The effect of parole officers on reoffending

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Aim: The aim of this study was to determine the effect that parole officers have on the reoffending of parolees.

Method: The sample chosen was all adults released on parole in NSW between 2009 and 2012. Data on parole officer, officer characteristics and office of the parolee were obtained from Corrective Services NSW. This was matched with the reoffending database (ROD) maintained by the NSW Bureau of Crime Statistics and Research to obtain demographic, index contact and prior offending variables for each parolee. The outcomes measured were reoffending within one, two or three years of release, and were recorded as binary variables. Logistic regression models were used to estimate these effects, with parole officer and parole office being included as random effects. Significance of the random effects was measured using likelihood ratio tests comparing the random effects models to the same models without the random effects included. Finally, the random parole officer effects were regressed on parole officer gender, age and years of experience to determine if these factors influenced parole officer effects.

Results: Significant variance was found in the random effects for the parole officers for reoffending within one, two or three years, and within one and three years for parole offices. In the majority of cases, differences in parole officer and office effects accounted for less than 1 percentage point in the probability of reoffending. However, in extreme cases, this difference could be as high as 11 percentage points. No evidence suggesting that parole officer age, gender or years of experience were associated with parole officer effects was found.

Conclusion: It does appear that there are differences in parole officer and office effects on reoffending. However, in practical terms, these effects are very small in the majority of cases.

Keywords: Reoffending, parole, parole officer, supervision, random effects.

INTRODUCTION

BACKGROUND

Recidivism is a chronic problem for the criminal justice system. Agnew-Pauley and Holmes (2015) examined reoffending within NSW and found that 23% of adults and 41% of juveniles convicted in NSW in 2004 were reconvicted within 1 year, and 56% and 79% were reconvicted within 10 years, respectively. This problem is not localised to NSW – the Australian Bureau of Statistics (ABS) stated that across Australia, 56.5% of all prisoners had previously been imprisoned (ABS, 2018) and in a study of prisoners released in 2005 from 30 US states, 67.8% were re-arrested within 3 years, and 76.6% were re-arrested within 5 years (Durose, Cooper, & Snyder, 2014). Given the scope of this problem, it is unsurprising that it has been the subject of extensive study. These studies range from predicting reoffending (Ringland, Weatherburn, & Poynton, 2015; Stavrou & Poynton, 2016; Smith & Jones, 2008a; Smith & Jones, 2008b), to factors which influence reoffending (Fitzgerald & Graham, 2016; Stavrou, Poynton, & Weatherburn, 2016; Trevena & Weatherburn, 2015), and the evaluation of programs to help reduce reoffending (Halstead, 2016; Halstead & Poynton, 2016; Poynton & Menendez, 2015; Ringland, 2016).There is excellent motivation for conducting these studies – Weatherburn, Froyland, Moffat and Corben (2009) estimated that a 10% reduction in the re-offending rate in NSW would save $28 million per year on the cost of correctional facilities, not to mention the social impact of recidivism on the offenders and victims.

PAROLE IN NSW

An interesting aspect of recidivism is recidivism while on parole. Parole is '...the release of an offender from custody to serve the balance of their sentence in the community' (NSW State Parole Authority [SPA], 2018). It is intended to be a supportive framework for an offender to be reintegrated into the community before their sentence is concluded, while at the same time, maintaining a degree of protection for the community.

As stated in the *Crimes (Sentencing Procedure) Act 1999*, the non-parole period of a custodial sentence (the minimum time that the offender must spend incarcerated during their sentence) is set during sentencing by the court (although the court may decline to set a non-parole period if it wishes). After the non-parole period concludes, offenders with sentence terms between 6 months and 3 years are automatically released. For offenders with a sentence greater than three years, the SPA makes a decision on whether or not to release the offender on parole, using information such as the offender's behaviour in custody, prior criminal record, sentencing remarks made by the judge, pre-release reports from community corrections, statements from the offenders and victims families, and reports from professionals (e.g. psychologists). The SPA also decides if any conditions should be imposed on the offender if parole is granted.

PAST RESEARCH ON REOFFENDING ON PAROLE

Given the discretionary nature of parole, parolee recidivism has significant policy implications, and is worthy of academic attention. Weatherburn and Ringland (2014) looked at reoffending on parole in NSW and what demographic and criminogenic factors are associated with reoffending. They found that 28.4% of parolees in their sample (adult offenders released on parole in 2010 and 2011 in NSW) reoffended while on parole, as well as exploring relationships between reoffending on parole and demographic characteristics of the parolees. They found many factors which were more highly correlated with offending on parole, including (but not limited to) being male, Indigenous, young (under 25 years old), having a higher LSI-R score, and having spent less than 180 days in custody at the index appearance. Stavrou, Poynton and Weatherburn (2016) examined the relationship between parole release authority and recidivism. They found that parolees released by the court (who are responsible for the release of offenders with sentences less than three years) were significantly more likely to reoffend than parolees released by the SPA (who are responsible for granting parole in the case where the offender's sentence exceeds three years). This effect persisted across both overall reoffending, and when restricted to reoffending once parole supervision had concluded. This ties in with other research on the effect of parole supervision, with Ostermann (2013) and Wan, Poynton, van Doorn and Weatherburn (2014) all showing that parole

supervision has a positive effect on recidivism of parolees (that is, parole supervision reduces recidivism). Drilling down into supervision, both Bonta et. al. (2010) and Bourgon and Gutierrez (2012) have demonstrated the effectiveness of a training program in Risk-Needs-Responsivity (RNR) principles for parole officers in Canada, showing that officer training can influence recidivism of parolees, while Trotter (2012) showed a relationship between skill and qualifications of NSW Juvenile Justice staff involved with supervising young offenders.

The parole officer, (also known as a community corrections officer in NSW), supervises and works with offenders when they are released from custody on parole or serving community-based orders. Their role is to "work with offenders to reduce their risk of re-offence" (NSW Department of Justice, 2016). In practice, parole officers have two primary roles. Firstly, to help the offender re-integrate into society (by providing assistance for the offender to find employment or housing) as well as to monitor offenders and help ensure they adhere to their bail conditions. This creates a situation where the parole officers serve both as social workers and law enforcers (Clear & Latessa, 1993). Given that Bonta and colleagues (2010) and Trotter (2012) both show that there is an effect from parole officer skill and training, it is natural to ask what variation there is between the effects that parole officers have on reoffending among parolees due to factors other than training. Andersen and Wildeman (2014) used fixed effects models to show that parole officers can have significant effects (both positive and negative) on recidivism[1], earnings and dependency on public benefits for Danish offenders. There's also evidence that this relationship can be more complex. Willits, Broidy and Lyons (2010) show that parole officer's attitudes towards how likely their parolees are to desist are dependent on the demographic characteristics of the parolee in question. However, little is known (at least in NSW) about how much 'innate' skill a parole officer has when it comes to improving the reoffending of parolees. This brings us to the aim of this study.

AIM

There were two aims of this project. The first was to determine if there are significant differences in the effects parole officers have on the reoffending of their parolees. After finding an effect, a secondary analysis was conducted to determine if these differences could be explained by the age, gender or years of experience of the parole officer.

METHOD

The analysis for this project was split into two stages. The first stage was to determine if there was significant variance in the effect of parole officers on the recidivism of their parolees, while the second stage (if necessary) was to determine if these differences in parole officer effects could be explained by demographic characteristics of the parole officers.

DATA SAMPLE

The cohort of interest is all adults released on parole in NSW between 2009 and 2012. A dataset was obtained from Corrective Services NSW of each parolee who was released within this period, containing the parolee Master Index Number (a unique person identifier in the NSW JusticeLink database – commonly referred to as MIN), parole office, parole officer name, parole officer gender, parole officer age and parole officer years of experience. This dataset consisted of 15,953 parolees. Using the parolee MIN and release date, the parolees were matched to their index custodial appearance in the NSW Bureau of Crime Statistics and Research (BOCSAR) Reoffending Database (ROD – see Hua & Fitzgerald, 2006) in order to get index custodial appearance and prior offending characteristics for the parolees. It was found that 16 parolees could not be matched to ROD, and were subsequently removed. A further 39 parolees were actually identified as under 18 years of age at release, and were also excluded from the analysis. Finally, it was found that 805 offenders returned to custody within three years, but were not recorded as having a new offence (probably having returned due to a breach of parole). For these offenders, they would not have the same amount of 'free time' within one, two or three years of reoffending, so were excluded from the analysis[2]. This left 15,093 offenders, supervised by 922 different parole officers across 68 different parole offices.

DEPENDENT VARIABLE

The main outcome of interest for the first stage of the analysis was the reoffending of the parolees. This was measured as binary variables, which took the value of 1 if the parolee had reoffended within one, two or three years of their release from custody, and 0 otherwise. In the first stage of the analysis, random effects for each different parole officer were obtained, and were used as the outcome variable for the second stage of the analysis.

INDEPENDENT VARIABLES

The independent variables of interest in the first stage of the analysis were the parole officer and the parole office that the parolees were assigned to. These were recorded as categorical variables. In the second stage, the age, years of experience, gender and caseload of each parole officer were included as independent variables of interest.

COVARIATES

In the first stage of analysis, the following covariates were included in the analysis:

- The age of the parolee (categorised as 18-24 years, 25-34 years, 35-44 years, or 45 years and over).

- The gender of the parolee (categorised as male or female).

- The Indigenous status of the parolee (categorised as Indigenous or non-Indigenous).

- The ARIA remoteness classification of the postcode of the parolee (categorised as major city, inner regional Australia, outer regional Australia, remote Australia, very remote Australia, or missing).

- The SEIFA quartile of the postcode of the parolee (categorised as 1, 2, 3, 4, or missing; 1 is most disadvantaged).

- The age of the offender's first contact with the police (categorised as <17 years, 18-24 years, 25-34 years, 35-44 years, 45 years and over, or missing).

- The number of prior court appearances during the custodial episode or in the past five years with at least one proven offence (categorised as 0, 1, 2, 3, 4, or 5 or more).

- The LSIR- risk category of the offender (categorised as low, medium-low, medium, medium-high, high, or missing).

- The days spent in custody for the index offence (classified as <180 days, 180-365 days, or more than 365 days).

- The number of prior court appearances during the custodial episode or in the past five years with at least one proven violent offence (categorised as 0, 1, 2, 3, 4, or 5 or more).

- The number of prior court appearances during the custodial episode or in the past five years with at least one proven drug offence (categorised as 0, 1, 2, 3, 4, or 5 or more).

- The number of prior court appearances during the custodial episode or in the past five years with at least one proven breach offence (categorised as 0, 1, 2, 3, 4, or 5 or more).

- The parole release authority for the index custodial episode (categorised as court, SPA, or missing).

These covariates have previously been used in studies of reoffending whilst on parole (see Ringland, 2014; Stavrou, Poynton & Weatherburn, 2016). Missing values were treated as a separate category to minimise any bias arising from systematic missing data (an example of which is LSI-R scores, which are more reliably recorded if an offender has had more contact with Corrective Services NSW).

In the second stage, the following variables were used as covariates:

- The age of the parole officer (categorised as 18-24 years, 25-34 years, 35-44 years, 45 years and over, or missing).

- The gender of the parole officer (categorised as male, female, or missing).

- Number of years of supervision experience for the parole officer (categorised as less than 1, 1-2, 2-3, 3-4, 4-5, 5-6, 6-7, 7-8, 8-9, 9-10, 10 or more years, or missing).

These covariates were the only parole officer characteristics available for the analysis. Missing data was again treated as a separate category for the relevant variables.

DATA ANALYSIS

Checking for homogeneity across officers

Consultation with NSW Corrective Services informed us that the assignment of parolees to parole officers is primarily based on workload constraints. This would theoretically make assignment of parolees to parole officers as-good-as-random – that is, there would be no relationship between the parole officer and the characteristics of the parolees he/she is assigned. However, the allocation of parole officers would also be subject to geographical constraints – parolees need to be assigned to parole offices near where they live. This introduces the potential for bias in which parolees are assigned to which parole officers.

To check for this, each demographic characteristic of the parolees was regressed on the parole officer identifiers. Parole office fixed effects were included for this check.

Model fitting

The model fitting was performed in two stages. In the first stage, a random effects model was used to determine the effect of each parole officer on reoffending. In the second stage, the random effect for each parole officer was treated as an outcome variable in a linear regression, with parole officer characteristics used as covariates. The reason for the two separate stages of modelling was that a modelling approach combining all covariates (both for reoffending on parole officer effects) in a single model was computationally impractical (the model would not converge, so accurate estimates for the parameters could not be obtained).

First stage analysis

In the first stage, the data were analysed using a random effects logistic regression model. Logistic regression was chosen given the binary response variable (whether or not the parolee reoffended). Separate models were fit for reoffending within 1, 2 and 3 years. The effects of the parole officers and offices are included as random intercepts in the model. This was because there are bound to be unobserved differences between parole officers and parole offices but there were not enough parolees and offices to properly control for these differences through fixed effects. The random intercepts of office and officer effects are crossed rather than nested, as some officers have changed office during the period of interest. The statistical model used in this analysis is given by equation (1):

$$g(p_i) = \beta_0 + \boldsymbol{\beta X} + u_{1j} O_{ij} + u_{2k} P_{ik} + e_i \qquad (1)$$

with:

$$g(p_i) = \log\left(\frac{p_i}{1 - p_i}\right)$$

and $\quad p_i = \Pr(Y_i = 1)$

and where Y_i is a binary variable indicating if parolee i has reoffended, β_0 is the intercept or baseline probability when no other effects are present, $\boldsymbol{\beta}$ is a vector of the coefficients for the various covariates, $\boldsymbol{X}$ is a matrix for the different covariates for the different parolees, O_{ij} is an indicator variable, taking the value of 1 if parolee i is assigned to parole office j and 0 otherwise, P_{ik} is an indicator variable, taking the value of 1 if parolee i is assigned to parole officer k and 0 otherwise, $u_{1j} \sim N(0, \sigma_1^2)$ is the random effect of parole office j, $u_{2k} \sim N(0, \sigma_2^2)$ is the random effect of parole officer k, and e_i is the error term.

Testing for significance of the terms u_{1j} and u_{2j} is not as straightforward as testing for the significance of a regular fixed effect. When checking for significance of random effects, it is inappropriate to check for significance with individual random effects. Significance can be checked by testing the null hypothesis $H_0: \sigma^2 = 0$ vs the alternative hypothesis $H_A: \sigma^2 > 0$ where σ^2 is the variance of the random effects; however, this approach is complicated by the fact that σ^2 cannot be less than 0. The best way to test our hypothesis in these circumstances is to use likelihood ratio (LR) test between the null (model without the random effects) and alternative (model with the random effects included) models. To explain this, consider models (2) and (3) below:

$$g(p_i) = \beta_0 + \boldsymbol{\beta X} + e_i \qquad (2)$$

$$g(p_i) = \beta_0 + \boldsymbol{\beta X} + u_{1j} O_{ij} + e_i \qquad (3)$$

where all variables are defined as above. Note that model (2) is nested within model (3). In order to test the alternative hypothesis $H_A: \sigma_1^2 > 0$, a likelihood ratio (LR) test comparing the two models was conducted (in terms of which model gives the higher likelihood), and the p-value associated with this test examined. If office effects were found to be significant, then a LR test between models (1) and (3) was performed to determine if parole officer effects are significant. If office effects are not significant, parole officer effects are tested for by performing an LR test between model (2) and model (4), shown below:

$$g(p_i) = \beta_0 + \boldsymbol{\beta X} + u_k P_{ik} + e_i \qquad (4)$$

Finally, if significant parole officer effects were found, it is necessary to determine that the effect for each parole officer is constant over our sample period. This was done by adding year effects to either model (1) or (4) (depending on whether or not parole office effects are significant) which are nested within parole officer (such that the 2009 effect for parole officer k is different to the 2009 effect for all other parole officers, as well as different to the 2010, 2011 and 2012 effects for parole officer k). The statistical model used in cases where office effects are included is shown in equation (5) below:

$$g(p_i) = \beta_0 + \boldsymbol{\beta X} + u_{1j} O_{ij} + u_{2k} P_{ik} + u_{3k(t)} N_{ik(t)} + e_i \qquad (5)$$

where $N_{ik(t)}$ takes the value 1 if the offender i was released in

year t under the supervision of parole officer k, 0 otherwise, and $u_{3k(t)} \sim N(0, \sigma_3^2)$ is the nested random effect for $N_{ik(t)}$. An LR test was then performed between models (1) and (5). If this is not significant, it can be concluded that there is no change in parole officer effects over our sample period, meaning the second stage of the analysis could be performed.

Second stage

In the second stage of the analysis, the random effects for the different parole officers were extracted from the model and a linear regression was performed, using the random effects as the response and the gender, age and years of experience as the explanatory variables. This was done using the model below:

$$Y_i = \beta_0 + \beta_1 G_i + \beta_2 A_i + \beta_3 E_i + \varepsilon_i$$

Where i is the index for the different parole officers, Y_i is the random effect for parole officer i, G_i is an indicator variable for the gender of the parole officer, A_i is a variable for the age of parole officer i, E_i is a variable for the years of experience of parole officer i, and ε_i is the error term, assumed to be normally distributed.

RESULTS

SAMPLE CHARACTERISTICS

Table 1 shows the sample characteristics of our cohort of interest.

Looking at Table 1, it can be seen that the majority of parolees in our sample are:

- male
- 25-34 years old
- had their first contact with the police before they were 18 years old
- non-Indigenous
- were aged less than 18 years at their first contact with police
- had five or more prior offences
- lived in a major city
- were in the lowest quartile for SEIFA socio-economic status
- had spent over a year in custody during the index custodial episode
- had no prior violent, drug or breach offences
- were rated as medium risk on the LSI-R
- were released by the court rather than the SPA

Trends in reoffending were generally consistent across groups (i.e. if one group was more likely to reoffend after one year, they were generally also more likely to reoffend across two and three years as well). Male, younger and Indigenous offenders all were more likely to reoffend. Increases in prior offences (of all types)

also increased rates of reoffending. A less intuitive finding is that offenders being released from shorter custodial sentences were more likely to reoffend. ARIA and SEIFA scores showed that offenders in more remote and lower socio-economic areas were more likely to reoffend than those in urbanised or more affluent areas. Offenders released by the courts (rather than the SPA) reoffended at higher rates as well (agreeing with Stavrou, Poynton & Weatherburn, 2016), and (as expected) offenders with a higher LSI-R score were also more likely to reoffend. The final point of note is that 'Missing' scores for ARIA and SEIFA scores indicated lower rates of reoffending than average, whereas missing values for parole supervision authority showed higher rates of reoffending than average. Missing LSI-R scores appear to not be predictive of reoffending (compared to average rates), and the number of missing scores for days in custody was too small to draw any conclusions.

Homogeneity of parolees across CCOs was examined. While this showed that there were significant covariate imbalances across officers, it also showed that this imbalance did not affect later results. This analysis can be found in the appendix.

STAGE 1

Models (2) and (3) (as defined in the Method section) were fit first to test for the effects of the parole office on reoffending. Significance of the random office effects was tested using an LR test. Having determined this, tests for differences in the parole officer random effects were then performed. For reoffending within 1 or 3 years, this was done by performing a LR test on models (1) and (3). For reoffending within 2 years, parole office was shown to not have a significant effect. Because of this, it was inappropriate to include office effects in the model when testing for parole officer random effect. Therefore, to test for parole officer random effects, model (2) (the base model with only the covariates) was compared to the following model:

$$g(p_i) = \beta_0 + \boldsymbol{\beta X} + u_{2k} P_{ik} + e_i \qquad (4)$$

where all variables are defined as above. Finally, it was checked that (aside from changes in age and experience) the effects of the parole office and parole officer did not change over time. These results are all shown in Table 2.

As can be seen from Table 2, the variance of the parole office random effects is significantly greater than 0 for reoffending within 1 and 3 years. The p-value for reoffending within 2 years is greater than .05 but very close to it (.052). Furthermore, the variance in parole officer effects is significant for reoffending within all time periods. It can also be seen that the variance in random effects increases with the length of follow-up time. The nested year effects were not significant in any model, meaning that these effects did not need to be accounted for in stage 2 of our analysis.

Table 1. Characteristics of the parolee sample cohort

Variable	Number	Proportion of total	Reoffending within 1 year		Reoffending within 2 years		Reoffending within 3 years	
			N	%	N	%	N	%
Gender								
Female	1,424	9.4%	544	38.2%	754	52.9%	866	60.8%
Male	13,669	90.6%	5,405	39.5%	7,637	55.9%	8,800	64.4%
Age								
18-24 years	3,232	21.4%	1,607	49.7%	2,188	67.7%	2,469	76.4%
25-34 years	5,360	35.5%	2,380	44.4%	3,310	61.8%	3,796	70.8%
35-44 years	4,031	26.7%	1,512	37.5%	2,203	54.7%	2,548	63.2%
45+ years	2,470	16.4%	450	18.2%	690	27.9%	853	34.5%
Age at first contact								
Under 18 years	5,495	36.4%	3,021	55.0%	4,068	74.0%	4,570	83.2%
18-24 years	4,414	29.2%	1,708	38.7%	2,507	56.8%	2,918	66.1%
25-34 years	2,900	19.2%	901	31.1%	1,328	45.8%	1,576	54.3%
35-44 years	1,363	9.0%	269	19.7%	402	29.5%	479	35.1%
45+ years	857	5.7%	42	4.9%	76	8.9%	113	13.2%
Missing	64	0.4%	8	12.5%	10	15.6%	10	15.6%
Indigenous status								
Non-Indigenous/ unknown	9,692	64.2%	3,132	32.3%	4,523	46.7%	5,301	54.7%
Indigenous	5,401	35.8%	2,817	52.2%	3,868	71.6%	4,365	80.8%
Prior offences								
0	161	1.1%	26	16.1%	43	26.7%	54	33.5%
1	2,342	15.5%	237	10.1%	399	17.0%	507	21.6%
2	1,941	12.9%	452	23.3%	706	36.4%	873	45.0%
3	2,013	13.3%	673	33.4%	1,022	50.8%	1,233	61.3%
4	1,973	13.1%	800	40.5%	1,192	60.4%	1,402	71.1%
5 or more	6,663	44.1%	3,761	56.4%	5,029	75.5%	5,597	84.0%
Prior drug offences								
0	10,842	71.8%	3,738	34.5%	5,403	49.8%	6,308	58.2%
1	2,871	19.0%	1,425	49.6%	1,940	67.6%	2,199	76.6%
2	891	5.9%	482	54.1%	646	72.5%	733	82.3%
3	316	2.1%	184	58.2%	249	78.8%	268	84.8%
4	102	0.7%	71	69.6%	91	89.2%	93	91.2%
5 or more	71	0.5%	49	69.0%	62	87.3%	65	91.5%
Prior violent offences								
0	4,994	33.1%	1,471	29.5%	2,096	42.0%	2,487	49.8%
1	2,465	16.3%	836	33.9%	1,192	48.4%	1,380	56.0%
2	2,534	16.8%	1,017	40.1%	1,463	57.7%	1,685	66.5%
3	1,672	11.1%	789	47.2%	1,118	66.9%	1,266	75.7%
4	1,384	9.2%	664	48.0%	946	68.4%	1,082	78.2%
5 or more	2,044	13.5%	1,172	57.3%	1,576	77.1%	1,766	86.4%

Table 1. Characteristics of the parolee sample cohort - continued

Variable	Number	Proportion of total	Reoffending within 1 year		Reoffending within 2 years		Reoffending within 3 years	
			N	%	N	%	N	%
Prior breaches								
0	8,255	54.7%	2,522	30.6%	3,647	44.2%	4,312	52.2%
1	3,560	23.6%	1,681	47.2%	2,325	65.3%	2,663	74.8%
2	1,807	12.0%	917	50.7%	1,294	71.6%	1,452	80.4%
3	880	5.8%	479	54.4%	666	75.7%	742	84.3%
4	363	2.4%	195	53.7%	269	74.1%	294	81.0%
5 or more	228	1.5%	155	68.0%	190	83.3%	203	89.0%
Days in custody								
Less than 180 days	4,312	28.6%	1,956	45.4%	2,714	62.9%	3,087	71.6%
180-365 days	5,210	34.5%	2,255	43.3%	3,162	60.7%	3,579	68.7%
More than 365 days	5,568	36.9%	1,736	31.2%	2,513	45.1%	2,998	53.8%
Missing	3	0.0%	2	66.7%	2	66.7%	2	66.7%
ARIA score								
Major City	7,816	51.8%	3,222	41.2%	4,409	56.4%	5,042	64.5%
Inner Regional Australia	2,484	16.5%	1,007	40.5%	1,475	59.4%	1,702	68.5%
Outer Regional Australia	3,266	21.6%	1,252	38.3%	1,838	56.3%	2,157	66.0%
Remote Australia	550	3.6%	259	47.1%	371	67.5%	415	75.5%
Very Remote Australia	225	1.5%	105	46.7%	147	65.3%	164	72.9%
Missing	752	5.0%	104	13.8%	151	20.1%	186	24.7%
SEIFA score								
1	5,374	35.6%	2,236	41.6%	3,162	58.8%	3,661	68.1%
2	4,309	28.5%	1,722	40.0%	2,459	57.1%	2,851	66.2%
3	3,215	21.3%	1,354	42.1%	1,892	58.8%	2,141	66.6%
4	1,429	9.5%	526	36.8%	720	50.4%	824	57.7%
Missing	766	5.1%	111	14.5%	158	20.6%	189	24.7%
LSIR category								
Low	1,553	10.3%	166	10.7%	269	17.3%	362	23.3%
Medium-low	3,676	24.4%	970	26.4%	1,484	40.4%	1,796	48.9%
Medium	5,631	37.3%	2,473	43.9%	3,530	62.7%	4,070	72.3%
Medium-high	2,812	18.6%	1,595	56.7%	2,141	76.1%	2,366	84.1%
High	823	5.5%	524	63.7%	673	81.8%	737	89.6%
Missing	598	4.0%	221	37.0%	294	49.2%	335	56.0%
Parole Supervision Authority								
Court	11,590	76.8%	4,874	42.1%	6,863	59.2%	7,809	67.4%
SPA	2,719	18.0%	735	27.0%	1,072	39.4%	1,333	49.0%
Missing	784	5.2%	340	43.4%	456	58.2%	524	66.8%
Total	**15,093**	**100.00%**	**5,949**	**39.40%**	**8,391**	**55.60%**	**9,666**	**64.00%**

Practical significance of effects

While Table 2 confirms that re-offending is affected by both offices and officers, they provide no information about how big an effect these factors have. To examine this, the marginal probability of reoffending for a referent offender (that is, an offender who displays the most common/modal level of each variable, as outlined above in the Sample Characteristics subsection) was calculated. Then, the variation of these probabilities across offices and officers was examined and is shown in Figure 1. Figure 1 plots the marginal probability of reoffending for the

different parole officers and parole offices, with boxplots to show the spread of the data.

The main point of interest from Figure 1 is that, for both parole officer and office random effects, the first and third quartiles of the data are within 1 percentage point of the mean, showing that the bulk of the random effects are very similar. When looking at the extremes, it can be seen that the highest parole officer random effect increases reoffending by less than 5 percentage points in all cases. While the effects for the lowest officer seem much further from the median (6-11 percentage points), this appears to be due

Table 2. Significance of parole office and officer random effects for the three different reoffending models

Response variable	Parole office random effects		Parole officer random effects		Nested year random effects	
	Variance of random effects	*p*-value	Variance of random effects	*p*-value	Variance of random effects	*p*-value
Reoffending within 1 year	0.010	.015 **	0.025	.012 *	<0.001	.999
Reoffending within 2 years	0.009	.052	0.031	.003 **	<0.001	>.999
Reoffending within 3 years	0.020	.001 **	0.043	.000 ***	0.017	.569

*Note: Stars indicate level of significance; * .05, **.01, ***.001.*

Table 3. Coefficients and p-values for variables related to parole officer effects

Variable	Reoffending within 1 year		Reoffending within 2 years		Reoffending within 3 years	
	Coefficient	*p*-value	Coefficient	*p*-value	Coefficient	*p*-value
(Intercept)	-0.001	.849	0.004	.681	0.013	.270
Age						
25-34 years vs. 18 - 24 years	0.003	.715	0.002	.815	-0.006	.635
35-44 years vs. 18 - 24 years	-0.001	.930	-0.001	.955	-0.006	.606
45+ years vs. 18 - 24 years	0.002	.825	-0.001	.891	-0.009	.427
Missing vs. 18 - 24 years	0.001	.878	-0.003	.797	-0.012	.354
Gender						
Male vs. Female	0.003	.429	-0.006	.227	-0.006	.278
Missing vs. Female	-0.002	.505	-0.005	.167	-0.010	.029 *
Supervision years of experience						
>10 vs. 1 or less	0.010	.629	0.006	.794	0.006	.839
1-2 vs. 1 or less	-0.005	.354	-0.005	.373	0.000	.964
2-3 vs. 1 or less	0.001	.863	0.002	.787	0.005	.564
3-4 vs. 1 or less	-0.002	.752	0.001	.849	-0.002	.780
4-5 vs. 1 or less	0.000	.986	-0.003	.681	-0.001	.889
5-6 vs. 1 or less	0.009	.088	0.002	.771	-0.003	.684
6-7 vs. 1 or less	0.006	.183	0.005	.376	0.005	.443
7-8 vs. 1 or less	-0.003	.620	0.001	.868	0.003	.683
8-9 vs. 1 or less	-0.007	.382	-0.006	.570	-0.001	.926
9-10 vs. 1 or less	-0.006	.537	-0.005	.693	0.000	.991
Missing vs. 1 or less	-0.008	.592	-0.033	.065	-0.045	.046 *
Other vs. 1 or less	0.001	.972	0.014	.687	0.015	.726

*Note: Stars indicate level of significance; * .05, **.01, ***.001.*

Figure 1. Marginal probabilities for referent offenders for different parole officer (left panel) and office effects (right panel)

to two outlying points, rather than showing a long tail in the data. The differences in probability between the parole offices was within 2 percentage points in all cases.

Stage 2

The parole officer effect may be small but it is still interesting to know if these small differences can be explained by officer characteristics. Using the models fitted in stage 1, the random effects for different officers was obtained and different effects for different officers were examined by age, gender or years of experience. Relationships between these variables were examined using multiple linear regression models. The results from this are shown in Table 3.

Inspection of the columns labelled '*p*-value' in Table 3 suggests that the size of the parole officer effect is unrelated to parole officer age, gender or years of experience. The only significant effects are those involving 'Missing' data for gender and years of experience for reoffending within 3 years[4]. This probably says more about the quality of data rather than about the effect of parole officers on reoffending outcomes.

DISCUSSION

The aim of this study was to look at the effect that parole officers have on the reoffending of those they supervise, and (if effects were found) to try and explain these effects in terms of officer characteristics. Using random effects logistic regression, it was found that reoffending rates among parolees are affected by

both the supervising parole officer and the office where he or she works. In the majority of cases, parole officer effects only account for a one or two percentage point difference in the probability of reoffending. Surprisingly, the variation in the effect individual parole officers have on the risk of reoffending amongst the parolees they supervise appears to be unrelated to gender, age or years of experience.

Our findings are in qualitative agreement with those of Anderson and Wildeman (2014), but the effects they observed were much larger (up to 30 percentage points difference between median and the best/worst officers). Other studies, however, have found effects similar to ours. For example, gender of the parole officer has previously shown to have no impact (Maahs & Pratt, 2001) on preferred models/attitudes towards clients. While Maahs and Pratt (2001) did find that older officers were more likely to endorse a rehabilitative model in their relationships with their parolees, they did note that this was 'substantively weak', which would seem to align with our finding that there was no effect of officer age on reoffending (assuming that trends in models of rehabilitation mirrors those of innate skill).

The effects found from the different parole offices were interesting, especially when considering that the remoteness and socio-economic status of the parolee's postcode were included as covariates. This suggests that there is an effect from the office over-and-above the location fixed effects associated with each office. This seems to contradict results from Willits, Broidy and Lyons (2012), who find no significant effects from any institutional

(office) effects on parole officers' attitude towards parole. However, it is worth noting that attitude towards parole does not necessarily translate into differences in reoffending rates. Furthermore, it is possible that there are office-level factors that can influence reoffending, but these cannot be observed in this analysis.

Regardless, the implications for these results are important. This study has helped to shine a light on the role that parole officers can have on reoffending. The results show that (despite the effects being small) parole officers and offices should be taken into account when evaluating the effectiveness of parole supervision. While further research is necessary to properly examine what causes the difference in effects across parole officers, the fact that there is currently variation supports current efforts to enhance the quality of parole officer supervision, and is important knowledge for future studies of reoffending.

ACKNOWLEDGEMENTS

NOTES

1. In the referenced study, the outcome was a new offence or a technical breach within two years. This differed from the outcome in this study, which was simply a new offence.

2. Including these offenders did not change the results with regards to parole officer effects on reoffending, or parole officer demographics on parole officer effects. When looking at reoffending within two years, the p-value for office effects dropped from .052 to .048 when including these offenders, meaning that reoffending within two years was significant at the 5% level, not just the 10% level. Office effects for reoffending within one and three years remained unchanged.

3. Prior five years is taken to mean the five years prior to the index custodial offence.

4. The possibility of interaction effects were examined, and were found to be largely insignificant. The models with all interaction effects included are available from the author upon request.

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APPENDIX

HOMOGENEITY ACROSS OFFICERS

Logistic regression models were fit using gender, Indigenous status, LSI-R score, age, age of first contact with police, ARIA and SEIFA score of the offender as response variables, and parole officer as the explanatory variable (parole office was included as a fixed effect). For each parole officer, a *p*-value was obtained for how 'predictive' that officer was of the given characteristic for the offender. For example, for the model on gender, any significant parole officer effect in this model would mean that that particular officer would be predictive of gender of the offender; i.e. that officer has a different-from-average mix of offenders (with regards to gender).

After obtaining the *p*-values for each officer, I looked at the proportion of officers with a significant effect for each offender characteristic. With a 5% level of significance, we would expect to have 5% of officers having a significant effect, if there was truly no effect from officers on the characteristic. The number and proportion of officers who had significant effects for each characteristic is shown in Table A1.

From Table A1, it can be seen that less than 5% of officers had significant effects for gender, days in custody for the index offence, prior convictions for violent offences and prior convictions for drug offences, close to (but slightly more than) 5% of officers had significant effects for age of first contact with police, approximately 6% of parole officers had significant effects for Indigenous status, age, prior convictions and ARIA score, and significantly more than 5% of officers had significant effects for LSI-R score, SEIFA score and prior convictions for breaches of orders.

Given that many offender characteristics showed more than 5% of offices were significantly predictive of that characteristic, it is possible that the variance in parole officer effects is due to the variance in offender characteristics. While I did include offender characteristics as covariates when fitting the random effects models, it is possible that this is not capturing all variation caused by these effects. If this is the case, then whether or not an officer has a significant effect on an offender characteristic should be predictive of their effect on reoffending (i.e. officers who have different-from-average characteristics should have either higher or lower random effects for reoffending than average). Because of this, I then regressed the reoffending random effects on binary variables of whether or not the parole officer is significantly predictive of given offender characteristics. This regression (for reoffending within one, two and three years) is shown in Table A2, along with the R-squared for each regression.

Looking at Table A2, it can be seen that there are no significant predictors that influence the random effect for reoffending. It is worth noting that the R-squared value for each regression is .008, meaning that these predictors only explain 0.8% of the variance in reoffending random effects. Therefore, it appears that the differences in parolees seen by each parole officer are not what is driving the differences in the random effects of parole officers.

VALIDITY OF LINEAR REGRESSIONS IN STAGE 2 ANALYSIS

Figure A1 shows four plots to help determine the validity of the linear regressions used in the stage 2 analysis for reoffending within one year (the corresponding plots for reoffending within two and three years are shown in Figures A2 and A3 respectively. The layout of the plots is the same for all figures). Panel A) shows the raw residuals from the linear regression plotted against

Table A1. Significance of parole officer effects on offender characteristics

Variable	Number of non-significant parole officers	Number of significant parole officers	Percentage significant
Gender	919	2	0.2%
Indigenous status	864	57	6.2%
LSI-R score	848	64	7.0%
Age	865	56	6.1%
Prior convictions	865	56	6.1%
ARIA score	851	59	6.5%
SEIFA score	770	139	15.3%
Age of first contact with police	871	49	5.3%
Days in custody for index offence	896	25	2.7%
Prior convictions for violent offences	882	39	4.2%
Prior convictions for drug offences	896	25	2.7%
Prior convictions for breaches of orders	839	82	8.9%

Note: When fitting these models, offenders with missing values are excluded. Therefore, it is possible that the sample of some models contains fewer parole officers than others.

Table A2. Effects of significant CCO effects on reoffending effects within one, two or three years.

Variable	Reoffending within 1 year		Reoffending within 2 years		Reoffending within 3 years	
	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value
(Intercept)	0.001	.504	0.001	.698	0.001	.768
Indigenous Status	-0.007	.207	-0.01	.139	-0.012	.170
LSI-R	-0.007	.234	-0.007	.327	-0.009	.264
Age	-0.004	.520	-0.006	.467	-0.001	.934
Prior appearances	0.007	.198	0.005	.454	0.007	.440
ARIA	0.002	.709	0.003	.673	0.007	.376
SEIFA	-0.001	.829	-0.002	.671	-0.002	.667
Age first contact	-0.002	.753	0.008	.372	0.007	.532
Prior convictions for breaches of orders	-0.002	.643	-0.001	.908	-0.004	.625
R-Squared	.008		.008		.008	

the fitted values for each 'observation'. Panel B) shows the standardised residuals plotted against the theoretical quantiles from a normal distribution. Panel C) plots the standardised residuals from the linear regression plotted against the fitted values, and Panel D) plots the standardised residuals against the leverage of each observation.

In Figure A1, A2 and A3 Panels A) and C) show that the spread of the residuals (both raw and standardised) is approximately constant across all fitted values (with the exception of some outlying points). This supports the assumption of constant variance made by the linear regression. Panel D) for each plot shows that the observations with the higher leverage (leverage is a measure of how much influence each point has on the estimates of the coefficients in the linear regression) have

residuals closer to zero. This means that the regression is not being skewed by the outlying observations.

Panel B) for Figures A1, A2 and A3 show the quantiles of the standardised residuals plotted against the quantiles of a normal distribution. An approximately linear relationship in these plots would show that the residuals are approximately normally distributed, supporting this assumption of the regression. In all cases, the residuals appear to be roughly normally distributed, with the exception of a few outlying points (these are the points with the lowest values). Figure A4 shows these quantile-quantile plots with the most extreme observation removed. It can be seen now that the quantile-quantile plots all appear to follow a roughly linear relationship, so it does appear that the data is normally distributed.

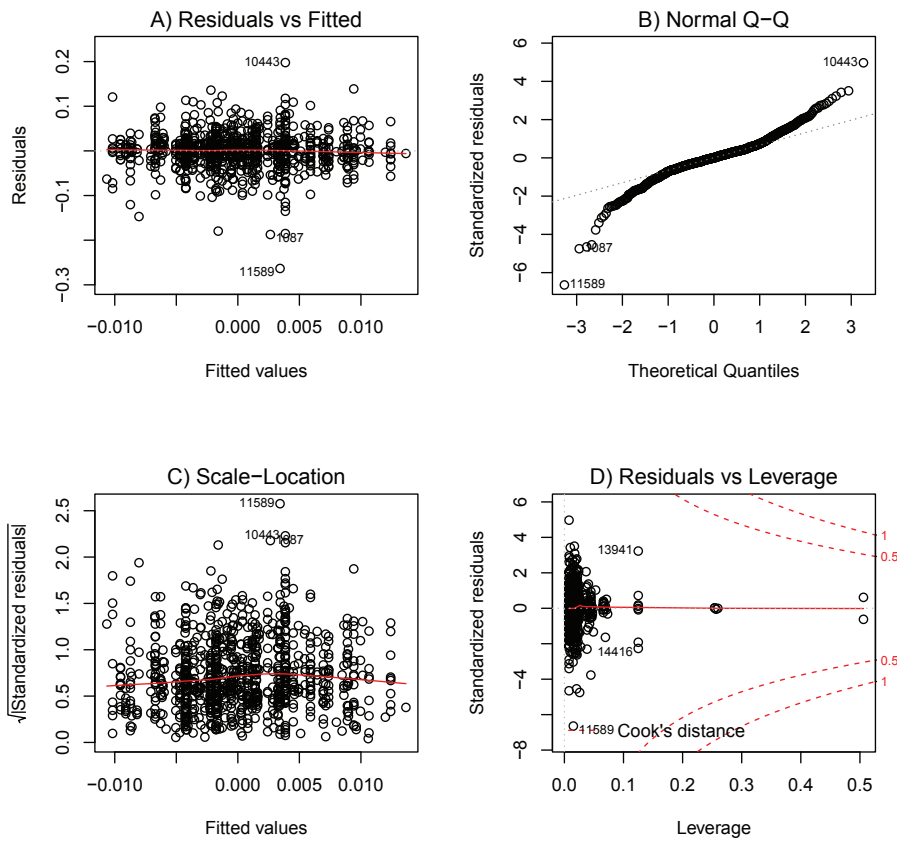*Figure A1. Validity plots for stage 2 linear regression for reoffending within 1 year*

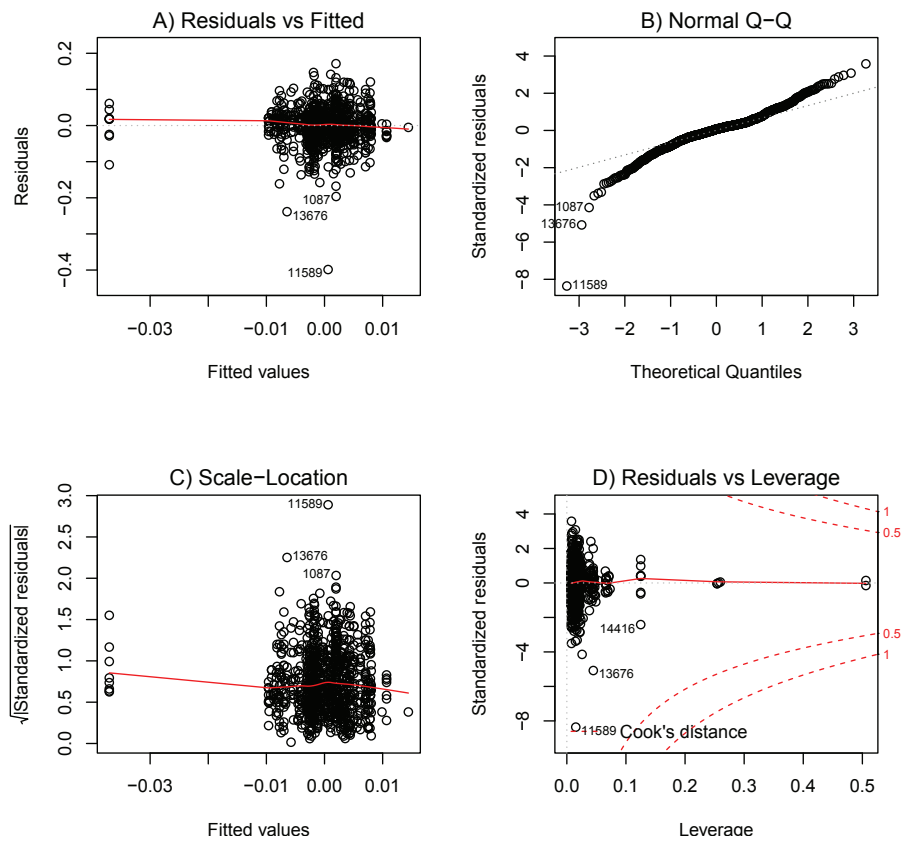*Figure A2. Validity plots for stage 2 linear regression for reoffending within 2 years*

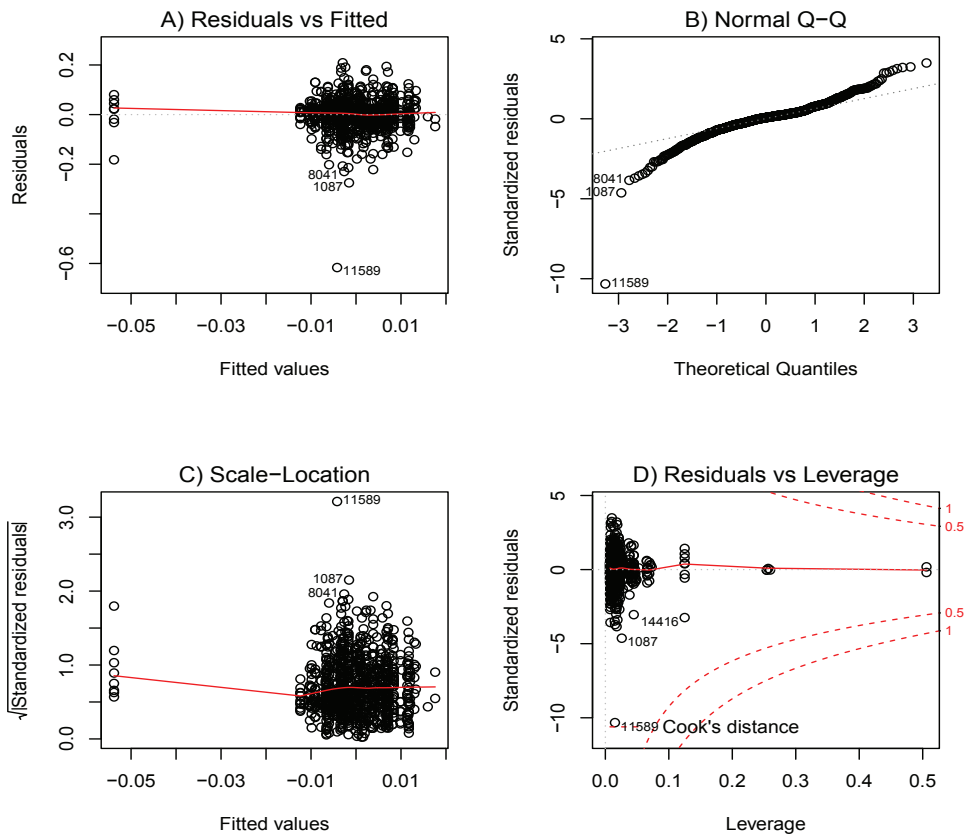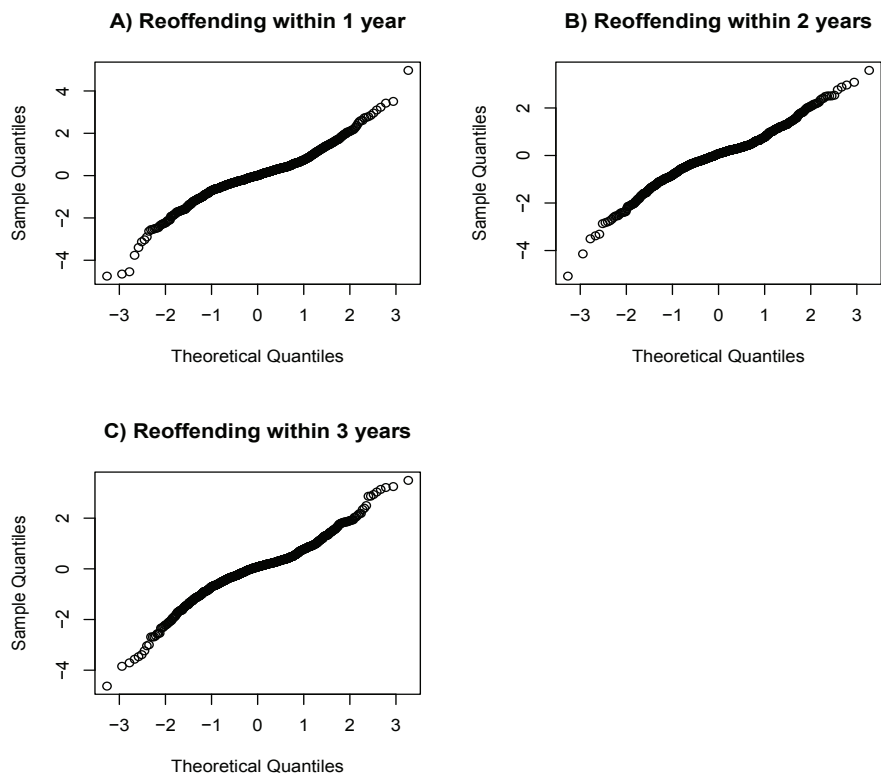*Figure A3. Validity plots for stage 2 linear regression for reoffending within 3 years*

Figure A4. Normal Q−Q Plots with the most extreme observation removed

Other titles in this series