Research Paper

The relationship between residential yard management and neighborhood crime: An analysis from Baltimore City and County

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HIGHLIGHTS

- Front yard landscaping has an association with crime, adjusting for several control variables.
- Crime correlates negatively with yard trees, garden hoses/sprinklers, lawns, and pervious area.
- Crime is positively associated with litter, desiccated lawns, uncut lawns, among other factors.
- Results add to the evidence that crime is deterred by "cues to care".
- They also add to the evidence that landscaping draws more "eyes on the street".

ARTICLE INFO

ABSTRACT

We analyzed the relationship between crime and indicators of residential yard management in Baltimore City and County. Data came from a survey we conducted of over one thousand front yards that included more than 40 indicators relating to lawns, trees, shrubs, beds and other features. These indicators were related to point counts of crime at the 150 m scale using a combination of ordinary least squares, spatial error, and Poisson regressions. After controlling for income, population density, block-scale tree canopy, and housing type, we found a consistently significant relationship between crime and a number of indicators of yard management. Yard-level variables that were negatively associated with crime included: the presence of yard trees, garden hoses/sprinklers, and lawns, in addition to the percentage of pervious area in a yard. Those positively associated with crime included presence of litter, desiccation of the lawn, lack of cutting of the lawn, and number of small trees in front of or adjacent to the property. While these results do not establish causality, they add evidence to a growing literature that suggests the possibility of several mechanisms by which environmental design may reduce crime: "cues to care" (the inverse of the "broken window" hypothesis) can lead to reduced crime by signaling to criminals the presence of social capital and the active involvement of neighbors in community spaces; and more appealing landscaping draws more "eyes on the street," which in turn deters criminals.

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1. Background

A growing body of literature suggests that urban environmental design has a significant impact on crime. However, the specifics of this relationship, including mechanisms and best management practices, are still poorly understood. This paper represents an attempt to address some of those gaps in the realm of residential yards.

A number of studies have focused on negative aspects of vegetation, suggesting that vegetation, particularly when low in height or dense in form, is positively associated with actual or perceived crime risk because it affords criminals concealment and a place to stash stolen goods or weapons (Fisher & Nasar, 1992; Nasar, Fisher, & Grannis, 1993). Michael, Hull, and Zahm (2001) cite anecdotes from park police about how dense vegetation is regularly used by criminals; and how automobile thieves say they use dense vegetation to shield many of their activities, including target selection, examination of stolen goods, and disposal of unwanted goods. Donovan and Prestomon (2012) found that low trees that decreased views from first floor windows on private lots in Portland, OR were associated with increased crime occurrence. Stoks (1983) found

that dense vegetation was a common characteristic of rape sites. It is not surprising, then, that in their guide to park design, Forsyth, Musacchio, and Fitzgerald (2005) discuss the importance of eliminating concealing undergrowth in parks to make users feel safer.

While this research suggests that vegetation can be a liability in some cases, an increasingly large literature suggests that it—along with outdoor landscaping in general—can be an asset in reducing crime. Troy, Grove, and O'Neil-Dunne (2012) found that tree cover has a strong negative correlation with several types of crime, even after adjusting for a number of socio-economic, housing, and environmental control variables. Wolfe and Mennis (2012) found that vegetation abundance measured at the tract scale has a significant negative association with rates of assault, robbery and burglary. Snelgrove, Michael, Waliczek, and Zajicek (2004) found a negative association between a remotely sensed greenness index and quantity of crimes committed.

A number of potential mechanisms for why trees may reduce crime have been proposed in the literature. One explanation is that well-designed landscaping makes spending time outdoors more appealing, leading to more "eyes on the street," which in turn leads to checks on dangerous behavior (Jacobs, 1961, Kuo, 2003). More "eyes" in public spaces deter criminals by making it harder for them to go unnoticed and by leading to informal surveillance networks (Kuo & Sullivan, 2001a; Kuo & Sullivan, 2001b). Additionally, these outdoor encounters foster social networks and cohesion among neighbors (Yancey, 1971), further fueling this virtuous cycle. Sullivan and Kuo's research suggests that stronger social networks can mean a reduced likelihood of crime from within the community in the case of public housing (Sullivan & Kuo, 1996). By contrast, non-landscaped, non-vegetated areas are often perceived as "no-man's lands" that keep people away. For instance, Coley, Kuo, and Sullivan (1997) found that the amount of time residents spent in common outdoor neighborhood spaces was associated with the presence of trees and that the closer trees were to residential buildings, the more people spent time outside near them. Kuo, Sullivan, Coley, and Brunson (1998) found that while residents disliked and avoided barren common spaces typical of many unmaintained inner city parks, they liked photo-simulations of the same spaces when those photos included additional grass and trees. The "eyes on the street" theory is consistent with "opportunity theory" from criminology, which suggests that for a crime to occur, motivated offenders must encounter suitable targets and the absence of capable guardians (Cohen & Felson, 1979; Wilcox, Land, & Hunt, 2003). Additional eyes on the street mean a potentially larger number of capable guardians.

A second explanation of why vegetation might reduce crime is that it can be seen as a "territorial marker" or a "cue to care," signifying to criminals that the residents are actively involved with their surroundings (Brown & Bentley, 1993), even if they see no residents on the street. The presumption is that when looking for a place to commit a crime, a perpetrator would move on to a neighborhood where cues suggest weaker neighborhood organization and less social capital. This is consistent with the "broken window theory," which posits that neighborhoods displaying visual cues of neglect or poor maintenance experience higher crime because these cues suggest to criminals a lack of effective law enforcement, while maintained neighborhoods send the opposite cue (Wilson & Kelling, 1982).

And finally, research also suggests that green surroundings can attenuate violent behavior through psychological mechanisms. For instance, green surroundings have been found to be associated with lower levels of aggression and mental fatigue in inner city residents (Kuo & Sullivan, 2001), while they have also been found to be linked to cognitive forms of self-discipline among youth, such as impulse inhibition and delay of gratification (Taylor, Kuo, & Sullivan, 2002).

The fact that some studies support the finding that vegetation increases crime through concealment while others find it decreases crime through eyes on the street or cues to care suggests that the type or configuration of urban vegetation matters. Most of the studies finding an inverse relationship between trees and crime are not explicit about the characteristics of vegetation being studied (e.g. height, species, age). One study that is explicit about this (Kuo & Sullivan, 2001a; Kuo & Sullivan, 2001b) looked specifically at widely-spaced, high-canopy trees over grass, finding that their presence decreased crime around Chicago public housing (although that predictor only explained about 8% of the variance). The authors point out that the vegetation being studied in this case was not the type that would afford concealment; therefore the vegetation's crime-fighting characteristics outweigh its crime-inducing effects. One of the few other studies to explicitly control for vegetation type in its design is from Donovan and Prestomon (2012), which found that low trees that decreased views from first floor windows on private lots in Portland, OR were associated with increased crime occurrence, while taller trees on private lots were associated with decreased crime.

While street trees have been associated with decreased crime in general, Troy et al. (2012), using Geographically Weighted Regression, found that there is some spatial variability in the relationship between tree canopy and crime that may be explained by vegetation management. The few block groups where more trees were associated with more crime tended to contain significant areas of unmanaged, densely stocked vegetation between residences and industry, suggesting that such landscapes have few of the crime-fighting benefits of managed vegetation while at the same time offering opportunities for concealment.

Several studies that examined the after-effects of vacant lot greening yield found further support for the proposition that actively managed urban landscapes are associated with less crime. These results suggest, in addition to the presence and height of vegetation, that the design and level of intentionality of urban vegetation and its associated landscaping matter. If urban trees or landscaping reduce crime at least partly through drawing "eyes to the street," then it would seem logical that landscapes that are more attractively managed may draw more eyes to the street as well. Among the studies that support this contention, Branas et al. (2011) examined more than 4000 vacant lots that had been greened in Philadelphia. These researchers found that gun assaults and vandalism rates dropped significantly around lots that had been greened when compared to un-altered lots. The study further supports the "eyes on the street" hypothesis in that it finds that residents around greened lots report more exercise and less stress. Not surprisingly, then, increases in the number of vacant lots have been found to be associated with greater assaultive violence (Branas, Rubin, & Guo, 2012).

This review of the literature suggests that a combination of landscape design, elements, quality, and maintenance can influence crime. While residential yards are one of the most prominent components of urban nature, no research to our knowledge exists that examines the relationship between private landscape features and crime in residential areas. This study attempts to fill this gap by relating indicators of the level of yard management to crime at a fine scale. Our hypothesis is that the level of yard management is inversely correlated with crime for several reasons: a streetscape with actively managed yards signals to potential criminals the presence of social cohesion and can drive the perception that informal surveillance exists, both of which raise the risks to criminals; a well-landscaped streetscape is more likely to have residents out on the street, increasing eyes on the street and likelihood for potential agents of intervention against crime; and greener streetscapes reduce stress and aggression while increasing cognitive function, all of which can help