A Quasi-Experimental Evaluation of the "Environmental Corrections" Model of Probation and Parole

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Abstract

Objectives: The current study reports the results of a pilot test of the Environmental Corrections model of probation and parole, a framework for supervising offenders in the community that focuses on opportunity-reduction strategies.

Methods: A pilot test of Environmental Corrections was performed in one probation and parole office in a large metropolitan area of Australia. All staff in the office (n = 13) implemented the new model following training, and all offenders supervised at this office were subjected to the model (average daily caseload size: n = 450; total supervisees that took part in trial: n = 993). Trends and rates in official recidivism (new offences recorded by police) and breaches (technical violations of supervision conditions) were analysed at six months post-intervention using a statistically equivalent comparison group created through propensity score matching across 19 covariates associated with recidivism risk.

Results: Using the propensity score matched control group, at six months post-intervention, 34.81% of the offenders in the control group had reoffended compared to 25.00% of the offenders in the matched treatment group ($\chi^2 = 3.929$, $p < .05$), for a reduction in the rate of reoffending of 28.18%. There were no statistically significant differences in rates of contravention between the two groups.

Conclusions: The pilot test demonstrates that opportunity-reduction strategies hold promise for reducing recidivism among community-supervised offenders through the Environmental Corrections model, which incorporates case plan stipulations which knife-off crime opportunities, redesigns offenders' routine activities, and utilises brief interventions focused on reducing situational propensity.

Key words: community corrections; Environmental Corrections; offender intervention; offender supervision; opportunity-reduction; probation and parole; recidivism

Introduction and Literature Review

"Environmental Corrections" has recently been proposed as a new organizing framework for probation and parole supervision (Schaefer et al. 2016). This model applies the tenets of environmental criminological theories to community corrections practices, focusing on reducing the opportunities for reoffending for each individual offender. The current study reports the quantitative results from a pilot test of this model of probation and parole through the use of a quasi-experimental research design.

Traditional models of probation and parole

Over the past several decades, mass incarceration has become a growing concern (Clear and Frost 2014; Pratt 2009). One of the side effects of a booming custodial correctional population is a corresponding increase in the community correctional population. The number of probationers and parolees is at an unprecedented level, and while some jurisdictions are seeing slight downward trends, the strain on resources for effectively supervising this large group of offenders in the community remains quite pressing. Yet despite the imperative to successfully manage this unparalleled population of probationers and parolees, the frameworks that guide community corrections practices have in many ways remained untouched. Traditional models of probation and parole balance two competing yet complementary orientations: treatment and control (Miller 2015; Whetzel et al. 2011). Unfortunately, with the recent demand to show "what works" and to develop "evidence-based best practices", a large body of literature has demonstrated that within community corrections, the exercise of treatment and control strategies are frequently ineffective.

Within the treatment paradigm, research demonstrates that corrections agencies cannot reliably reduce reoffending if the interventions fail to adhere to the principles of effective correctional intervention (Andrews and Bonta 2010; Cullen 2002). Unfortunately,

for many reasons, probation and parole departments often violate these principles in practice or choose to ignore them entirely (Lowenkamp et al. 2006; Taxman et al. 2006). Community correctional staff are frequently unskilled in behaviour change techniques (Bourgon et al. 2011), treatment referrals are often made through a blanket approach and fail to assess offenders' unique propensity-related reoffending risks (Matthews et al. 2001), and many existing correctional treatments target non-criminogenic needs (Bonta et al. 2008). The consequence of these shortcomings often produces an environment of generic and passive service brokerage rather than actual intervention (Solomon et al. 2008; Taxman 1999). Unsurprisingly then, many treatment efforts in probation and parole fail to prevent recidivism.

Within the control paradigm, community corrections frameworks often implement a bastardized version of deterrence theory, in which offenders are expected to comply with supervision conditions out of fear of the consequences of misbehaviour. This use of deterrence tends not to rely on a sound conceptualisation of rational choice, but instead utilises threats of punishment for choices that are (1) poorly defined and (2) difficult to monitor; as a consequence, the "cost" component of the cost-benefit analysis is inconsistently applied, at best. Research demonstrates that these control orientations to probation and parole are not only ineffective, but that they sometimes increase recidivism (MacKenzie 2000, 2006; Solomon et al. 2005; Taxman 1999). The conclusion from these studies is thus that, "for offenders who are already in the correctional system, there is just not much evidence that trying to punish them makes them less criminogenic" (Cullen and Jonson 2012: 89). Logically, there are concerns that control-oriented correctional models may invoke temporary behavioural compliance, but without a meaningful intervention, long-lasting behavioural change is unlikely to result.

Some probation and parole frameworks rely on invalid criminological or penological theories, resulting in ineffective uses of the treatment or the control orientation to offender supervision; still other agencies have responded by focusing on case management and administration rather than correction (Day et al. 2012; Solomon et al. 2004; Turner 2010; Worrall and Hoy 2005). Given these realities, ineffective community corrections practices abound, and some that are harmful have actually prospered (Cullen et al. 2009; Lipsey 2009). The fact that recidivism rates have remained largely unaltered has led some scholars to propose moving beyond the treatment-control paradigm of community corrections, developing a new model based on the available evidence about how to effectively prevent (re)offending.

The "Environmental Corrections" model of probation and parole

Toward the goal of developing a new organizing framework for probation and parole, Cullen, Eck, and Lowenkamp (2002) proposed their model of "Environmental Corrections", which merges the tenets of environmental criminological theories with community corrections practices. Drawing on the insights from crime science about opportunity-reduction methods of crime prevention, they reasoned that within probation and parole, "opportunity will be curtailed not only by threats of formal punishment for non-compliance, but more importantly by problem-solving officers who seek to expand informal social control over offenders, to increase the effort offenders must exert to access crime opportunities, and to work with offenders to restructure and fill their lives with prosocial routines" (Cullen et al. 2002: 35). The Environmental Corrections model was recently elaborated by Schaefer, Cullen, and Eck (2016), which details how community corrections agencies can best target the two known factors of (re)offending: opportunity and propensity.

First, probation and parole officers must work to limit their supervisees' access to chances to commit crime. This is accomplished through the development of case plan stipulations that restrict the offender's contact with criminogenic settings (that contain risky associates, activities, and antecedents). These stipulations must be specific to each individual offender, drawn from data that demonstrates what crime opportunities prove tempting for him or her (e.g., assessments, police records, offender reports). Thus, rather than providing offenders with generic restrictions and prescriptions that are meant to control their behaviour (but are difficult to define and enforce; e.g., "You are not permitted to associate with any other known offenders"), each individual is given supervision conditions that are specific to his or her criminogenic risks (e.g., "You are not permitted to communicate with John Smith", or "You may only associate with Jane Smith in the presence of your parents"). In addition to these efforts to knife-off specific crime opportunities, officers should also work to redesign offenders' routine activities so that risky situations are regularly avoided but are also replaced with prosocial substitutes. In this way, probationers and parolees are provided with a template for a longer-lasting prosocial lifestyle beyond adherence to a list of rules.

Second, the nature of officer-offender meetings must be reoriented so that the contact is interventive and the criminogenic needs of each probationer and parolee are addressed. This should occur using the principles of effective correctional intervention (Andrews and Bontaa 2010), including a reliance on cognitive-behavioural techniques and a focus on known criminogenic needs (such as cognitive skills deficits; Bonta et al. 2008; Day et al. 2012). More than this though, is the importance of corrections practitioners thinking about reducing criminal propensity in ways that are *related to* criminal opportunity, in part because not all crime opportunities will be identified and controlled by supervising officers. Rather than attempting to address the deep-seated issues that lead to offending behaviours (e.g., childhood trauma) or non-criminogenic needs of offenders (e.g., employment), officers must

maximize their interactions with supervisees to provide them with goal-oriented skills focused on the here-and-now. Specifically, officers can deliver interventions with the offenders on their caseload to teach skills in opportunity-avoidance (skills in decision-making that help offenders to steer clear of environments where opportunities for relapse are present), and opportunity-resistance (skills in problem-solving that help offenders to withstand remaining chances to reoffend).

Combined, the Environmental Corrections model thus works to reduce offenders' opportunities for reoffending while simultaneously working with offenders to reduce their propensity for choosing risky situations and exploiting the crime opportunities that they encounter. The framework differs from the dominant risk-need-responsivity (RNR) approach to correctional intervention (Andrews and Bonta 2010) given its emphasis on opportunity-reduction as opposed to a focus on propensity-reduction. The Environmental Corrections approach adheres to the RNR principles but further aims to redesign offenders' routine activities so that chances for recidivism are reduced. In this way, the Environmental Corrections approach is distinct in that it extends the arm of supervision beyond officer-offender interactions in the probation and parole office, instead considering the real risks for relapse present in each offender's environment and tailoring supervision conditions accordingly. This model is innovative in that it applies theories of crime prevention to corrections practices; however, many of the ideas that have guided the development of the Environmental Corrections framework are evidence-based. Thus, while the package is new, the contents are demonstrably effective, evidenced by a canon of crime science and penology studies. The question then becomes whether these crime prevention strategies can be effective for probation and parole authorities in the same way they have proven beneficial for police practitioners. Toward this end, this study describes the results of a world-first pilot test of the Environmental Corrections model.

To help readers appreciate the advancements made by the Environmental Corrections framework, here we briefly describe the differences between this approach and that used by the agency in which the pilot test was conducted (for a full discussion of the Environmental Corrections model, see Schaefer et al. 2016). Under the traditional supervision framework, staff were allegiant to instrument completion (e.g., case notes, supervision inventories), prioritising bureaucratic deliverables and rarely including any offender intervention. Although the agency demonstrated a familiarity with the principles of effective correctional intervention, these were not embodied in practice; here, probation and parole practices were centred around case processing rather than crime prevention, aiming to manage offenders rather than to encourage desistance. Within this pilot test, the Environmental Corrections approach transformed probation and parole staff into problem-solvers who (1) diagnosed the environmental conditions unique to each offender that encourage criminal behaviour, and (2) implemented supervision conditions and administered brief interventions aimed at disrupting those criminogenic settings. The aim of Environmental Corrections is to address the two ingredients of crime: opportunity and propensity. Thus, compared to the administratively-focused framework that was in place, the Environmental Corrections model minimised opportunities for reoffending by restructuring offenders' routine activities and reduced propensity by coaching offenders to recognise and avoid risky settings. Environmental Corrections is distinct from traditional probation and parole models in its focus on crime opportunities rather than case management or propensity-reduction alone.

Methods

A quasi-experiment of the "Environmental Corrections" model of probation and parole was recently conducted in a metropolitan region in Australia. The current study

describes the results of a six-month quantitative evaluation of this opportunity-reduction framework for the community supervision of offenders.

Sample

Following negotiations with the state corrections agency, a pilot test of the Environmental Corrections model was implemented in a probation and parole district office in a large metropolitan area in Australia. Random sampling and assignment were not feasible methodologies for this initial pilot test, therefore one office was purposively selected as the field site for the intervention. The site selection for the pilot test was supported by four points. First, the office, while part of the larger metro region, is somewhat isolated compared to the other district offices in the area, which minimizes the possibility of offenders reporting to alternate offices where the intervention was not in effect. Next, the age, tenure, and professional development of the pilot site left room for intervention, as the staff were experienced enough to embrace a reorientation of their roles without being entrenched in traditionalism and resistant to change. Third, the selected office hosts a balanced caseload of supervision orders and offender characteristics; the office is of moderate size comparatively and is not saturated in any special offender categories. Finally, the catchment area for the pilot site is comprised of communities that are relatively socioeconomically disadvantaged and experience higher rates of crime. These factors helped to draw attention to some of the precise place-based risks for offending that probationers and parolees in the area are exposed to.

All of the staff working in the selected probation and parole office received training in the Environmental Corrections model ($N = 13$), in addition to three staff members from other offices in the event that positions needed to be backfilled during the intervention period. This included two District Managers, two Supervisors, seven Senior Case Managers (who supervise high-risk offenders), four Case Managers (who supervise low- and medium-risk

offenders), and one Probation Services Officer (who oversees community service orders). During the intervention period, all staff in the office used the Environmental Corrections model in the execution of their duties to ensure that all offenders reporting to this district office were receiving opportunity-reduction supervision (this was a necessary design, given that a probationer or parolee may meet with another staff member in the event that their supervising officer is not available).

Additionally, all offenders being supervised at the pilot site were subjected to the Environmental Corrections model; all offenders who were currently under active supervision orders at the time of the intervention as well as offenders received into the district office during the intervention received the experimental manipulation. The office carries approximately 450 community corrections orders at any given time, resulting in caseload sizes of approximately 40 offenders for Senior Case Managers and 80 offenders for Case Managers. During the six-month intervention period, 993 offenders were exposed to the Environmental Corrections model, with periods ranging from 1 day to 183 days (the total period of the experimental trial; $M = 127.29$, $SD = 61.92$).

Intervention

All of the staff to be trained were gathered for a meeting in the weeks preceding the implementation of the Environmental Corrections model. During this meeting, staff received information about the objectives and the methods of the pilot test, were given endorsement from management staff within the organization, and were provided the opportunity to ask questions about the experiment. All of the staff were provided with pre-training materials at this meeting, including a preparation manual with pre-readings to help prime them for the face-to-face training.

The formal training in the Environmental Corrections model took place across two days in the last week of April 2016. The training was designed and delivered by the first author, who has approximately ten years of experience in working with community corrections practitioners and facilitating training. The training was comprised of three sections, each with three modules. The first section, "Managing Opportunity", provided training in (1) an introduction to crime opportunity theories, (2) developing opportunity-reduction case plans, and (3) supervision tools and crime controllers. The second section, "Managing Propensity", delivered training in (4) an introduction to theories of criminal propensity (particularly those related to the principles of effective correctional intervention), (5) cognitive-behavioral techniques of intervention, and (6) administering cognitive skills training to community correctional clients. The third section, "Managing Offenders", provided training in (7) special populations of offenders, (8) strategies for monitoring offenders, and (9) a review of the goals and methods of Environmental Corrections. The new model was implemented immediately following the training, such that all staff working at the pilot site exclusively used the Environmental Corrections model with all offenders under their supervision as of 1 May 2016.

In the weeks following the implementation of the Environmental Corrections model, the Principal Investigator completed field observations and conducted shadowing of officer-offender meetings. Individual upskilling was provided to staff members where requested or required. Group-based booster training sessions occurred on seven occasions between May and October 2016. These sessions provided refresher and advanced training where staff performance deficiencies were noted or as problems emerged. The group booster trainings included role-playing exercises that were designed to redirect Case Managers' performance that showed slippage from the Environmental Corrections model. Sessions covered topics such as dealing with intervention-aversive clients, identifying opportunity-related

criminogenic risks, (re)scheduling clients' routine activities, and graduated rewards and sanctions. These booster sessions were used more frequently toward the beginning of the trial as the Case Managers grew accustomed to the new model and navigated the difficulties inherent to utilising new practices within a broader institutional framework that remained unaltered.

Analytic procedures

Following the completion of the intervention period of six months, data was provided to the research team by the state corrections agency. The data included offender, offence, and order characteristics for all individuals supervised at the pilot site, in addition to all offenders supervised at another district office within the region. The latter subsample was chosen to serve as a control group in order to conduct a quasi-experimental comparison of the effect of the Environmental Corrections intervention. The control group was purposively selected; it is the district office that is geographically nearest to the pilot site, reflecting comparable caseload characteristics. The final dataset contained information about 2,978 orders across more than 400 variables for all offenders supervised at these two district offices from 1 January 2015 to 31 October 2016 (the implementation of the intervention occurred in the first week of May 2016).

The data were cleaned and prepared for analysis. To reduce the influence of any confounding differences between the experimental and control sites, we created two statistically equivalent groups through propensity score matching. The matching process was conducted with SPSS version 22 using the PSM dialog (Thoemmes 2012). This invokes three separate R packages, including *Matchit* (Ho et al. 2007), *RItools* (Bowers et al. 2010), and *CEM* (Iacus et al. 2009). We calculated propensity scores using logistic regression with the district office as the group indicator with 19 covariates, including offender, offence,

order, and risk characteristics of each probationer or parolee. We used nearest neighbour matching without replacement and applied a caliper of 0.1 of the standard deviation of the logit of the propensity score; the selection of the caliper width was based on research examining the impact of different calipers on the reduction of bias when using a mixture of continuous and binary covariates (Austin 2011). In addition, we specified for exact matching within risk of reoffending categories to ensure that participants from the treatment group would match exactly with a participant from the control group who had a similar covariate distribution within each of the risk of reoffending categories.

The propensity scores calculated from the unmatched sample were shown to accurately predict group membership for the experimental and control group participants (χ^2 (19, n = 684) = 40.97, $p < .001$, $R^2 = .08$). Of the 308 participants from the control group, 258 (83.77%) were matched to a participant from the experimental group. While the two groups were roughly comparable to begin with, the propensity score matching reduced any remaining differences to statistical non-significance (see Table 1). The distribution of the propensity scores for the participants by district office and whether they were matched or unmatched to a corresponding case of the opposite group displays a large area of common support (see Figure 1). We used both univariate and multivariate tests post-matching to assess whether the matching process was successful and achieved statistical balance between the groups. First, the overall balance test (Hansen and Bowers 2008) was non-significant, indicating that the matching process resulted in a good balance on the covariates ($\chi^2 = 6.44$, $p = .998$). Second, an improvement in the $\mathcal{L}1$ multivariate imbalance measure (Iacus et al. 2011) also demonstrated that balance between the groups had been achieved.

[TABLE 1 ABOUT HERE]

[FIGURE 1 ABOUT HERE]

One of the appeals of propensity score matching is the ability to control for pre-existing differences between groups, especially where a more rigorous methodology such as random sampling or random assignment could not be employed. Here we used matching to approximate experimental conditions so that apart from the difference in treatment, the groups were equal in other respects. However, because the construction of a propensity score relies on a range of observable covariates to match and account for selection bias, there remains the potential for residual selection bias from unobserved variables that simultaneously affect assignment into treatment and the outcome variable (Rosenbaum 2002). Whether there is any "hidden bias" and the implications that this might have on our results can be assessed through a sensitivity analysis. This provides a quantitative statement of how large of an effect unmeasured variables would need to have in order to invalidate our findings (Rosenbaum 2002). Despite the implications that hidden bias might have on results, it is oft-neglected within the criminological literature where propensity score matching is employed (Loughran et al. 2015).

We calculated Rosenbaum bounds to provide information about how sensitive the findings might be due to the effect of unobserved confounders. As the outcome variable within our analyses was binary-coded, we used the Mantel and Haenszel (1959) test statistic, as suggested by Aakvik (2001); this was conducted using the mhbounds Stata module (Becker and Caliendo 2007). The resulting gamma statistic (Γ) is interpreted as an odds ratio, so that a gamma value of 1 indicates no hidden bias at $\Gamma = 1$, and provides a critical value at which our conclusions about a significant treatment effect might be invalidated because of unmeasured confounders. A gamma statistic of a small magnitude (closer to $\Gamma = 1$) indicates that our results are more sensitive to hidden bias, while a large magnitude implies that our finding is robust to hidden bias. In our analysis, the critical value of $\Gamma = 1.13$ indicates that

our results are relatively sensitive to hidden bias, although there is a lack of clear thresholds about the interpretation of critical values.

Results

In the first stage of analyses, we examined the trends of reoffending across all probation and parole orders, comparing the treatment office and the control office from January 2015 through October 2016 (see Figure 2). Here, reoffending is operationalized as a new offence as recorded by police, and the rate is calculated as the number of orders incurring a reoffence relative to the number of active orders within a given month. Results demonstrate that the rate of reoffending is roughly comparable between the two offices prior to the implementation of the intervention (averaging 31.54% for the treatment office and 32.23% for the control office in the preceding year), with the treatment office experiencing a reduction in the rate of reoffending following the introduction of the Environmental Corrections model. At six months post-intervention, the treatment office had a lower reoffending rate than the control office (26.65% versus 32.58%). Calculating the difference between these rates produces a reduction in the rate of reoffending of 18.18%.

[FIGURE 2 ABOUT HERE]

Although this initial result appears promising, it must be interpreted with caution for two central reasons. First, these calculations were performed on an order-by-order basis, meaning that an individual offender could be serving multiple orders concurrently and appear in the data multiple times, skewing the results. It is also possible that an order could incur multiple reoffences rather than being coded as a success versus failure. Second, this analysis was performed without controlling for any potential confounding variables between the two groups that may influence the outcome. Accordingly, we completed the next analysis using the two propensity score matched groups, using individual offenders as the case and

controlling for several confounding variables that affect the risk of reoffending. Drawing on the procedures described above, the consequent differences observed in comparisons between the treatment and control group following this matching procedure can be more safety attributed to the intervention.

The second analysis we conducted compares the cumulative rates of reoffending across the matched treatment and control groups following the implementation of the Environmental Corrections model. Figure 3 showcases the proportion of offenders in each group of 258 that incurred a police-recorded reoffence in each of the six months following the intervention. The difference between the proportion of reoffending between the treatment and control group becomes statistically significant at four months onward. By six months post-intervention, 34.81% of the offenders in the matched control group had reoffended compared to 25.00% of the offenders in the matched treatment group ($\chi^2 = 3.929$, $p < .05$). Comparing the two groups reveals a reoffending rate reduction of 28.18%.

[FIGURE 3 ABOUT HERE]

Viewed differently, we also conducted a Kaplan-Meier analysis. Figure 4 displays the hazard curves for the treatment and control group, showing the proportion of offenders supervised at each office recidivating (y-axis) by the number of days (x-axis) between the implementation of the Environmental Corrections intervention and the event (reoffence) or the censor (no observed recidivism in the six-month follow-up period). The average number of days between the start of the intervention and the first reoffence differed significantly ($t = 2.090$, $p < .05$) between the treatment group ($M = 67.25$, $SD = 53.13$) and the control group ($M = 42.56$, $SD = 85.84$). Visual inspection of the hazard rates shows that the two groups are roughly comparable in the first month post-intervention, with the greatest growth between the two curves occurring at approximately three-months after the commencement of the new model. The log-rank Mantel-Cox test was used to examine whether the cumulative

reoffending hazards between the two groups were statistically significantly different, with the result confirming what appears to be two different curves in Figure 4 ($\chi^2 = 4.609$, $p < .05$).

[FIGURE 4 ABOUT HERE]

One of the concerns with the Environmental Corrections model is that the rate of order contravention may increase compared to supervision as usual. The worry is that by providing probationers and parolees with more clearly specified supervision conditions that are tailored to each offender's unique risks for reoffending, that breaches are more readily identifiable and case plan stipulations are more easily enforceable. Thus, to explore this possibility, we examined the rate of these technical violations between the two propensity matched groups (see Figure 5). Although the rate of breaches of order conditions is slightly higher for the treatment group (14.63% compared to 11.60% for the control group), this difference is not statistically significant ($\chi^2 = .697$, $p = .404$). Readers should note that in the location of the pilot test, offenders can receive a technical violation regarding the conditions of their order and still remain on supervision, and those individuals have thus been retained in the pool of "at risk" participants who are "eligible" to reoffend as measured by police arrest for a new offence.

[FIGURE 5 ABOUT HERE]

We anticipated that the Environmental Corrections approach may be more or less effective depending on several offender and offence characteristics. Although the results above provide support for the model overall (compared to treatment-as-usual in the control group), there may be moderating effects that are of interest that will help to contextualise the findings and provide directions for future research. Here we report a selection of these associations. We conducted a series of crosstabulations and means comparisons for those covariates associated with reoffending risk as reported in Table 1. For those participants in the treatment group, at six months post-intervention, reoffending was more likely for those

offenders who had committed an act of major violence (homicide and related offences, serious assault, sexual assault, and robbery; $\chi^2 = 3.923$, $p < .05$), those offenders who were concurrently serving multiple orders ($\chi^2 = 8.966$, $p < .01$), those with more previous correctional orders ($t = -2.000$, $p < .05$), and those with a higher risk of reoffending score ($t = -3.947$, $p < .001$). There were no statistically significant differences in reoffending by offender demographics (age, sex, ethnicity, or Aboriginal and Torres Strait Islander status) or by order type, nor between other offence types beyond major violence (minor violence, drugs, property, weapons, or public order). Overall, these findings suggest that the Environmental Corrections model is less effective with very high risk offenders with entrenched criminogenic needs and extensive correctional histories, but otherwise has widespread utility across offender and offence types.

Relatedly, there is the possibility that those individuals with greater "street time" would be at greater risk of reoffending, given their increased opportunities for doing so. Although we do not have an ideal operationalisation of such a variable that would enable us to test for such an effect, we have used the offender's employment risk level as a proxy for free time. We did indeed find that those offenders that were categorised as "high risk" in the employment domain (i.e., those that are unemployed, not looking for employment, and have little training or few skills that would enable employment) were more likely to incur a new police-recorded charge compared to those offenders without such risks ($\chi^2 = 5.154$, $p < .05$). We likewise found that those with high risk scores in the substance abuse domain were also more likely to reoffend ($\chi^2 = 4.157$, $p < .05$), while all other risk domains showed no statistically significant differences between those who recidivated and those who did not. There is a moderate correlation between employment and substance abuse risk in this sample ($\Phi = .248$, $p < .001$). Combined, the findings that those who are unemployed and with serious substance abuse problems are more likely to reoffend does lend support to the

hypothesis that greater street time is criminogenic. We suggest that this result is a demonstration of the utility of the tenets of Environmental Corrections: that engagement in a prosocial routine is protective against reoffending. Accordingly, while employment itself is certainly not a panacea for the recidivism problem, enmeshing probationers and parolees in routine activities that knife-off crime opportunities appears to be helpful.

Discussion

The current quasi-experimental evaluation of the first pilot test of the Environmental Corrections model of probation and parole has provided promising results. The new supervision framework was implemented in one purposively selected district office in a large metropolitan area in Australia for a period of six months, during which 13 staff members worked with nearly 1,000 offenders on community supervision orders. Due to the inability to use random sampling or random assignment for this initial field trial, we created a statistically equivalent control group using propensity score matching that accounted for 19 covariates associated with recidivism risk. Six months following the introduction of Environmental Corrections, the proportion of offenders in the treatment group with a new offence (as recorded by police) was 25% compared to 35% of offenders in the control group, for a reduction in reoffending of 28%.

Beyond this promising snapshot result, two other interesting findings are worth noting. First, there appear to be dosage effects at play. This is in part due to the analyses demonstrating that the difference between reoffending between the treatment and control group became statistically significantly different from four-months post-intervention. Thus, it is probable that the length of exposure to the intervention matters, such that the treatment makes demonstrable differences to behaviour only after repeated officer-offender contacts. Accordingly, future research should unpack the frequency with which these meetings occur

so as to maximize the impact of the intervention while not violating the risk principle of effective correctional intervention. Second, despite introducing a new model of supervision that provides more specific case plan stipulations, contraventions such as technical violations did not significantly increase. This is promising given the oft-supported adage of, "The closer you watch them, the more you see them fail." Here, it appears as though the addition of rules was not a hindrance but instead guided behaviour in a meaningful way. Subsequent studies should examine this further, detailing the kinds of breaches and reoffences that occur under this new supervision model.

Despite these contributions, the current study is not without limitations. Principally, because the experiment could not include random sampling or random assignment, it is possible that the results achieved were a consequence of the district office where the pilot test occurred and the staff that work there. Although we attempted to limit the shortcomings of not using randomization by creating a statistically equivalent control group through propensity score matching, it will be necessary for subsequent studies to use more rigorous research designs. Next, due to agency constraints, the length of the trial was only six months in length; future studies must examine whether these results can be maintained or whether decay would present. Relatedly, one of the reasons for the short period of intervention was staffing instability, which created difficulties in the administration of the experiment. Each staffing movement between roles and offices resulted in disruptions to the trial, including caseload handovers that interfered with the continuity of care supervisees should optimally receive. Yet the largest obstacle we encountered in performing the pilot test was that we were operating a "model within a model"; that is, while the experimental site adopted the Environmental Corrections framework, other agency policies and practices were retained (e.g., assessments, criteria for suspensions, reporting to other agencies). These standard operating practices were sometimes at odds with the goals of the piloted model, which at

times required staff to adhere to the department's rules or the state's legislation (for example, automatic sentence revocations upon failed drug tests) and to ignore the preferred strategies that would be implied by the Environmental Corrections model. Future experiments are required to evaluate the impact of opportunity-reduction supervision strategies absent these operational constraints.

Finally, it merits noting that the pilot test was designed and administered by the first author, who is also one of the developers of the full Environmental Corrections model (Schaefer et al. 2016). To help combat this potential conflict of interest, the evaluation was conducted with the assistance and oversight of others, including the second author. While it is difficult for researchers to distance themselves entirely from the values or ideals that may be wrapped up in the subjects they sometimes study, clearly it can be potentially problematic for an individual with a vested interest in an idea to also empirically evaluate that idea, even when such a bias may be unintentional (Eisner 2009). At the same time, program fidelity is important, and it is not uncommon for correctional programs to fare better when the designer is involved in implementation. Still, the results of this pilot test, while promising, should be interpreted cautiously; the Environmental Corrections model should be replicated elsewhere and independently evaluated.

These shortcomings withstanding, this study provides evidence of the potential utility of the Environmental Corrections framework for probation and parole in reducing reoffending. It is possible that the marked crime prevention effects observed here are the consequence of the format of the experimental model as opposed to the content, whereby the structured brief interventions that officers conducted in their meetings with probationers and parolees were influential rather than the focus on knifing off crime opportunities. This caveat requires further research, but should also highlight for crime scientists the potentially important role of situational propensity. If an individual's motivation to commit crime is

triggered, heightened, or dampened by features of the environment, then part of the solution for corrections practitioners should be to change the way offenders interpret these environments. This tactic would augment supervision stipulations that help probationers and parolees to avoid crime opportunities and expose them to prosocial influences, but would also help to encourage long-lasting behavioural change by teaching community-supervised offenders to independently assess, avoid, and abstain from remaining opportunities to reoffend.

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Table 1: Comparison of Treatment and Control Group Before and After Propensity Score Matching

	Before PSM (N = 684)						After PSM (N = 516)					
	Treatment Group (n = 376)		Control Group (n = 308)		Hypothesis Test		Treatment Group (n = 258)		Control Group (n = 258)		Hypothesis Test	
Offender Characteristics	*P / M*	*SD*	*P / M*	*SD*	*test*	*sig.*	*P / M*	*SD*	*P / M*	*SD*	*test*	*sig.*
Age	32.29	10.35	34.49	11.63	**t = -2.593**	**0.009**	32.54	10.76	33.41	10.32	t = -.935	0.350
Sex (1 = female)	0.21		0.19		χ^2 = .666	0.414	0.21		0.20		χ^2 = .190	0.663
Native born (1 = yes)	0.71		0.68		χ^2 = .526	0.469	0.66		0.69		χ^2 = .717	0.397
Aboriginal and Torres Strait Islander (1 = yes)	0.23		0.09		**χ^2 = 22.640**	**0.000**	0.10		0.11		χ^2 = .020	0.887
Offence Characteristics												
Number of current offences	3.60	3.12	3.33	3.13	t = 1.125	0.261	3.15	2.73	3.46	3.23	t = -1.193	0.233
Most serious offence	9.61	4.03	9.85	4.20	t = .178	0.859	9.69	4.09	9.78	4.16	t = -.235	0.814
Offence: major violence (1 = yes)	0.35		0.37		χ^2 = .127	0.721	0.35		0.35		χ^2 = .000	1.000
Offence: minor violence (1 = yes)	0.10		0.06		χ^2 = 3.240	0.072	0.06		0.06		χ^2 = .034	0.853
Offence: drugs (1 = yes)	0.36		0.36		χ^2 = .001	0.972	0.37		0.37		χ^2 = .008	0.927
Offence: property (1 = yes)	0.52		0.43		**χ^2 = 5.830**	**0.016**	0.46		0.46		χ^2 = .008	0.930
Offence: weapons (1 = yes)	0.07		0.06		χ^2 = .560	0.454	0.05		0.06		χ^2 = .151	0.698
Offence: public order (1 = yes)	0.09		0.07		χ^2 = .813	0.367	0.07		0.07		χ^2 = .029	0.865
Order Characteristics												
Order type					χ^2 = 5.073	0.167					χ^2 = .018	0.999
Probation	0.41		0.48				0.47		0.47			
CO parole	0.39		0.31				0.33		0.33			
BO parole	0.15		0.17				0.16		0.16			
Other	0.05		0.04				0.04		0.04			
Multiple orders (1 = yes)	0.38		0.36		χ^2 = .412	0.521	0.38		0.37		χ^2 = .132	0.716
Risk Characteristics												
Risk of reoffending category					**χ^2 = 11.975**	**0.007**					χ^2 = .000	1.000
Low	0.14		0.21				0.16		0.16			
Standard	0.45		0.48				0.52		0.52			
Enhanced	0.21		0.18				0.18		0.18			
Intensive	0.20		0.13				0.14		0.14			
Number of correctional episodes	1.81	2.46	1.59	2.10	t = 1.215	0.225	1.41	1.91	1.67	2.14	t = -1.453	0.147
Accommodation risk (1 = high)	0.25		0.27		χ^2 = .335	0.563	0.25		0.28		χ^2 = .633	0.426
Employment risk (1 = high)	0.74		0.70		χ^2 = 1.193	0.275	0.71		0.71		χ^2 = .038	0.846
Substance abuse risk (1 = high)	0.72		0.68		χ^2 = 1.290	0.256	0.65		0.68		χ^2 = .877	0.349

Figure 1: Distribution of Matched and Unmatched Propensity Scores for Control and Treatment Groups

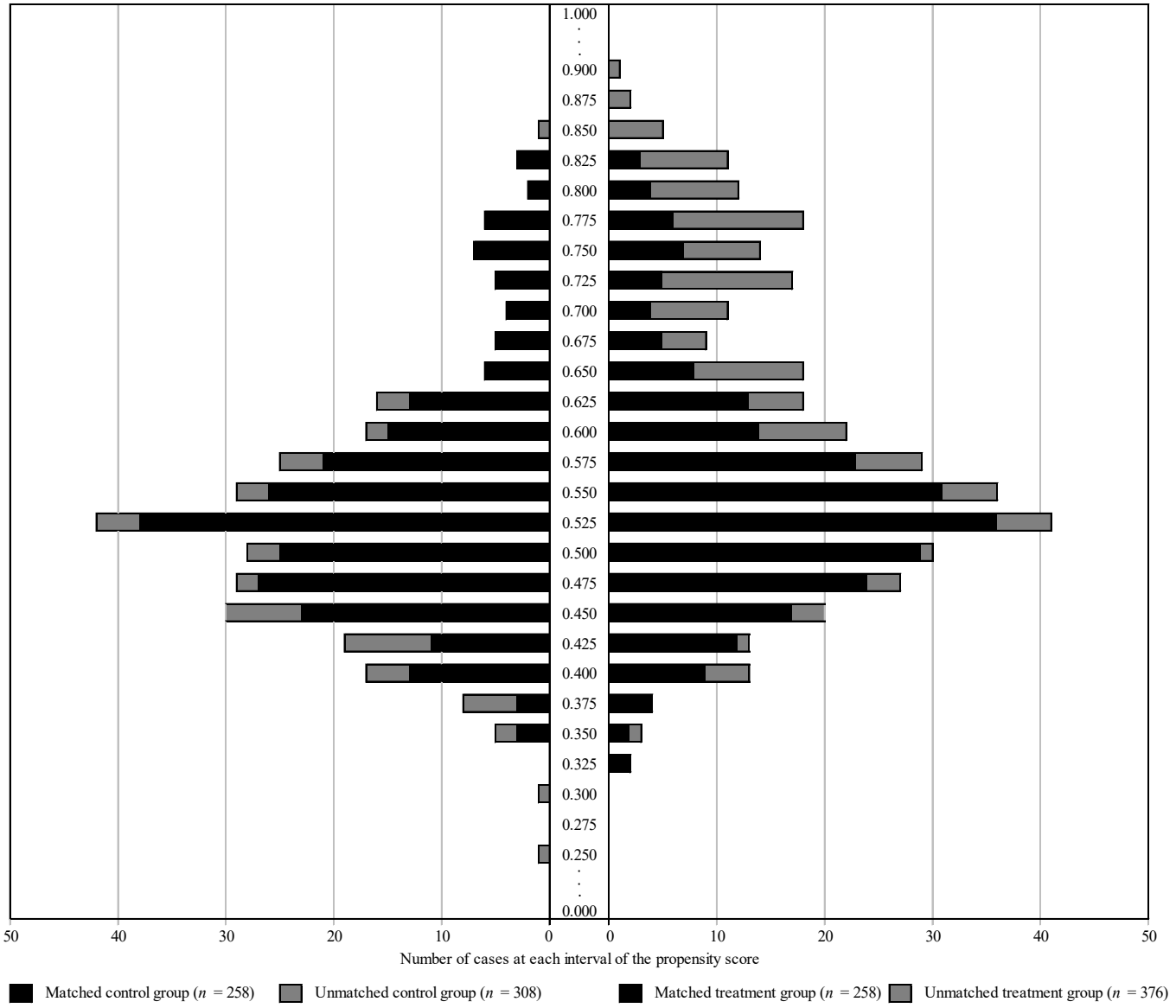


Figure 2: Comparative Trends of Reoffending Across All Orders

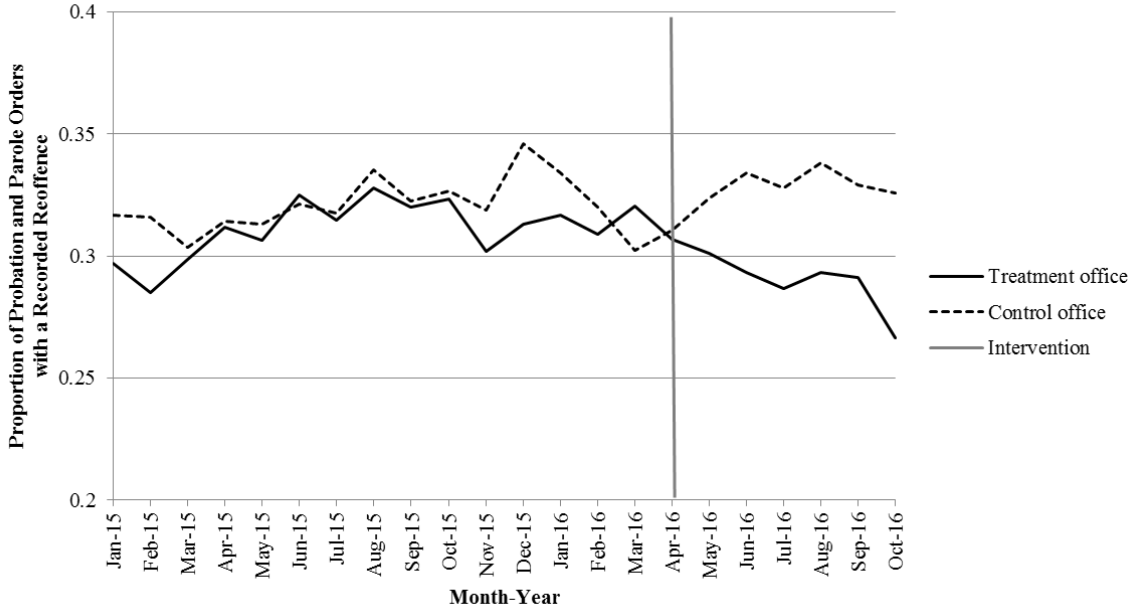
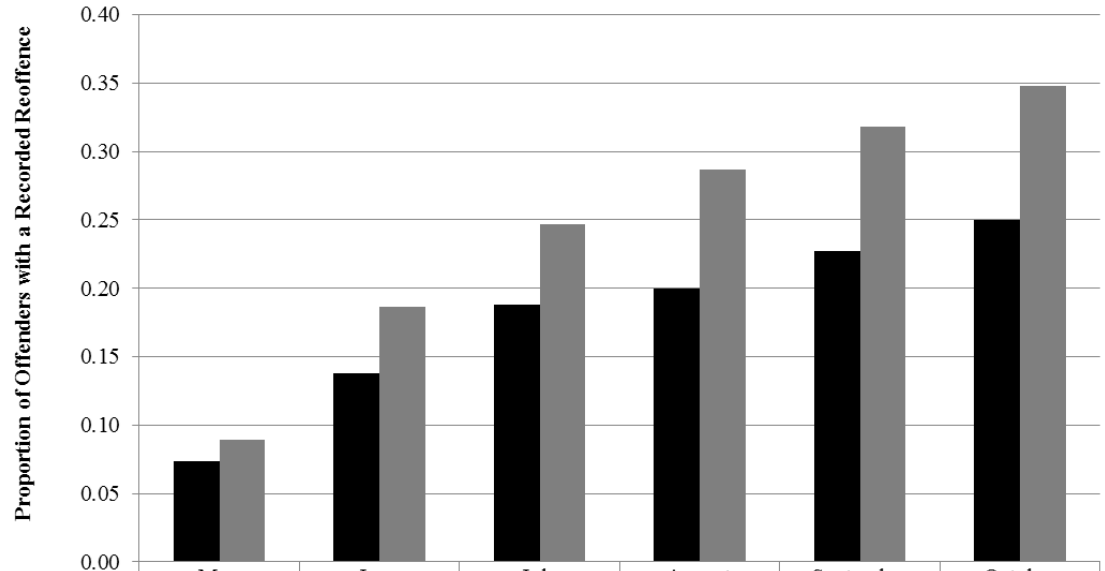


Figure 3: Comparative Cumulative Rates of Reoffending Post-Intervention



	May 1 month post	June 2 months post	July 3 months post	August 4 months post	September 5 months post	October 6 months post
Treatment group	0.07	0.14	0.19	0.20	0.23	0.25
Control group	0.09	0.19	0.25	0.29	0.32	0.35

Figure 4: Hazard rates for recidivism between treatment and control groups

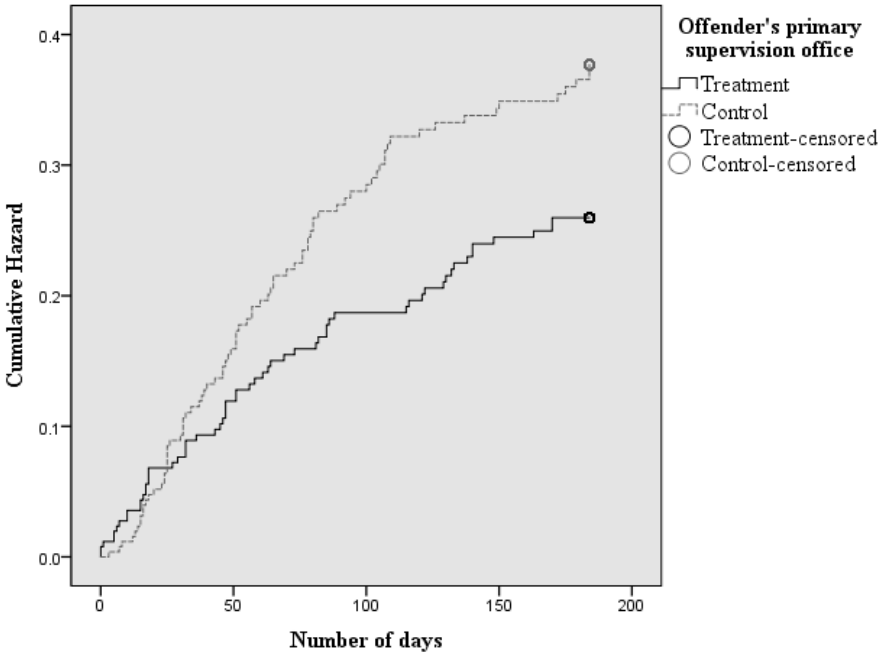
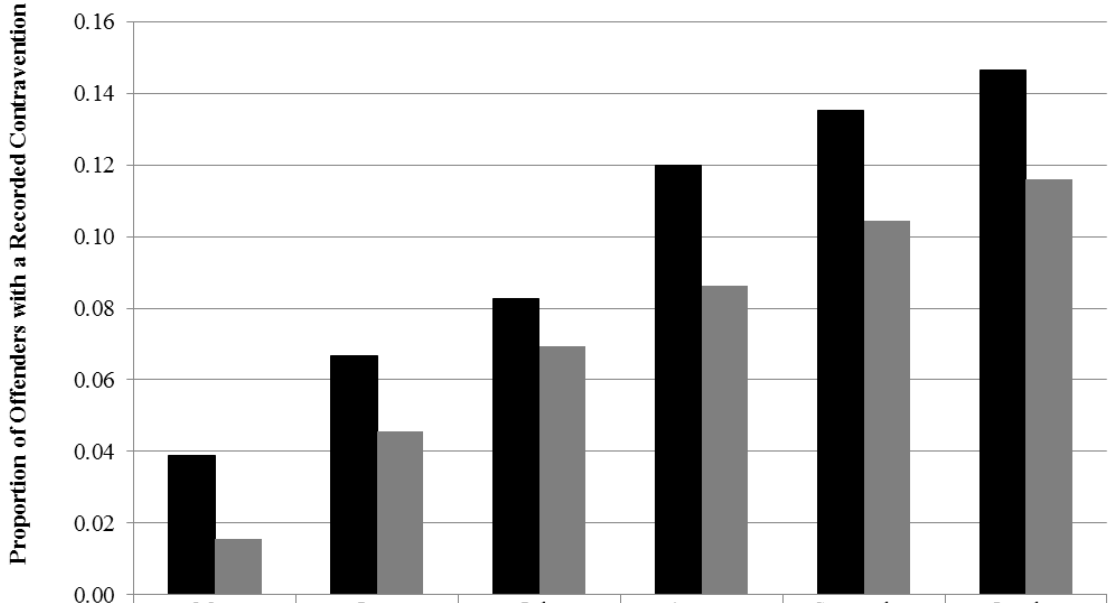


Figure 5: Comparative Cumulative Rates of Contravention Post-Intervention



	May 1 month post	June 2 months post	July 3 months post	August 4 months post	September 5 months post	October 6 months post
Treatment group	0.04	0.07	0.08	0.12	0.14	0.15
Control group	0.02	0.05	0.07	0.09	0.10	0.12