RUTGERS Center on Public Security

BRIEF

Police-monitored CCTV cameras in Newark, NJ: Placement choice and their impact on street crime incidents

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Innovative Improvements on Past Research

Prior research on street-level public surveillance CCTV cameras and their effectiveness in reducing crime has had mixed results. Some studies suggest CCTV cameras have no effect while others find small reductions in crime; however, many of these studies suffer from construct validity and other methodological and design limitations. For example, to evaluate the impact of CCTV cameras on crime, circular buffer areas are created around cameras to serve as target (i.e. experimental) locations for before-and-after analyses of crime occurrence. There has been little theoretical consideration for appropriate buffer diameters or recognition that some areas within the buffers may be visibly obstructed from cameras due to natural or human-made barriers, such as buildings. These issues must be addressed in the design of this research to avoid overstating or understating the impact of CCTV on crime deterrence, displacement, and/or dispersion.

The quasi-experimental study briefed here improved on the limitations of prior research by using viewsheds of areas visible to cameras via direct line-of-sight. Viewsheds were digitized using easily replicable methods that can be generalized to most other U.S. or worldwide jurisdictions using basic tools in ArcView, a Geographic Information System (GIS).

Our study also took an innovative approach to considering the effect of cameras on crime from the perspective of (potential) criminals in determining whether *they* could see cameras or should be concerned about cameras from where they were going to commit the crime. By conceptualizing CCTV viewsheds as "risky areas" to commit crime due to the greater potential of being seen and recorded by police, we more directly measured the deterrent and displacement effect of cameras at these locations. This conceptualization was also more consistent with the crime data used for statistical testing—incident locations (i.e. the presence or absence of a crime event), not the clearance or conviction rates or other outcomes that might be impacted by CCTV cameras.

The study assessed the impact of CCTV cameras only on crimes that could, conceivably, be deterred from street-viewing cameras. For example, theft or assault may occur within a dwelling that walls block visibility to a camera. Only crimes that occurred on streets, sidewalks, or other unobstructed areas were, therefore, included in the statistical analyses. In an unprecedented way, this study determined the extent to which police-monitored CCTV cameras deter visible street crimes in Newark, NJ at both the local and regional scales.

Data and Methods

The city of Newark installed two groups of cameras on two separate dates in March and July 2008, using two different placement strategies. The placement of "March" cameras was dictated by the sponsors who paid for this first wave of cameras and who required that they be placed in the Newark Business District. The placement of "July" cameras was done in consultation with Newark police department personnel and the cameras were subsequently located in known high-crime areas.

Data on shootings, auto thefts, and thefts from autos that occurred in Newark during 2007 through 2009 were obtained from the Newark Police Department.

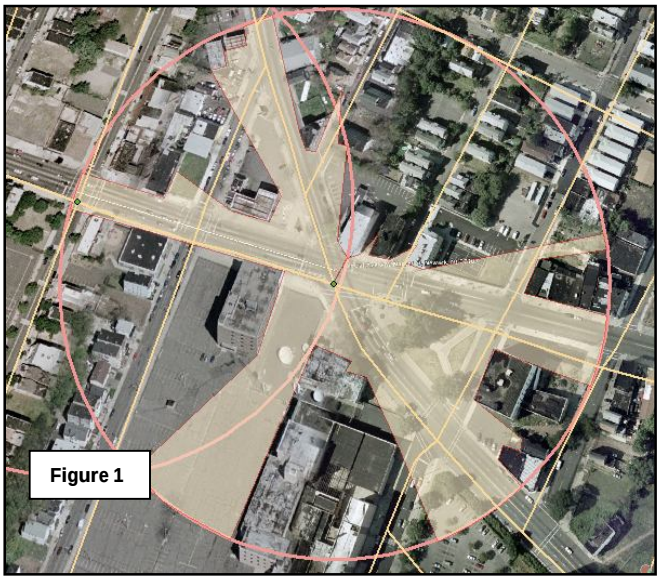

Figure 1

The calculation of the extent of viewsheds around a camera's location was based upon empirical research suggesting that crime-prone places typically comprise just one or two street blocks, which qualify as behavior settings (e.g., Felson, 1995[1]; Taylor, 1997[2]; Taylor and Harrell, 1996[3]) that are "regularly occurring, temporally and spatially bounded person-environment units" (Taylor, 1988[4]). This distance was determined to be double the median length of Newark block faces (582 feet). Viewsheds were then created by an innovative methodology using aerial photographs from Google Earth and basic ArcGIS tools and procedures to digitize viewshed features that took into account buildings and other permanent barriers to a camera's visibility. As shown in Figure 1, not all the areas within a buffer were visible to the camera—a concept that has been overlooked or ignored by many other researchers (see Ratcliffe and Taniguchi[5] as an exception).

Inferential statistical analyses were used to determine the impact of cameras on shootings within 73 experimental viewshed areas. Randomly chosen control sites, with subsequently created viewsheds, were used to compare installation strategies of experimental cameras to random (i.e. non-strategic and non-tactical) locations. The total number of control points (n=73) was equal to the number of police-monitored street-level CCTV cameras (n=73) installed throughout Newark and included in this study.

Results

The system of cameras in Newark significantly deters auto theft city-wide. However, shootings and thefts from autos are only deterred by cameras installed in certain places within the city. Local variations in crime concentrations and, presumably, the criminogenic characteristics of these locales can differentially impact the ability of police-monitored CCTV cameras to deter street crimes. In light of these findings, the impact of CCTV cameras should be considered modest in scope and, depending on where they are used and how they are operated, they should only be targeted to specific crimes under certain conditions. Perhaps it is no surprise that location matters!

Conclusion

The system of cameras in Newark is not as efficient as it could be at deterring certain street crimes. Some cameras are more effective than others. The ability of police-monitored CCTV cameras on street crime can probably be improved with more accurate methods and techniques for identifying ideal camera installation sites.

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[1] Felson, M. (1995). Those who discourage crime. In J.E. Eck & D. Weisburd (eds.), Crime and Place: Crime Prevention Studies. Vol. 4. Washington, D.C.: Police Executive Research Forum.

[2] Taylor, R. B. (1997). Social order and disorder of street-blocks and neighborhood: Ecology, microecology and the systemic model of social disorganization. Journal of Research in Crime and Delinquency 24: 113-155.

[3] Taylor, R. B. & Harrell, A. V. (1996). Physical Environment and Crime. Washington, D.C.: National Institute of Justice.

[4] Taylor, R. B. (1988). Human Territorial Functioning. New York. University of Cambridge Press.

[5] Ratcliffe, J. & Taniguchi, T. (2008). Retrieved from http://www.temple.edu/cj/misc/PhilaCCTV.pdf