikely to result in a reduction in prisoner returns to prison (see Arluke, 1956; Arluke, 1969; Hartman, Latessa, & Travis, 1996), although there are notably more successful exceptions (e.g., Veysey, Ostermann, & Lanterman, 2014). The most recent survey study undertaken by Travis III and Stacey (2010) argued that the large number of parole conditions typically imposed on US parolees constituted an “arsenal of the prosecutor” (p. 607) which contributes to the high re-imprisonment rate for parolees. Indeed, the researchers found a median of 19.5 conditions (ranging from 10 to 24) across multiple US

jurisdictions.

By contrast, in New Zealand it appears that the number of parole conditions imposed at release, as set out in the Parole Act of 2002, not a hindrance to successful reintegration and may even be serving a critical protective function in reducing recidivism. Previous research has demonstrated that parole itself is associated with a reduction in re-conviction for this sample (see Polaschek, Yesberg, & Chauhan, 2018). For the current sample, the mean number is much lower — approximately seven per person — and often includes some rehabilitation-focused provisions.

### 7.2. Neighbourhood-level variables

Two neighbourhood-level variables were significantly associated with recidivism in the baseline model. The percentage of foreign born residents in the neighbourhood was negatively associated with recidivism and the diversity index positively associated. Importantly, these two predictors measure different constructs; the diversity index provides an indication of the ethnic/racial variation among neighbourhood residents without considering their country of birth, while the percentage foreign born provides an indication of differences in citizenship within neighbourhoods. From a purely geographical perspective, these results provide the first empirical indications that neighbourhood composition is relevant to understanding recidivism in New Zealand (see also Breetzke & Polaschek, 2017).

That high-risk parolees returning to neighbourhoods with greater racial/ethnic diversity were at increased risk of recidivism is predicted from a social disorganisation perspective. But recent recidivism research has found mixed results for this prediction. For example, Orrick et al. (2011) and Tillyer and Vose (2011) found no significant associations among released offenders in Florida and Iowa respectively. Also in Florida Wang, Hay, Todak, and Bales (2014) found no support for a moderating effect of racial/ethnic heterogeneity between individual criminal propensity and recidivism, but Mears, Wang, Hay, and Bales (2008) found neighbourhood-level diversity to be positively linked with re-offending for certain types of offences. The results of this study are in line with the latter finding. It could be that parolees returning to more diverse neighbourhoods become increasingly socially isolated as they struggle to develop the supportive social ties and networks that protect against recidivism (see Hipp et al., 2010; Orrick et al., 2011). Indeed, previous research has shown how inter-racial trust, trust of neighbours, and even trust of one's own racial group is lower in more ethnically diverse neighbourhoods (see Putnam, 2007).

Explanations for the paradoxical finding of a negative association between the percentage of the neighbourhood that is foreign born and recidivism are speculative but could be related to the demographic composition of New Zealand. Over a quarter of all residents of New Zealand are foreign born (Statistics New Zealand, 2013) with the country ranked 5th among the Organisation for Economic Co-operation

and Development (OECD) countries for percent foreign born population (OECD, 2013). In the criminological literature, percent foreign born is most often used as an indicator of racial/ethnic heterogeneity, in turn a proxy for social disorganisation and an increased propensity for crime. In a New Zealand context however, this measure may not adequately capture racial/ethnic heterogeneity, and could instead measure the degree of social cohesion and collective efficacy commonly found among immigrant communities, particularly in Australasia (see Markus, 2015).

Regarding the substantive aim of this research, contrary to our hypothesis, men returning to neighbourhoods with higher rates of existing crime were not found to be at an increased risk of recidivism than those returning to neighbourhoods with lower rates of existing crime, after controlling for individual and other neighbourhood variables. This finding is surprising in light of the literature discussed above on the influence of environmental crime opportunities on offending, and the international literature on geographic profiling and 'journey to crime' modelling which typically shows that offenders tend to commit crimes relatively close to their place of residence (see Ackerman & Rossmo, 2015; and Townsley et al., 2015 for recent literature summaries). However, there is some evidence to suggest that the influence of residential address on offence location may be smaller in an Australasian context (Townsley et al., 2015) and journeys to crime longer in New Zealand specifically (Edwards & Grace, 2006; Hammond, 2013). It is possible that the lack of association between crime opportunities in the immediate neighbourhood and recidivism found in this study reflects a greater general criminal mobility in this jurisdiction.

Further, our results are consistent with several previous studies which have examined the relationship between local crime opportunities and recidivism (Miller et al., 2016a; 2016b) although their methods differ to ours. One possible explanation for this finding could be that the immediate neighbourhood context to which parolees return may not be as important a factor in their desistance to crime as the broader environment. It is widely acknowledged among 'geography of crime' researchers that individuals are affected not only by their own neighbourhood but by their surrounding neighbourhoods as well and that these effects manifest themselves in terms of their behaviours (see Barnum, Caplan, Kennedy, & Piza, 2017; Brunton-Smith, Sutherland, & Jackson, 2013). Researchers have already shown the importance of the broader neighbourhood context in recidivating. Hipp et al. (2010), for example, found that the concentrated disadvantage of surroundings neighbourhoods increased the likelihood of recidivating by up to 26 percent, while Chamberlain and Wallace (2016) found that the spatial clustering of parolees within surrounding neighbourhoods also increases levels of recidivism. Others found a similar 'spatial contagion' effect on recidivism (see Mennis & Harris, 2011; Stahler et al., 2013).

Opportunities for crime outside the immediate neighbourhood of the released offender could also influence recidivism, since the home neighbourhood is usually not the only location where parolees would spend their time. Routine activities for work and leisure may take parolees to other neighbourhoods which could differentially affect their environmental risk exposure. Given the problems that parolees typically experience in terms of obtaining work and finding stable housing it is therefore quite possible that parolees are mobile from day to day, increasing their exposure to criminal opportunities and peers. It therefore possible that crime occurring within parolees' surrounding neighbourhoods has a stronger relationship with recidivism than crime occurring within their home neighbourhood. An additional potential explanation for our null findings is the aggregate level at which we measured both crime and recidivism. It is possible that environmental opportunities for specific types of crime influence recidivism in relation to those types of crime but not others, presenting another avenue for further research.

Finally, many prisoners in this sample were released after engaging with various forms of support and assistance that were intended, in part, to protect against the effects of neighbourhood factors. Future

research will explore the addition of factors more immediate to the parolee (e.g., family and social support) in predicting recidivism.

There are some limitations of our study worth considering. First, it is possible that a parolee could have moved from one (high crime) neighbourhood into another (low crime) neighbourhood post-release, and our study only references the neighbourhood to which the parolee first returned. However, the likelihood of such a change in neighbourhood is reduced by the fact that high-risk parolees in New Zealand have strict parole conditions that often restrict the changing of residence without permission. In fact, our sample of parolees had a mean number of 6.9 parole conditions (see Table 1), including limitations on the offender's ability to move to a new residential address. Further, recent research has shown that when released offenders move it is most often to a neighbourhood with an equal or lower socio-economic context (see Wolff, Baglivio, Intravia, Greenwald, & Epps, 2017). A related concern, and potential explanation for the lack of association found between neighbourhood crime and recidivism, could be the temporal contemporaneity between our crime and recidivism measures. To reflect the existing crime environment, crime data were obtained for the two years preceding the offenders' release (i.e., 2009–2010). It is possible that, for offenders released later in the period covered by the dataset (2011–2013), the crime levels in the release neighbourhood may have changed. To the extent that crime levels reflect social and environmental factors which tend to be relatively stable over time, such change is unlikely within the period under consideration. Future research could address this potential issue by linking the crime data period to the date of each offender's release.

An additional limitation is that our neighbourhood-level control variables could themselves be considered as predictors of high crime occurring within neighbourhoods, certainly within the social disorganisation framework. Although these concerns have merit, the correlations run between our controls and all four crime variables were weak to moderate (see Table 2) while previous research suggests that various other factors, particularly in the built environment, also impact on crime risk both locally and internationally (see Breetzke & Pearson, 2015; Conrow, Aldstadt, & Mendoza, 2015; Curtis-Ham & Walton, 2017; Nelson, Bromley, & Thomas, 2001). In fact, in our study we hypothesised that high crime rates will increase recidivism because they reflect other, uncontrolled for, factors relating to crime opportunities in the neighbourhood. In recent work Braga and Clarke (2014) note that crime opportunities manifest themselves in place characteristics, situations, and dynamics that are often not easily operationalized at the neighbourhood level. Our notion was that these unknown precipitators (or inhibitors) of crime can lead to increased opportunities for returning offenders to commit crime and potentially lead them to recidivate.

Finally, our sample of released parolees is relatively small when compared to other studies of this nature (see Kirk, 2012; Kubrin & Stewart, 2006). The sample of 280 offenders must, however, be seen in the context of incarceration in New Zealand. In December 2016 the country had a total sentenced prisoner population of 7140, (and an additional 2714 were in prison on remand (New Zealand Department of Corrections, 2017a). During the three-year period of this study the New Zealand Parole Board heard 17287 applications for parole, of which 4535 were successful (26%) (New Zealand Parole Board, 2011, 2012, 2013). The 280 offenders used in this study come from this group of 4535 parolees and therefore represent 6% of all offenders released during this period. As a percentage of the total population therefore the present sample far exceeds past, mainly US-based, studies.

## 8. Conclusion

The main aim of this research was to determine whether neighbourhood crime rates were associated with short term individual-level recidivism. Not only has this study achieved this aim, it has also made several important contributions to the existing recidivism research. First, this study found no demonstrable link between neighbourhood-

level crime rates and recidivism among a cohort of high-risk male parolees in New Zealand when controlling for other individual- and neighbourhood-level factors. Rather, it appears as if the immediate neighbourhood criminogenic context plays less of a role in shaping recidivism outcomes than we had hypothesised. Despite our null findings, the fact that this study is the first of its kind in New Zealand, and indeed Australasia as a whole, makes it highly significant. Second, the study found significant associations between individual- and neighbourhood-level predictors which are largely incongruent with much previous US-centric recidivism literature. In particular, the finding that an increase in the number of parole conditions and increased neighbourhood-level heterogeneity decreased the likelihood of short-term recidivism lies in stark contrast with previous literature. Explanations for these findings were provided in the context of New Zealand's demography as well as crime characteristics. There is likely to be considerable heterogeneity in the findings of research of this kind, even within the US, given the wide variety of variables at different levels of explanation that may contribute to differences in parole outcome. Future research in contexts outside the US can only enhance an understanding of this complexity. Third, it is clear from this research that much work remains on investigating the individual- and neighbourhood-level causal mechanisms that impact on short-term recidivism in New Zealand. Our research indicates that neighbourhood-level crime did not play a predictive role once social and economic neighbourhood indicators were controlled. Alternatively, given the increased efforts to prepare New Zealand prisoners for release by putting in place social capital and other needed resources (e.g., housing, employment) (see New Zealand Department of Corrections, 2017b), there could be value in future research examining the interplay between individual- and neighbourhood-level factors in predicting recidivism.

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## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.apgeog.2018.11.002>.

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