The Impact of Community Gardens on Numbers of Property Crimes in Urban Houston

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SUMMARY. Research has suggested that city environments with more green space may have lower crime levels. For this pilot study, 11 established community gardens in Houston, TX, were selected and mapped using ArcGIS 9.1 software. The numbers of property crimes reported in the 2005 crime data from the Houston Police Department surrounding the community garden areas at a distance of 1/8 mile were then tallied and mapped for the areas. The numbers of crimes were evaluated alongside demographic data from the 2000 U.S. Census. Statistical comparisons were made between community garden areas and randomly selected city areas that were within a 1-mile area surrounding each garden. Initial results of paired t tests indicated no statistically significant differences between the mean number of crime occurrences in community garden areas and the mean number of crimes in randomly selected areas. Results from a linear regression analysis also indicated that the presence of a community garden was not a predictor of a lower crime rate for a neighborhood. Adjustments were then made by removing randomly selected areas that were demographically least like their respective community gardens. Results from further analysis indicated that there were no crime number differences between the community garden areas and the randomly selected areas. However, interviews conducted with community garden representatives showed that community gardens appeared to have a positive influence on neighborhoods, with residents reporting neighborhood revitalization, perceived immunity from crime, and neighbors emulating gardening practices they saw at the community gardens.

n a 1995 Regional Plan Association poll, two key factors of an Lacceptable quality of life were safe streets and access to greenery or open spaces (Trust for Public Land, 2008). Residents of urban environments with higher concentrations of green areas feel safer, have an increase in social contact with each other, an increase in communication among neighbors (Kuo and Sullivan, 2001a; Waliczek et al., 1996), and have reduced feelings of mental fatigue among citizens (Kuo and Sullivan, 2001b). The results of a research study performed by Kuo and Sullivan (2001a) indicated that apartment buildings surrounded by greenery in poor, urban areas were less prone to crime when compared with those that were barren of greenery.

Urban residents in cities across the United States have created usable green space in vacant lots in the form of community gardens when green spaces such as parks and greenbelts were limited. According to the American Community Gardening Association (ACGA), there were an estimated 150,000 community gardens in 2004 (ACGA, 2004). In areas surrounding community gardens, researchers have found signs of neighborhood stabilization such as an increase in owner-occupied dwellings, an increase in residents' incomes overall from attracting people with higher incomes, and rent increases in areas surrounding community gardens (Whitmire Study, 2008). Research has indicated that people can derive many quality-of-life benefits from being involved in a community garden such as social, self-esteem, and safe environment needs (Waliczek et al., 1996). For many, the act of building and maintaining a community garden can become a tool to empower

neighborhood residents against urban blight and crime. Additionally, some people have reported that urban lots that were once trash-strewn eyesores and magnets for criminal activity have become havens of safety that provide valuable interaction among neighbors. This, in turn, can contribute to a perceived reduction in crime (Hynes, 1996). In support of this idea, the Trust for Public Land in New York City manages 64 active community gardens and has stated that "The gardens attract new residents, restore neighborhood vitality and stability, enhance civic pride and even reduce local crime." (Trust for Public Land, 2008)

A panel of experts from around the United States was formed by the ACGA to create a research agenda designed to guide future community garden research (ACGA, 1992). Among the subjects identified as important research topics were issues associated with security and safety such as vandalism and a community garden's potential impact on crime and crime statistics (ACGA, 1992).

The purpose of this study was to determine if community gardens had an impact on reported property crimes in neighborhoods surrounding several urban community gardens in Houston.

Materials and methods

CITY SITE. The city of Houston was selected because it is a large urban area with a suitable number of community gardens to sample and property crimes were present at measurable rates.

COMMUNITY GARDEN SITES. Eleven community gardens were used for this study: Meredith Gardens, Levy Park/Upper Kirby District Community Garden, Old Sixth Ward Community Teaching Garden, SEARCH Garden, Brennan Park Garden, Kashmere Community Garden, El Shaddi Community Garden, Julia C. Hester House Community Garden, AL Garden, 17th Street Community Garden, and Garden Oaks Community Garden. At the time of the study, each garden

Units			
To convert U.S. to SI, multiply by	U.S. unit	SI unit	To convert SI to U.S., multiply by
1.6093	mile(s)	km	0.6214

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was visited to ensure that the garden was active and to observe the surround-ings.

INTERVIEWS. Interviews with community garden representatives were conducted in person, or via e-mail, letter, or telephone. Interviews were conducted to record information regarding the inner workings of each community garden. This information was used during evaluation of data. Questions included: When was the community garden founded? Who or what entity founded the community garden? Does the community garden hold special functions such as plant sales, planting days, workshops, or festivals? How do you see the community garden has affected the neighborhood (for example, any notable reactions to the garden from passers-by)? Have you perceived changes within the neighborhood since the inception of the community garden?

CRIME DATA COLLECTION. Crime data from the year 2005 were collected from the Houston Police Department Public Affairs Division, Open Records Section website (City of Houston, 2005) using the monthly police reports called Positive Interaction Program Statistics (PIP stats). PIP stats were provided monthly as AccessTM (Microsoft, Redmond, WA) databases or as ExcelTM (Microsoft) spreadsheets. To collect these data, the Excel spreadsheets for each month in 2005 were downloaded from the Houston Police Department website.

Each month contained a list of reported crimes, including violent crimes and property crimes. All violent crimes were deleted from the spreadsheet so that only property crimes (burglary, theft, and auto theft) remained. Property crimes were used for this study because, according to the Federal Bureau of Investigation (FBI), the majority of crimes that occurred nationally were property crimes (FBI, 2004). Anecdotal information on the benefits of green spaces indicated that these types of crimes would be most influenced by the presence of a community garden (Snelgrove et al., 2004).

MAPPING OF CRIME DATA AND COMMUNITY GARDENS. The spreadsheets containing the edited crime data and the community garden addresses were sent to a San Antonio, TX, company called GeoSpatial Training Services where the data were geocoded to create a shapefile. Geocoding refers to the process in which an address is given an x/y (latitude/ longitude) coordinate. A shapefile is "a set of files that contain a set of points, arcs, or polygons (or features) that hold tabular data and a spatial location used in ArcGIS 9.1© software" [Environmental Systems Research Institute (ESRI), Redlands, CA] (City of Fort Collins, 2007). Addresses were obtained using a nationwide street map database. The shapefile contained a single point for each address that was geocoded.

The gardens were geocoded and overlaid onto a Houston city map. A 1/8-mile radius was created around each community garden. Property crimes that fell within that area were mapped. One-eighth mile was chosen because it is walking distance from the garden and was likely to be visible to passers-by.

MAPPING OF RANDOM CITY POINTS. A 1-mile radius surrounding the garden was also determined and mapped. A 1-mile radius was used because the area was likely to be within the same neighborhood as the community garden and demographics were likely to be similar. Five points within this area were randomly placed (Fig. 1). A 1/8-mile radius was created surrounding each of those five random points. Property crimes within each of those random areas were tallied (Fig. 1).

DEMOGRAPHIC DATA. Demographic data by census block (U.S. Census Bureau, 2007) were overlaid onto the Houston city map along with the crime data and community garden data. Demographics that were considered in the study included median income, ethnicity of residents,



Fig. 1. (Continued).



Fig. 1. Total property crimes for an 1/8 mile (0.2 km) radius surrounding each community garden (shown in gray) and for an 1/8 mile (0.2 km) radius surrounding each of the 5 random points within 1-mile (1.6 km) of each community garden in the study of the effect of community gardens on numbers of property crimes in urban Houston.

and number of rented homes versus owner-occupied dwellings. Demographic data were determined for each community garden area, as well as for each of the five random points within the 1-mile radius of each community garden.

Demographic data for each garden and each random point surrounding the community gardens were compared using descriptive statistics, as well as paired t tests to determine any statistically significant differences in demographics for all of the areas.

Further analysis was conducted between community garden areas and their respective randomly selected areas for which statistically significant differences were revealed after the initial analysis.

DATA ANALYSIS. Numbers of property crimes within a 1/8-mile radius surrounding all 11 community gardens and numbers of property crimes within a 1/8-mile radius surrounding all 55 of the random areas were entered into SPSS® (version 11.5; SPSS, Chicago). The mean number of property crimes for the community garden areas and the random areas were compared statistically using paired ttests. Additionally, a linear regression analysis was performed to determine if the presence of a community garden could predict greater or lesser numbers of reported property crimes.

Results

COMMUNITY GARDEN BACKGROUND INFORMATION AND INTERVIEW RESULTS. Six of 11 gardens responded to interview questions. Missing information pertaining to each garden was obtained through garden websites created by Urban Harvest, a Houston-based organization that provides support to community gardens (Urban Harvest, 2008), and researcher observation. Researchers visited each site to determine that the gardens were active and to observe notable garden surroundings such as neighborhood conditions and garden visibility.

The selected gardens appeared to represent many of the different demographic possibilities typical of an urban area in the United States, with some of the gardens being located in residential areas and others existing in commercial areas. Ten of the 11 community gardens appeared active and established. SEARCH Community Garden appeared inactive for at least one spring gardening season during the study. Alabama Community Garden and Julia C. Hester House Community Garden were the oldest gardens that were included in this research project, each having been established for over 20 years. 17th Street Garden, established in 2004, was the newest garden. Most of the gardens were founded by an individual, a civic club, or an organization. All gardens appeared to have established support within their communities regardless of the founding entity. Six of the 11 community gardens confirmed that they held special functions and/or workdays. Two garden representatives stated that they did not have special functions or workdays because an individual was responsible for most of the garden operations.

Community gardens in this study represented several different styles of community gardens in regards to organization. Three gardens, including Alabama Community Garden, 17th Street Community Garden, and Levy Park/ Upper Kirby Community Garden, were designed to support individual rental plots. Four gardens were designed to be gardened communally. They included Meredith Community Garden, SEARCH Community Garden, Old Sixth Ward Community Garden, and Julia C. Hester House Community Garden. Researchers were unable to contact representatives from El Shaddi and Kashmere

community gardens to determine organizational styles, but they both appeared to be gardened communally rather than divided into individual plots. A caretaker or an individual maintained two community gardens in this study: Austin Street/Brennan Park Community Garden and Garden Oaks Community Garden.

Community gardens in this study received funding for upkeep and maintenance from various sources. Funding sources included United Way, Urban Harvest, neighborhood associations and civic clubs, plot rental fees and donations, as well as some that were individually funded.

Eight of the 11 community gardens in this study prompted reactions from passers-by and/or seemed to be influential in their communities. Six of the 11 community garden respondents noted changes within their neighborhoods since the inception of the garden. Changes included cessation of illegal activity such as dumping and/ or drug activity, increased property values, increased neighborhood redevelopment, and increased immunity from crime.

Interview responses and information gathered through the Urban Harvest website (Urban Harvest, 2008) indicated that the community gardens used in this study were established and visible enough to have had a possible effect on their communities. Most of the community gardens were placed in such a way as to be visible from the street and to passersby. Exceptions included Levy Park/ Upper Kirby Community Garden, which was obstructed by tall office buildings and fences, and El Shaddi Community Garden, which was located behind a small clubhouse. According to interview responses, Levy Park/ Upper Kirby Community Garden was used by local businesses and likely gained notice due to the weekly farmer's market. El Shaddi Community Garden, although blocked by the clubhouse, displayed a large sign visible from the street.

STATISTICAL COMPARISONS. The number of property crimes per community garden area and the number of property crimes per random area and their frequencies were mapped and tabulated using ArcGIS© 9.1 and were observed using Google EarthTM (Google, Mountain View, CA). Initially, a grid overlaid the map and each grid was color-coded to signify property crime activity. Researchers referred to darker grids, or those having a greater number of crimes, as "hot spots." This initial analysis allowed researchers an overall look at the mapped gardens and numbers of property crimes in relationship to the community gardens. However, differences in numbers of property crimes surrounding the garden were difficult to observe using this methodology. Paired t tests were used to compare the mean number of property crimes for all 11 community gardens with the mean number of property crimes for all 55 random areas. Results indicated no statistically significant differences between mean crime occurrences in community garden areas and mean crime occurrences for the randomly selected areas (P = 0.270) (Table 1).

DEMOGRAPHIC COMPARISONS. Demographic information for each community garden area and each randomly selected area were retrieved

Table 1. Paired *t* test results of comparisons of the mean number of property crimes for all 11 community garden areas with the mean property crimes for all random areas in the study of the effect of community gardens on numbers of property crimes in urban Houston.

Location	Sample (no.)	Property crime mean ^x	SD	df	Р
Community garden					
areas ^z	11	14.272	10.169	10	0.270
Random areas ^y	55	11.600	10.655		

^zEleven community gardens were included in the study: Meredith Gardens, Levy Park/Upper Kirby District Community Garden, Old Sixth Ward Community Teaching Garden, SEARCH Garden, Brennan Park Garden, Kashmere Community Garden, El Shaddi Community Garden, Julia C. Hester House Community Garden, Alabama Garden, 17th Street Community Garden, and Garden Oaks Community Garden.

^xFive random points were mapped within a 1-mile (1.6 km) radius surrounding the 11 community gardens. ^xMean number of property crimes were calculated from Houston Police Department records of crimes that occurred within a 1/8 mile (0.2 km) radius surrounding all 11 community gardens and within 1/8 mile radius surrounding each of the 55 random areas. by census block (U.S. Census Bureau, 2007) and were overlaid onto the Houston city map along with the crime data and community garden data using ArcGIS© 9.1. To ensure that comparisons made between random points and community garden areas were demographically similar, paired t tests were used to compare the random sites with the community garden areas on each of the demographic variables, including median household income and ethnicity of residents, and number of rentals and number of owner-occupied dwellings.

Results of paired t test analyses revealed that there were no statistically significant differences demographically between each of the following five community garden areas and their respective five randomly selected neighborhood areas without community gardens: Old Sixth Ward Community Garden, AL Community Garden, Garden Oaks Community Garden, Kashmere Community Garden, and Meredith Community Garden. Therefore, no further considerations due to demographic influences were necessary in these particular areas.

Six of the 11 community gardens in this study had statistically significant differences demographically from their respective randomly selected neighborhood areas. They included: Austin Street/Brennan Park Community Garden, Julia C. Hester House Community Garden, El Shaddi Community Garden, Levy Park/ Upper Kirby Community Garden, SEARCH Community Garden, and 17th Street Community Garden. Because demographic differences have been known to have an impact on crime from other research and may have influenced results of initial analyses (Hagan and Albonetti, 1982; Lockwood, 2004; Smith, 1986; U.S. Department of Justice, 2006; Weitzer and Tuch, 1999; Whitmire Study, 2008), the community garden areas that were statistically significantly different demographically from the randomly selected areas surrounding them were subjected to further analysis.

Researchers examined descriptive statistics to find marked differences and/or similarities in demographics between the community gardens and each of the five randomly selected areas associated with each garden. Randomly selected areas that were least like the community garden areas demographically were removed to allow the community garden areas to be analyzed using paired t tests with randomly selected areas that were demographically the most similar.

Of the six community gardens that were subjected to further analysis, Austin Street/Brennan Park Community Garden was the only garden to produce results that showed a statistically significant difference between the reported property crimes surrounding the garden and the reported property crimes within the 1/8-mile of each of the randomly selected areas. The community garden area had seven reported property crimes within the 1/8-mile radius compared with 48, 19, and 18 in the three randomly selected areas that were demographically most similar to the community garden.

Two of the six community gardens that were subjected to further analysis, SEARCH Community Garden and El Shaddi Community Garden, produced no significant differences in comparisons of numbers of crimes in areas that had community gardens versus the randomly chosen areas.

Three community gardens did not have more than one random area data point that was demographically similar. Therefore, descriptive data were used to make comparisons. According to crime data, Levy Park/ Upper Kirby Community Garden and 17th Street Community Garden had greater numbers of reported property crimes in the 1/8-mile radius surrounding the community gardens when compared with the numbers of reported property crimes within the randomly selected areas (61 vs. 23, and 21 vs. 7). One community garden, Julia C. Hester House Community Garden, had fewer reported property crimes within the community garden area when compared with the randomly selected area with similar demographics (6 vs. 20).

Therefore, of all 11 community gardens, seven garden areas showed no differences in crime numbers, two gardens showed higher numbers of crimes, and two gardens showed lower numbers of crimes in comparison with the randomly selected locations in the same neighborhoods.

LINEAR REGRESSION ANALYSIS. Results of the initial linear regression analysis indicated that the presence of a community garden was not a predictor of property crimes in neighborhoods (P = 0.447) (Table 2). A second linear regression analysis was conducted after removing the randomly selected areas that were demographically different from their particular community garden areas. Results indicated no statistically significant differences. Therefore, in this particular study, the presence of a community garden did not appear to be able to be used as a predictor for the number of property crimes for an area (Table 3).

Conclusions

While anecdotal evidence has pointed to a reduction in crime surrounding community gardens, this research did not support the premise that the presence of a community garden can lead to lower levels of property crime or that the presence of a community garden can be used as a predictor for the numbers of property crimes. However, through interviews with community garden co-ordinators, this research found that eight of the 11 community gardens in

this study prompted positive reactions from passers-by and/or seemed to be influential in their communities. Six of the 11 community garden respondents noted neighborhood changes such as the cessation of illegal activity, including dumping and/or drug activity, increased property values, increased neighborhood redevelopment, and increased immunity from crime. Therefore, though the actual numbers of property crimes did not indicate a difference, residents and/or users of the community garden areas perceived a safer neighborhood. This information supported other studies that found that signs of neighborhood stabilization may often lead to a perceived reduction in crime (Skogan, 1990). Observation by community organizations and some research suggests that solutions to negative inner city conditions can be influenced by residents. Promotion of the development of community gardens could be one type of grassroots organizing that could help alleviate these problems (Trust for Public Land, 2008). In community gardens, residents may be cultivating feelings of well-being

Table 2. Results of a linear regression analysis using community garden presence as a predictor and number of crimes as a dependent variable in the study of the effect of community gardens on numbers of property crimes in urban Houston.

Presence of a community garden ^z /Property crimes (no.) ^y	df	Mean square	F	R ²	Р
Regression	1	65.482	0.585	0.009	0.447
Residual	64	111.959			
Total	65				

^zEleven community gardens were included in the study: Meredith Gardens, Levy Park/Upper Kirby District Community Garden, Old Sixth Ward Community Teaching Garden, SEARCH Garden, Brennan Park Garden, Kashmere Community Garden, El Shaddi Community Garden, Julia C. Hester House Community Garden, Alabama Garden, 17th Street Community Garden, and Garden Oaks Community Garden.

⁹Mean number of property crimes were calculated from Houston Police Department records of crimes that occurred within a 1/8 mile (0.2 km) radius surrounding all 11 community gardens and within 1/8 mile radius surrounding each of the 55 random areas.

Table 3. Results of a linear regression analysis after removing demographically less similar random neighborhood areas using community garden presence as a predictor and number of crimes as a dependent variable in the study of the effect of community gardens on numbers of property crimes in urban Houston.

Presence of a community garden ^z /Property crimes (no.) ^y	df	Mean square	F	R ²	Р
Regression	1	62.486	0.418	0.006	0.520
Residual	72	149.465			
Total	73				

²Eleven community gardens were included in the study: Meredith Gardens, Levy Park/Upper Kirby District Community Garden, Old Sixth Ward Community Teaching Garden, SEARCH Garden, Brennan Park Garden, Kashmere Community Garden, El Shaddi Community Garden, Julia C. Hester House Community Garden, Alabama Garden, 17th Street Community Garden, and Garden Oaks Community Garden. ⁹Mean number of property crimes were calculated from Houston Police Department records of crimes that occurred within a 1/8-mile (0.2 km) radius surrounding all 11 community gardens and within 1/8-mile radius surrounding each of the 55 random areas. and safety by coming together and performing peaceful acts such as gardening. Community gardening, while not necessarily being a cure for crime, may foster further revitalization and community improvements (Whitmire Study, 2008).

Further research using larger sample sizes is recommended. The sample size in this pilot study was too small to generalize to the overall population. Results were also limited to 2005 because crime data were only collected from that year. Researchers recommend that future studies use crime data from several years. Researchers also recommend administering questions to people not directly involved in garden activities in regard to their perceptions of the community gardens influence on the neighborhood. Researchers also recommend the use of mapping technology in future studies.

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