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the Amstelveen experiment

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Abstract

In three neighborhoods in the city of Amstelveen, the Netherlands, an experiment with near repeat patrolling after a burglary was implemented, during the 4th quarter of 2011. After a burglary had been reported to the police, two uniformed police officers were patrolling in a radius of 250 meter during two days from 7 am – 11 pm. Though the near repeat patrols did influence the near repeat pattern of burglary in the experimental areas, crime rates in the experimental areas did not become more favorable, compared to those in a control area in the same city. It is suggested that the experiment, though asking for a considerable amount of officers' time, was not large enough to be able to demonstrate positive effects, which then implies that effects are at best small, if not absent. The article is a short résumé in English of an earlier publication in Dutch.

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Introduction

Peeters, Van der Kemp, Beijers & Elffers (2012) did report, in the Dutch "*Tijdschrift voor Criminologie*", an evaluation study of a near repeat police patrolling experiment in Amstelveen. The present paper is a short résumé in English of that publication. We concentrate in this note on the experiment and its results, and skip a theoretical introduction to the near repeat phenomenon, for which we refer to the original publication, or to Johnson et al. (2007).

Is near repeat patrolling useful?

It has been widely demonstrated that many crimes, among which home burglaries, display a near repeat pattern, or, as it sometimes is metaphorically formulated, burglary is contagious. When a house has been burgled, it holds that the risk of a new burglary is increased for houses in an area close by and shortly after the initial burglary. We call such a period in time and space when risk is higher a *near repeat window*. Is it then a wise strategy for a police force to patrol intensively in and during a near repeat window (called near repeat patrolling), in order to either prevent a new burglary or to catch burglars red-handed? The present paper is investigating that question.

The Amstelveen near repeat patrolling experiment

In three neighborhoods in Amstelveen (a city of over 80,000 inhabitants, adjacent to Amsterdam) a near repeat patrolling experiment was designed in close cooperation between the local police force (viz. the police district Zuid of the police region Amsterdam-Amstelland) and us as researchers. The experiment was implemented during the period October 1st, 2011 and January 1st, 2012. All three neighborhoods have between 3000 and 5000 inhabitants, and had been chosen for having a burglary problem. For comparison reasons, four other neighborhoods were selected that had, loosely, characteristics "not too much different" from the experimental neighborhoods.[1]

When a burglary in the experimental area (the "initial burglary") became known to the police, a *near repeat patrol* was installed. That meant that during daytime and evenings (7 am – 11 pm), two officers were patrolling in a circle with radius 250 meters around the initial burglary.[2] The uniformed officers were clearly visible to all passers-by and inhabitants, hence also to prospective burglars.[3] They worked from an easily recognizable mobile police post, installed close to the initially burgled house. Officers approached inhabitants, informing them that the Amstelveen police was addressing burglary in the area, asking them whether they had seen something conspicuous around the initial burglary, and advising citizens how to behave in order to prevent becoming a victim of burglary, especially so if they observed careless behavior. During nighttime, no near repeat patrol officers were present in the patrol area, though their mobile post was still there and may have emanated the impression that the officers were around close-by.[4] Additionally, normal police work (e.g. reacting on calls for service) continued during the experiment.

It takes time after a committed burglary to install such a near repeat patrol, for two reasons. First, it may already have taken time for inhabitants to become aware of the fact that their dwelling has

[1] Because neighborhoods were not selected at random, we speak of a quasi-experiment.

[2] The radius of 250 m has been chosen on the basis of an analysis of the near repeat pattern in the burglaries in the experimental neighborhoods during previous years.

[3] Notice that it would also be possible to design a covert near repeat patrolling scheme, in which officers are present, but not easily recognized as policemen. Such a scheme would not aim to prevent burglary, but to arrest burglars.

[4] No police could be around during nighttime due to a limited availability of police staff for the experiment.

been burgled and subsequently report it to the police. Second, it takes time for the police to actually summon two officers, and install their mobile post. So, on the day the burglary had been reported (day 1), the near repeat patrolling was not active. The patrol was installed and maintained during day 2 and day 3 after the (assumed) time of the initial burglary.[5]
In the control area, no special police presence is organized, and burglary is treated "as usual".

Research questions and analysis

We attempt to answer two questions:

1) Does near repeat patrolling decrease burglary?
2) Does near repeat patrolling change the near repeat pattern?

Addressing the first question, we compare the occurrence of burglary (according to police records) in the experimental area with the same phenomenon in four control areas, two of them neighborhoods adjacent to the experimental neighborhoods, and two neighborhoods further away, using the distinction between the two types of control areas in order to look into displacement effects. We analyze the *change* in burglary rates for an area compared to the rates in a previous period.
The second question is analyzed by comparing Knox tables for the experimental and earlier periods.

Results: crime rate change

Table 1 shows results.

Comparing first the totality of experimental areas with the totality of control areas, we see, quite unexpectedly, that near repeat patrols seem to have a *counterproductive* effect: in the control group, we count 19% less burglaries, while in the experimental group we observe a 6% increase of burglaries. The differences are, however, not significant (α=.05; χ^2 = 0,80; df =1; n.s.), which may well be a consequence of rather small numbers of observations.
At second thought, we see that there is a considerable variation within the experimental and within the control group. Within the control group the percentage of change varies between -71% and +71%, (the differences between the various neighborhoods in the control group are indeed significant), within the experimental group that percentage varies between -33% and + 17% (n.s.).
We have to conclude that other influences (or random variation) than just the existence of a near repeat patrol scheme may be dominant, hence the power of the comparison is too low to arrive at safe conclusions. Burglary, though one of the most common crimes, is simply a too rare event to generate a powerful comparison design.

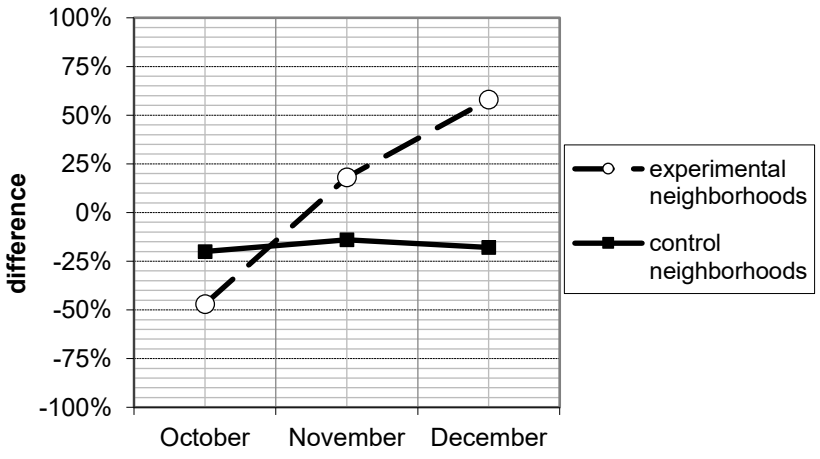
[5] The time length of three days of the near repeat window was again chosen by analysis of the near repeat pattern in previous years. When it was likely that a reported burglary occurred more than 2 days ago, no near repeat patrol was set up.

Table 1: Comparison of number of burglaries (final quarter of 2010 and 2011, per neighborhood)

TYPE OF NEIGHBORHOOD	NEIGHBORHOOD NUMBER	# OF BURGLARIES 4TH QUARTER 2010	# OF BURGLARIES 4TH QUARTER 2011	INDEX 2011 (2010=100)
EXPERIMENTAL	1	23	27	**117**
	2	16	19	**112**
	3	12	8	**67**
EXPERIMENTAL *TOTAL*		51	54	**106**
CONTROL (ADJACENT)	4	24	7	**29**
	5	15	14	**93**
CONTROL (FURTHER AWAY)	6	7	12	**171**
	7	12	15	**125**
CONTROL *TOTAL*		**58**	**48**	**81**

The same conclusion is reached when we split up the data in three one-month periods (Figure 1).

Figure 1:
Difference between number of burglaries in 2011 and 2010 as % of the number in 2010, per month



In November and December, the experimental areas experience an increase in number of burglaries, in October a decrease, for which we do not have an explanation: other influences are presumably dominating the experimentally manipulated presence or absence of near repeat patrol.

So, we were unable to demonstrate that near repeat patrolling is an effective way of preventing near repeat burglaries. Our impression is that crime rate changes are dominated by other -experimentally uncontrolled- influences. Hence, if at all, the effect of near repeat patrols is minor in comparison with other influences. Further research whether near repeat patrol has a non-zero effect would need larger areas (generating more crime instances) and better experimental control.

Results: near repeat pattern change

Possible change in near repeat patterns under influence of near repeat patrolling is investigated by comparing Knox tables[6] for the total experimental group in the experimental stretch of time (4th

[6] A Knox table presents odds ratios, indicating how much higher / lower the observed crime rate in a time/space slice is, compared to what may be expected when no near repeat effect had been present (Johnson et al., 2007). Knox tables can be computed by Ratcliffe (2008)'s freeware program that also performs a Monte Carlo resampling statistical significance test for the hypothesis that a presented odds ratio differs from 1.

quarter of 2011) with the same table for all burglaries in those areas in the period 2007 until 2010. The results are summarized in table 2.

Table 2: Knox table of odds ratios, in time/space slices, for experimental areas together (comparing last quarter of 2011 with the period 2007 – 2010)

	0 - 1 day	2 days	3 days	>3 days
1 - 250 meter	4.63* / *5.60**	0.25 / *2.86**	1.19 / *1.98**	0.96 / *1.50*
251 - 500 meter	0.98 / *0.77*	0.15 / *1.18*	1.43 / *1.22*	1.02 / *1.50**
> 500 meter	0.51 / *0.99*	1.32* / *0.89*	0.86 / *1.04*	1.00 / *0.96*

Upper left corner: Knox ratio for the experimental areas together, last quarter of 2011
Lower right corner in italics: Knox ratio for the experimental areas together, period 2007 - 2010
* factor is significantly different from 1 (α=0.05, Monte Carlo resampling test), factor >1 means increased risk

The light gray area is the near repeat window in which near repeat patrolling has taken place
The dark grey area belongs to the intended near repeat window, in which however, due to practical reasons, near repeat patrolling had not yet been installed

Not unexpected, there is little difference in odds ratios between the experimental and previous period in the upper left cell, as that is the time period when no near repeat patrolling had not been installed yet. Its Knox factor is indeed rather high, meaning that the near repeat patrolling would in all probability have been rather successful, if it would have been installed immediately after an initial burglary.

In the actually implemented near repeat window (1-250 m, 2 – 3 days) Knox factors in the experimental period are not significantly different from 1, while they used to be larger than 1 previously. In that sense, it looks like in terms of reducing risk, near repeat patrolling is successful. Although, as we have seen in the previous paragraphs, this has not lead to less burglaries in the experimental areas in total. It is tempting to comment on the very low odds ratios in the 2 days / 1-250m and 251-500m slices, but the estimates are not significantly different from 1, again due to low numbers of observations. Notice that the Knox ratio 2 days / > 500 m is indeed significantly > 1,, which may be interpreted as a displacement effect.

Strength of the near repeat phenomenon

A Knox table demonstrates that risk is not randomly distributed after an initial burglary, but it does not tell us how strong that effect is. In Table 3 we present how often we have observed pairs of burglaries that may be interpreted as (possible) near repeat cases, in the sense that the initial burglary (“originator”) and a subsequent one lie within the relevant time / space slice.

Table 3: Number of pairs of burglaries in various time/space slices (experimental areas, 4th quarter of 2011)

	0-250 m	251-500 m
≤ 1 day	10	1
2 -3 days	7	9
>3 days	2	4

The light gray area is the near repeat window in which near repeat patrolling has taken place
The dark grey area is where near repeat patrolling had not yet been implemented

We see that in the shortest time/ smallest space slice ten burglaries followed an initial one, which perhaps might have been prevented, had near repeat patrolling already been active. However, it seems[7] that five of these pairs actually were serial burglaries in one run, with very short time elapsing between them, so short that it is unrealistic to hope that police could already have reacted, leaving us with the hypothesis that possibly some five extra crimes might be prevented.

On the other hand, in the time/space slice that near repeat patrolling was active (2-3 days / 0-250 m) still seven burglaries followed an initial one, notwithstanding the near repeat patrols. It looks like a majority of them, five burglaries, were committed in the nightly hours (between 11 pm and 7 am) that patrols were interrupted[8], so only two cases were executed when patrol was active. If indeed near repeat patrolling would be active during the night, it is possible that a substantial part of the five nightly possible near repeats could have been prevented as well.

Adding up our hypotheses in the last two paragraphs, we predict that a 100% near repeat patrolling in the relevant near repeat window potentially could prevent some 5 + 5 = 10 burglaries. From table 1 we know that in total 54 burglaries took place in the experimental area in the relevant time period, so if we could prevent an extra 10, that would be a rather substantial share.

Notice however, that near repeat surveillance as implemented in this experiment is very labor intensive for the police already, and extension to the nightly hours and the first day after a burglary would intensify that considerably, so that we may wonder whether the results would match the amount of work needed.

Conclusion

A quasi experimental evaluation of a near repeat police patrol scheme did not prove a decrease of the number of burglaries in three experimental areas, compared to a set of four control areas. We diagnose this rather disappointing result as being the effect of two phenomena: first, the number of burglaries in a rather small area has a very large variation, due to influences not controlled for in our experiment. Moreover, the power of our experiment is rather low due to the fact that the number of burglaries in the neighborhoods investigated is small: even burglary, though the most common crime, is a rather seldom event. Low power implies that we would be able to distinguish only very large effects. It seems that such large effects are not present.

[7] Due to the uncertainty about the actual time that a burglary took place, this is not quite certain.
[8] The same proviso holds as in the previous note.

It could be shown that the near repeat pattern in the experimental area indeed was influenced by the near repeat patrol, so there is still evidence that near repeat patrolling has some effect, but the effect is, as shown in the previous section, at best rather small. A statistically sound estimate of its eventual size needs larger experiments, which will be more expensive. It is doubtful that near repeat patrolling is cost effective.

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