THE EFFECT OF COMMUNITY GARDENS ON NUMBERS OF PROPERTY CRIMES IN URBAN HOUSTON

THESIS

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Michelle Renée Gorham, A.A., B.S.

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ABSTRACT

THE EFFECT OF COMMUNITY GARDENS ON NUMBERS OF PROPERTY CRIMES IN URBAN HOUSTON

by

Michelle Renée Gorham

Texas State University- San Marcos, Texas

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SUPERVISING PROFESSOR: TINA MARIE CADE

Today, in many of America's major cities, communal gardening projects have not only yielded produce to their participants but also a plethora of neighborhood success stories including feelings of well-being, safety and the beautification of acres of vacant land. The purpose of this study was to determine if community gardens had an effect on the number of reported property crimes in Houston, Texas. According to the Federal Bureau of Investigation and the Houston Police Department, property crimes included burglary, theft and auto theft. Data for reported property crimes were obtained from the Houston Police Department for 2005. Property crime data were geocoded and mapped using Arc View© 9.1 GIS software. Eleven active community gardens were found using the Harris County Extension, word of mouth and the internet. Community gardens and property crimes were geocoded and mapped using Arc View© 9.1 GIS software and displayed in Google Earth® Software to look for property crime "hot spots". An eighth of a mile radius was drawn around each community garden. The number of property crimes within an eighth of a mile radius of each community garden was determined. A

one mile radius surrounding the garden was also determined and five random points within this radius were created. An eighth of a mile radius was created surrounding each of the five random points and property crimes within each eighth of a mile radius surrounding the random points were tallied. In addition to the evaluation of crime data, demographic data by census block were overlayed onto the Houston city map along with the crime data and community garden data. The number of property crimes within the eighth of a mile radius surrounding all eleven community gardens and property crimes within an eighth of a mile radius surrounding all of the random areas were entered into SPSS (Statistical Package for the Social Sciences 11.0) (New Jersey) and analyzed using paired t-tests and regression analysis. 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 (P =0.270). Results also indicated that the presence of a community garden was not a predictor of a lower crime rate for a neighborhood (P=0.447). 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 differences between the community garden areas and the randomly selected areas. However, community garden members were interviewed either in person, via e-mail or written letter for thoughts and opinions pertinent to the presence of their particular community garden. Interview results showed that community gardens had a positive influence within their neighborhoods such as neighborhood revitalization, perceived immunity from crime and neighbors emulating gardening practices they see in the community gardens. It is recommended that further research consider numbers of crimes before versus after a community garden is implemented.

CHAPTER I

INTRODUCTION

Vacant land in urban areas has been a valuable resource for city residents especially when parkland and green space is limited. In a 1998 study researchers found that, on average, fifteen percent of the land in the average American city was classified as vacant (Pagano and Bowman, 2000). One of the largest cities in the United States, Los Angeles only claimed a mere 1.106 acres of park land per 1,000 residents which was a fraction of the standard set by the National Recreation and Parks Association (NRPA) (Environmental Defense, 2006). NRPA recommended 10 acres per 1,000 residents (Lancaster, 1990).

In a 1995 Regional Plan Association poll, two key factors of an acceptable quality of life were safe streets and access to greenery and open spaces (The Trust for Public Land, 1999). The per capita percentage of green space played a role in determining the quality of life of American cities (The Trust for Public Land, 1999). Urban residents in cities across the United States have created usable green space in vacant lots in the form of community gardens. According to the American Community Gardening Association (ACGA), in 2004, an estimated 150,000 community gardens were in existence (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 resident's incomes overall from attracting people with higher incomes and rent increases in areas surrounding community gardens (Whitmire Study, 2004). Anecdote points to the decrease in crime due to the presence of a community garden. E. O. Wilson, an esteemed American ecologist, believed that people have evolved profoundly intertwined with the workings of nature, so much so, that it is deeply entrenched within our genotype (Kellert and Wilson, 1993). It is not surprising that research within the last 30 years or more are finding evidence that supports the positive effects of greenery, green space, parks and gardens on people both passively and actively.

In 1984, research reported the possibility that people responded favorably to vegetation as opposed to places that were urban and lacked vegetation (Ulrich, 1984). The research also stated that alpha waves (the brain wave associated with wakeful relaxation) were higher among individuals who were shown color slides of areas with vegetation when compared with individuals who were shown color slides of urban, plant-less settings (Ulrich, 1984). Another study has suggested that the lack of contact with nature may have contributed to certain mental and social problems among city dwellers (Stainbrook, 1973). Urban environments with a higher concentration of green areas have been shown to make certain problems associated with crime less severe. These may include greater feelings of safety and an increase in social contact and communication among neighbors (Kuo and Sullivan, 2001b; Waliczek et al., 1996), as well as reducing mental fatigue (Kuo, 2001). The results of a research study performed by Kuo and Sullivan (2001b) 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. Community gardening refers to a group of individuals within a local setting who work together, either in individual plots or in one collective garden toward the common goal of cultivating a piece of land for the purpose of creating beauty, producing food and building social cohesion (American Community Garden Association, 2004). As a form of active plant/people interactions, community gardens have served as a vehicle for connecting people to plant life as well as each other. For instance, community gardens have offered refugees and immigrants' familiarity and support in a foreign place. The Cambodian and Laotian refugees that met in the non-profit Asian gardens in Dallas, Texas served as an example of this (Warmack, 2003).

Gardens have created a way for community members to have a strong presence within their neighborhoods and to build social capital. Jane Jacobs, in her renowned 1961 book on urban planning, *The Death and Life of Great American Cities,* introduced the concept of social capital and researchers in various fields of study have subsequently used the term. Social capital, as defined by Putnam (2000) in the national bestseller, *Bowling Alone- The collapse and revival of American community,* "refers to connections among individuals-social networks and the norms of reciprocity and trustworthiness that arise from them" (Putnam, 2000, p. 19).

The definition of community may vary depending on the source, but each definition will almost always hold similar principles. Community, as defined by Oxford Dictionary, is "a body of people living in one place, district or county" (Thompson, 1996, p. 167). Marshall, author of *How Cities Work,* defined community as follows: "It is a network of relationships among individuals, families and groups that binds them in a mutually supportive and dependent construct" (Marshall, 2000, p. 193). Marshall's

definition goes a step beyond the Oxford Dictionary definition and has included the emotional ties and connections people may make within a community. Community gardening has held at its very core this definition of community. Collective efficacy may have also been a factor in the success of a community. Research has defined collective efficacy as follows: "mutual trust among neighbors, combined with willingness to intervene on behalf of the common good, specifically to supervise children and maintain public order" (Sampson et al., 1998, p. 18). The researchers believe that collective efficacy is, "the most powerful influence keeping violent crime low" (Sampson et al., 1998, p. 18). Community gardens have been one approach to increase a community's collective efficacy.

Given the estimated number of gardens and the legislation that has been set in place to protect gardens that are being threatened by development (Englander, 2001; Schukoske, 2000), it is likely that people have seen certain benefits to having a community garden within their neighborhood, especially when crime has been perceived as a problem. Research has indicated that people can derive many quality of life benefits from being involved in a community garden such as social needs, self-esteem needs and safe environment needs (Waliczek et al., 1996). For many, the act of building and maintaining a community garden became a tool to empower neighborhood residents against urban blight and crime. According to anecdote, people reported that urban lots that were once trash strewn eyesores and magnets for criminal activity have become havens of safety, and have provided valuable interaction among neighbors which, in turn, contributed to a perceived reduction in crime (Hynes, 1996).

According to the FBI Uniform Crime Reports from 2002, 88% of reported crimes were property crimes that directly affected 4,118.8 out 100,000 inhabitants (Federal Bureau of Investigation, 2003). Although crime statistics indicated that there was a decline in crime rates (FBI, 2003), there continue to be constant efforts and struggles of local governments to prevent crimes. It may be a worthwhile effort to consider the benefits of greening inner city neighborhoods. Research has found that all too often city planners and local governments forgo greening efforts due to cost considerations (Ulrich, 1984). However, the cost of incarceration has been very high. The average cost to house one incarcerated person has averaged $30,000 for operating costs and as much as $50,000 in the construction of new jail cells (Hynes, 1996). Community gardening may serve as a viable option for city decision makers to empower city residents, encourage collective efficacy and possibly lessen the negative aspects of urban living.

Problem Statement

The intent of this study was to examine the effect of a community garden on the number of property crimes in an urban area.

Purpose and Objectives

The purpose of this study was to determine if community gardens had an effect on the number of reported property crimes in Houston, Texas.

The objectives for this study were as follows: 1) To collect background information, asked either in person, via e-mail or by written letter, pertaining to the selected Houston community gardens, 2) To compare the mean number of property crimes occurring within an eighth of a mile radius of 11 active community gardens to the mean number of property crimes occurring within an eighth of a mile radius surrounding

55 randomly selected areas within a mile of the 11 selected community gardens in Houston, TX, 3) To determine if the presence of a community garden could predict greater or lesser numbers of reported property crimes.

Definition of Terms

Urban-Densely settled area containing at least 50,000 people (U.S. Census Bureau, 2003).

Crime Rate- The number of times an offense punishable by law occurs (FBI, 2003).

Community Garden- A group of individuals within a local setting who work together, either in individual plots or in one collective garden toward the common goal of cultivating a piece of land for the purpose of creating beauty, producing food and building social cohesion (American Community Garden Association, 2004).

Green Space- "A term applied to certain urban areas, including parks, preserves and public or private lands. In general, these places are over an acre large, are well separated from manmade developments and contain forests, gardens, grass or other foliage" (The Oregon Story, 2006, Glossary, ¶ 14).

Property Crime- Crimes that cause damage to property including Burglary, Theft and Motor Vehicle Theft (Federal Bureau of Investigation, 2003).

Community- "A network of relationships among individuals, families and groups that binds them in a mutually supportive and dependent construct" (Marshall, 2000, p. 193).

Collective efficacy- "Refers to mutual trust among neighbors, combined with the willingness to intervene on behalf of the common good, specifically to supervise children and maintain public order" (Sampson et al., 1998, p. 18).

Social Capital- "Refers to connections among individuals-social networks and the norms of reciprocity and trustworthiness that arise from them" (Putnam, 2000, p. 19).

GIS- Geographical Information Systems.

ArcView- "Desktop GIS Software developed by ESRI, Environmental Systems Research Institute- the company that makes Arc View, used to do some basic GIS operations and print maps" (City of Fort Collins, 2007).

Geocoding- the process in which an address is given an x-y coordinate (GeoSpatial Training, 2006).

Shapefile- "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 ArcView Software" (City of Fort Collins, 2007).

Limitations of the Study

Because of climate differences, especially the longer growing seasons, between most of Texas and other areas within the United States, results cannot necessarily be generalized to cities outside of Texas.

The Houston Police Department was only able to provide property crime occurrences data to the nearest block of where the crime occurred. Therefore, some property crime data would not map within the computer mapping program.

Researchers were only able to collect data for one year, 2005.

Factors such as police presence as well as the presence of community recreation centers, parks, community policing programs, schools and churches may also have influenced the occurrence of crime or the lack of crime occurrence.

Only 6 out of 11 garden representatives responded to requests for interviews.

Basic Assumptions

It was assumed that the chosen community gardens were active enough to have a presence and visibility within the neighborhood.

It was assumed that all crimes committed were reported.

Delimitations of the Study

The research was only conducted with one major Texas city.

The research only included 11 community gardens and 5 randomly selected areas per garden.

CHAPTER II

REVIEW OF LITERATURE

Benefits of Urban Green Space

It may surprise some to learn of the condition of the Tenth Street School Mother's Club Community Garden after the 1992 riots that transpired in Los Angeles, California. Not one single plant had been disturbed. The garden was surrounded by evidence of the violent activity that had occurred on previous days: broken windows and burnt buildings from looting and rioting. Equally surprising, information found listed among a declaration of policies issued by Los Angeles gang members, were complaints regarding a shortage of parks and green spaces in their neighborhoods (The Trust for Public Land, 1994). Many urban areas, like Los Angeles, tend to have less green vegetation than the areas extending beyond city limits. According to Environmental Defense, Los Angeles has 1.106 acres of parks per 1,000 residents, which scarcely reached 10% of the standard set by the National Recreation and Park Association (NRPA) (Environmental Defense, 2002). Their standard was 10 acres per 1,000 residents (Lancaster, 1990)

Green space, as defined by Oregon Public Broadcasting's, *The Oregon Story*, is "a term applied to certain urban areas, including parks, preserves and public or private lands. In general these places are over an acre large, are well-separated from manmade

developments and contain forests, gardens, grass or other foliage" (The Oregon Story, 2006, Glossary, ¶ 14). The importance of urban green space has topped the list among urban residents in recent surveys in American cities (The Trust for Public Land, 1999). In a 1995 Regional Plan Association poll, two key factors of an acceptable quality of life are safe streets and access to greenery and open spaces (The Trust for Public Land, 1999). The per capita percentage of green space plays a role in determining the quality of life of American cities (The Trust for Public Land, 1999). Green space can contribute to an increase in property values for adjacent properties, influence the behavior of shoppers in a retail business district, contribute to human health and physical well-being, improve air quality and reduce storm water runoff (Crompton, 2001; Sherer, 2004; Wolf, 2003; Wolf, 2005). Several studies have shown that homes that are adjacent to naturalistic parks and open spaces typically have an 8% to 20% higher appraised property value than similar properties elsewhere (Crompton, 2001). According to studies conducted at the University of Washington, people claim to be willing to pay 10% more for products in a shopping area with trees (Wolf, 2003). In reference to human health and physical well-being, The American Journal of Preventative Medicine reviewed a group of studies and found that there was a 48.4% increase in occurrence of physical activity when people had better access to a place to exercise when paired with informational outreach regarding health and fitness (Sherer, 2004).

Physical safety goes hand-in-hand with an acceptable quality of life. Some research has indicated that greater levels of green space or vegetation can lead to reduced crime activity (Kuo and Sullivan, 2001b). In a 2004 study in which crime occurrences were plotted across inner city Austin and compared to average greenness values, it was

determined that "83% of all crimes occurred in areas that had greenness values below 34%" (Snelgrove et al., 2004, p. 6). In some neighborhoods where access to parks was limited but land in the form of vacant lots was abundant, a solution has been to transform his unoccupied property into usable space. For many, a community garden was a viable option.

Community gardening can be defined as a group of individuals within a local setting who work together, either in individual plots or in one collective garden toward the common goal of cultivating a piece of land for the purpose of creating beauty, producing food and building social cohesion (American Community Gardening Association, 2004). According to the American Community Gardening Association (ACGA) successful, thriving community gardens have been found in most major cities around the United States (ACGA, 2004). In 2004, ACGA estimated that around 150,000 community gardens were in existence (ACGA, 2004).

Making the Connection between Horticulture and People

E. O. Wilson, a prominent American naturalist, once said that human's attraction to plants is involuntary because of evolution (Kellert and Wilson, 1993). He believed that humans evolved as beings profoundly entangled with the workings of nature, and that this kinship with nature was deeply fixed in our genotype (Kellert and Wilson, 1993). Horticulture, as a human activity, may be one way people address their need to have contact with or take part in the natural world. Horticulture, present in our routine environment, can be a way for people to passively interact with the natural world.

Charles Lewis, of the Morton Arboretum, notes the inundation of people taking an interest in horticulture. He asks, "Society has found horticulture, but how does

horticulture find society?" (Lewis, 1976, p. 4). He goes on to state that a change in perspective might be the answer; "the traditional viewpoint of horticulture as a process that produces a product will also accommodate societal aspects of horticulture" (Lewis, 1976, p. 4).

Later a professor at Virginia Tech, Diane Relf, redefined the term horticulture to include the benefits of horticulture for "human life quality" (Relf, 1992, p.159). Previously, horticulture was defined as, "the science and art of growing fruits, vegetables, flowers and ornamental plants" (Relf, 1992, p.159). Relf claims that this definition only includes one side of the field of horticulture: the science. The art of horticulture, or the part horticulture plays in human well-being, is ignored (Relf, 1992). Relf's definition reads as follows: "Horticulture- the art and science of growing flowers, fruits, vegetables, trees and shrubs, resulting in the development of the minds and emotions of individuals, the enrichment and health of communities, and the integration of the garden in the breadth of modern civilization" (Relf, 1992, p.159). The field of horticulture has increased its scope to include the interactions, both passive and active, between plants and people.

Passive Interaction with Plants

Researchers from various disciplines have been evaluating the relationship between green spaces, nature and vegetation and the feelings of well-being and positive emotional states among humans. Most would only consider the benefits of plants if people were actively involved in horticulture or having hands-on experiences with plants instead of considering the passive benefits plants have on daily life. Passive experiences

can include: the value of a shade tree on an environment, the colorful flower bed in front of an office building or even a lone flower in a vase. It is reported that a worker who has a view of green space could experience improved productivity (Kaplan, 1993). In 1984, research reported the possibility that people responded favorably to vegetation as opposed to places that were urban and plant-less (Ulrich, 1984). Ulrich (1984) reported that alpha waves (the brain wave associated with wakeful relaxation) were higher among individuals who were shown color slides of areas with vegetation than when they were shown urban, plant-less settings (Ulrich, 1984).

A 1992 study also confirmed that hospital patients having a view of nature recuperated more quickly and required a smaller quantity of painkilling medications than those without a view of nature (Ulrich, 1992). Another researcher argued that the lack of contact with nature might contribute to certain mental and social problems among city dwellers (Stainbrook, 1973). A study published in 1989 indicated that nature fascination at a cognitive level was a strong reason for gardening even when the gardener is not actively involved in the garden (Kaplan and Kaplan, 1989). In reference to urban tree planting programs and their proclaimed positive social benefits, another study found that, "Community benefits are those that accrue to people whether or not they were involved in a program or project" (Westphal, 2003, p. 138). The study found that "changes for one person or group can have a ripple effect" (Westphal, 2003, p. 138).

Urban environments with a higher concentration of green areas have been shown to make certain problems associated with crime less severe. These problems may have included greater feelings of safety and an increase in social contact and communication among neighbors (Kuo and Sullivan, 2001b; Waliczek et al., 1996), as well as reducing

mental fatigue (Kuo, 2001). The results of a study done by Kuo and Sullivan (2001b) indicated that apartment buildings in poor urban areas were less prone to crime than those that were barren of greenery. Research reported that, "individuals who had some nearby vegetation were significantly more effective in managing their major life issues than were their counterparts living in barren environments" (Kuo, 2001, p. 26). Kuo (2001) further suggested that "in poor inner-city neighborhoods, planting a few trees may help provide individuals and families with the psychological resources needed to 'take arms against a sea of troubles'" (Kuo, 2001, p. 30).

In a similar study, Kuo and Sullivan (2001a) found the possibility that the contact with nature by inner city residents helped quell mental fatigue and reduced aggression and violence. The authors found that levels of aggression and violence were considerably lower among persons who had some natural scenery outside their apartments when compared to a similar group of people who lived in an area without trees and other vegetation (Kuo and Sullivan, 2001a). In another study, in which researchers analyzed Uniform Crime Reports from the Chicago Police Department, they found that apartment buildings with little or no greenery had higher total crimes. The buildings with high levels of greenery had 52 percent fewer total crimes when compared to buildings with little or no greenery (Kuo and Sullivan, 2001b).

Researchers noticed that more and more studies were finding that views of nature scenes dominated by vegetation had positive effects on health (Ulrich, 1991; Ulrich and Parsons, 1992). The researchers also reported that, "views of vegetation foster restoration from stress apparently because of a combination of beneficial effects: They produce increases in positive feelings; reduce negatively toned or stress related feelings such as

fear, anger or sadness; hold interest/attention effectively and hence may block or reduce stressful thoughts" Ulrich and Parsons, 1992, p. 102).

A Swedish study published in 2004 revealed that garden access and views of the garden in the workplace positively influenced stress and *trivsel,* a Swedish term meaning comfort, pleasure and well-being (Stigsdotter, 2004).

In another study, community gardeners were surveyed on quality of life issues related to Maslow's hierarchy of needs. Results revealed that gardening helped meet quality of life needs on the higher levels of esteem and self-actualization as well as those needs toward the bottom of the pyramid related to food and safety. Also, social benefits were found to be important to African-American and Hispanic respondents (Waliczek et al., 1996).

Active Interaction with Plants

Humans may also play a more active role in people/plant relationships. Active involvement in gardening can help people develop new skills such as improved communication (Relf, 1981). Researchers have found that gardening fosters emotional growth and gives people a positive self-image, a feeling of responsibility and increases feelings of self-worth (Relf, 1981). A study published in 1989 indicated that gardening satisfaction was strong in the categories of 'nature fascination' and 'peacefulness and quiet' (Kaplan and Kaplan, 1989). Research has shown that active participation in horticulture can satisfy both sides of human creativity: "fostering life" as well as "acquiring objects" (Matsuo, 1996). Matsuo noted that the "fostering life" side of our creativity is often lacking in modern times leaving humans off balance. He claimed that horticulture could restore that balance (Matsuo, 1996).Many successful horticulture or

gardening programs have been reported for seniors, the developmentally challenged, adults, adolescents and children. Alice Waters, Chez Panisse chef and owner in Berkley, remains a strong advocate for including school gardens as part of the academic curriculum but also within school lunch programs. Her concern for children's nutrition spawned efforts that created the Edible Schoolyard Project at Martin Luther King Middle School, in Berkley, California. A three-year study by Harvard professor, Michael Murphy reported that fewer emotional problems and improved behavior occurred at Martin Luther King Middle School as compared with a control group at a similar middle school (Ornstein, 2004). Student's participation in school gardens and working alongside their teachers, parents and fellow students can potentially be a precursor to a student's positive outlook on community involvement as an adult.

Cammack et al. (2002) reported that overall environmental attitude among juvenile offenders who participated in the Green Brigade Horticultural Program in San Antonio, Texas were significantly more positive when compared with attitudes prior to participation in the program. Another study found that there was a decrease in vulnerability to addiction in inmates who were involved in a prison horticultural therapy program (Richards and Kaufami, 1992).

The Garden Project in San Francisco is a horticulture program within San Bruno Correctional Facility. The program involves the active participation of inmates in growing, harvesting and selling food to local restaurants as well as donating food to local homeless shelters (Hynes, 1996). Several San Bruno Correctional Facility inmates who were participating in the horticulture program were asked, "If the garden has helped you in any way, please tell us" (Hynes, 1996, p. 43). Responses to this question included: "I

learn respect for life", "The garden helps us focus" and, "It gives me responsibility and unity" (Hynes, 1996, p. 43).

Gardens have also been planted by soldiers doing battle overseas as recently as the war in Iraq (Levine, 2006). A United States soldier, reportedly, planted a garden in Tikrit, Iraq as a way of coping with his homesickness (Levine, 2006).

Community Garden History

Records have shown that allotment gardens existed in Great Britain as early as 1731. The earliest communal gardening efforts in the United States are said to be Boston's Fenway Gardens (Reid, 1996). Typically, the basis for gardening communally throughout the last century has been economic instability and lack of food security. In the 1890's, mayor of Detroit, Haze Pingree, advocated the use of vacant land as food gardens for the unemployed. Basset said that these vacant areas were dubbed Potato Patch Gardens and as many as 975 families in Detroit were said to be successfully cultivating potatoes, turnips and beans to supplement their meager diets (Bassett, 1979).

When most people think of gardening communally they may think first about the gardens that appeared during the first and second World Wars. During World War I, gardens that were communally worked were called Liberty Gardens. Liberty Gardens became a patriotic duty of civilians. The National War Garden Commission advocated the idea that by farming as much available land as possible, civilians could produce enough food to allow food produced by America's farmers to be shipped to American and allied forces overseas. Through tremendous propaganda and instructional efforts, the National War Garden Commission was able to convince civilians that they were "home

soldiers" (Bassett, 1979). It is not known how many of the gardens were home gardens or how many were communal areas but food production was substantial. In 1917, three million five hundred thousand gardens produced $350,000,000 worth of food, and in 1918 over five million gardens produced $525,000,000 worth of food (Bassett, 1979).

During the Great Depression of the 1930's, the Relief Garden movement swelled due to economic uncertainty. Unlike the Potato Patch Gardens of the 1890's, which served the unemployed, the Relief Gardens moved beyond serving those on welfare and aided a larger portion of society as a result of the scope and severity of the Great Depression (Bassett, 1979).

Perhaps the most documented in communal gardening history were the Victory Gardens of World War II. Once again, the country's resources were being used to support war efforts. Intense governmental propaganda encouraged civilians to begin raising as much food as possible. Accordingly, 20 million gardeners produced over 40% of the nations food supply in Victory Gardens (The Victory Garden, 2006).

The Anti-Inflation Gardens of the 1970's were probably the nearest relative of the modern day community garden. Anti-Inflation gardens were modeled after the Potato Patch Gardens of the late 19th century and the Relief Gardens of the Great Depression (Bassett, 1979). By the 1970's gardens built for a separate purpose were starting to emerge.

One of the most popular gardens in the history of community gardens was Adam Purple's Garden of Eden in New York City's Lower East Side. After watching neighborhood children playing in rubble from a demolished building Adam Purple was inspired to create something that was more palatable to the community (Environmental

Design and Research Association, 1985). Garden of Eden was built in the vacant lot next to Purple's building in 1973. Using brick dust, manure bicycled from Central Park and a plethora of treasures left after the demolition of several buildings, Purple created a place for children of the Lower East Side to play and discover the earth (Environmental Design and Research Association, 1985). The Garden of Eden was bulldozed in 1986 to make room for affordable housing (notbored, n.d). Adam Purple reacted to the destruction of the Garden of Eden by stating that he hoped the garden would bring about a greater consciousness and people would try to recreate what he had done (Bacigalupi, 2002).

Not all New York community gardens suffered the same fate as the Garden of Eden. Clinton Community Garden in the city's west side was saved from destruction due to the combined efforts of community members. The rescue of Clinton Community Garden was recorded on the garden's website as follows:

> "In 1981 the city announced its intention to auction the property, but the community unified to halt the sale. Trust for Public Land, Housing Conservation Coordinators and the Green Guerrillas joined in the fight and the gardeners started the Square Inch Campaign, "selling" a piece of the garden for a $5.00 donation. The story attracted national attention as well as the support of Mayor Edward I. Koch who kicked off the campaign in April of 1984 by buying the first square inch. The public auction was postponed until December of that year" (Clinton Community Garden, n.d., History of Garden, ¶ 3).

> "On November 16, 1984, just one month before the scheduled auction, Mayor Ed Koch transferred the garden land from the Housing Department to NYC's Parks & Recreation. Although square inch sales raised over $70,000, it was seed money from the Clinton Fund that secured the deal making Clinton Community Garden the first community garden in New York City to be transferred to permanent parkland status. In 1986 the land was formally licensed by Parks to the non-profit Clinton Community Garden, Inc. The Vincent Astor Foundation, Operation Green Thumb, Greenacre Foundation, City Parks Foundation, Ninth Avenue Association, Community Board No. 4 and the West 47th and 48th Street Block Associations have all been helpful to the growth of our garden" (Clinton Community Garden, n.d., History of Garden, ¶4).

The events that saved the Clinton Community Garden provided a model for others to preserve their neighborhood gardens.

Many school gardens began due to the economic strains of the past century as well as for the purpose of teaching children about nature (Warman, 1999). Research has established the part of the school landscape as a teaching resource by an increased understanding of botany and having developed positive attitudes toward the environment (Harvey, 1989). In recent years, entire gardening curriculums like the National Junior Master Gardeners® (JMG) Program designed by Texas A&M University have become a part of education in many American schools (Texas Cooperative Extension, the Texas A & M University System). Recent research has shown that over 85% of respondents to national surveys stated that JMG® has increased youth interest in science, and over 83% of respondents said youth were more enthusiastic about learning (Cummings and Boleman, 2002). Researchers claim that using a gardening and hands-on classroom activities as part of the science curriculum for as little as once weekly will help improve science achievement test scores (Smith et al., 2005).

In addition to improved academic success, youth gardening research also showed that gardening projects increased self-esteem, helped students develop a sense of ownership and responsibility and increased parental involvement in school (Alexander and Hendren, 1998). In central Texas, teachers have attended a full day workshop called *Get Going and Keep Growing* that has taught educators how to incorporate gardening into their curriculums. Alice Waters, Chez Panisse chef and owner in Berkley, remains a strong advocate for including school gardens not only into the academic curriculum but also into school lunch programs. Her concern for children's nutrition spawned efforts that

created the Edible Schoolyard Project at Martin Luther King Middle School in Berkley, California (Ornstein, 2004).

Benefits of Community Garden Organization

Resources have indicated that garden members must unite amongst themselves as well as with city municipalities, volunteer organizations and perhaps potential funding resources to plan the gardening effort. After the garden is constructed, members have needed to stay connected in order to keep the garden active and thriving (ACGA, 2004). Some benefits of community garden construction have been leadership development and development of problem solving capabilities among members (Reid, 1996). A study published in 2004 has indicated that social ties are built through non-gardening activities (Glover, 2004).

Organization procedures have varied from garden to garden, but some form of governance has been involved in garden operations (ACGA, 2004). Community gardens have had individuals serving as director, chairmen on specific committees and committee members (ACGA, 2004). The responsibility of leadership and group organizing carries with it the ability to work through problems. The problem solving has brought people closer together by creating a greater understanding between individuals. In a documentary film on the Peralta Community Garden in Berkley, California called, *A Lot In Common*, gardeners had a number of issues to overcome. These issues included how to decide on the artwork incorporated into the garden and individual gardeners making decisions that affected everyone. After tensions subsided and wounds healed, gardeners held a greater understanding of one another and what was needed to make their garden successful (Bacigalupi, 2002).

Many local and even national connections have been created to ensure the success of community gardens. Volunteer gardening groups, members of city government, city municipalities, and local non-profits and foundations involved in serving inner city residents in some capacity have been valuable local connections (ACGA, 2004). In many cities, organizations that helped people connect with green space have assisted. For example, in Chicago, the City of Chicago's Green Corps and the Openlands Project assisted by providing materials and volunteers to the Peace in the Valley Community Garden (Small, 2002). The Peralta Community Garden in Berkley "rented" land from the Bay Area Rapid Transit, which formed a necessary tie to outside influences to ensure success (Bacigalupi, 2002).

Aside from the act of garden tending, various activities have taken place in community gardens that have widened the prospect of a community garden from merely a garden into what Karl Linn, Architect and Psychologist, called a "commons area" (Bacigalupi, 2002). Some of these activities have included potlucks, musical performances, storytelling, mural painting and other art projects. People from outside the garden have contributed by donating artwork and other products of one's talents. In *A Lot in Common*, several artists contributed artwork in the form of mosaic tile benches, and sculpture while others contributed their building expertise to guide interested community members through the building of a cob tool shed and a bamboo arbor. Carl Anthony, co-founder of Urban Habitat, likens activities that involved building things that one could not do alone to the barn raisings of the Mennonites (Bacigalupi, 2002).

There have been support systems such as umbrella organizations, usually not-for-profit, which has helped guide and support neighborhood community gardens. In

Houston, Urban Harvest has been one such organization. Urban Harvest serves Houston's community gardens in several ways. They have hosted bi-weekly farmer's markets, and offered a long list of instructional classes designed to inform community gardeners for success including instruction on starting a community garden. Urban Harvest helped gardeners with garden signage and designing web pages (Urban Harvest, n.d.). Similar organizations existed around the country: Philadelphia Green in Philadelphia, Pennsylvania, Boston Community Garden Council in Boston, Massachusetts, the Green Guerillas in New York, New York and the San Francisco League of Urban Gardeners in San Francisco, California (Boston Natural Areas Network, 2006; Green Guerillas, 2002; The Pennsylvania Horticultural Society, 2006; SFGRO, n.d; Urban Community Gardens, n.d.).

There have also been national organizations standing by to assist community gardeners with land acquisition and advice on community garden organizing such as The Trust for Public Land and the American Community Gardening Association (ACGA, 2004). Funding opportunities have been available in the form of Federal Block Grants or Community Food Projects Competitive Grants Program (USDA, 2006).

Community Garden Preservation

Community gardens in New York, as well as other major cities, have been, and continue to be, threatened by developers (Englander, 2001). The fact that people have gone to great lengths to keep community gardens from being destroyed has shown the important role that these gardens have played in the lives of so many inner city residents. In 1998, 114 of 700 New York community gardens were intended to be auctioned off. Pressure from public opposition and the media caused the mayor's office to negotiate

before the auction. Sixty-three gardens were sold to the Trust for Public Land and the rest were sold to Bette Midler's New York Restoration Project (Englander, 2001).

Land trusts have been created in several U.S. cities to address the increased threats to community gardens. Chicago's NeighborSpace was an urban land trust created to buy property from the city of Chicago for a dollar. In addition to acquiring property, the land trusts provided liability insurance to gardening groups who maintained the property (NeighborSpace, 2004). In Philadelphia, "The Neighborhood Gardens Association's goal is the long term preservation of community gardens. Most community gardeners do not own the land they garden and are always at risk of being asked to leave the land. In the last few years more than five acres of gardens in Philadelphia have been built upon or developed for other uses. The NGA battles against this trend, thus far acquiring a total of 16 gardens" (City Farmer, 2001, ¶ 6).

Organizations like The Neighborhood Gardens Association have aided in the preservation of community gardens especially when they have been threatened by demolition in the name of affordable housing. People have seen the need for public policy in supporting and protecting community gardens (Schukoske, 2000). Community gardeners interviewed by Virginia Small in Garden Magazine told her that even if they knew they could lose their gardens someday "they would still pour their soul and sweat" into it (Small, 2002, p. 64).

Community Gardens and Food Security

Community gardening is typically an urban phenomenon for several reasons including the potential for greater food security (Newman, 1997). Food security refers to the ease of access to fresh food particularly by people with low incomes (Newman,

1997;USDA, 2006) Based on United States census data from 1990, only 1.8% of the American population is responsible for our food supply. The United States Department of Agriculture offers grants to people who assist in linking people with limited access to food either through marketing, infrastructure improvements or entrepreneurial projects (USDA, 2006). As evidence to the potential for community gardens to provide food security, the president of the Food & Agriculture Task Force touts the production of Philadelphia's 501 community vegetable gardens. The gardens produced $1,948,633 dollars worth of fruit and vegetables in 1994 from a total of 2,812 families, which were 12,093 individuals (City Farmer, 2001).

In addition to the economic value of food produced in community gardens, garden participants also reaped the reward of personal satisfaction and self-sufficiency (Patel, 1991).

Crime and Community Gardens

Anecdote has suggested that community gardens can be credited with reducing crime rates. According to Barbara Huff, the author of *Greening City Streets- The Story of Community Gardens*, the crime rate in the area of the Six and B garden in New York City had decreased after the inception of the garden. "Six and B has been a community garden only since 1983, but already it has a positive effect on the neighborhood. Like all the city's gardens, Six and B improves the quality of life, and as crime rates go down and residents take more pride in where they live, new people begin moving in and buying property" (Huff, 1990, p. 25). Huff also stated that the area of New York once dubbed "Hell's Kitchen" has outgrown its name because of the positive effects of the Clinton Community Garden (Huff, 1990).

According to observations in other garden areas (Hynes, 1996), the creators of the Enchanted Marston Gardens in north Philadelphia have formed "place attachment" in their neighborhood. Hynes claimed that "place attachment" is marked by "drawing neighbors together as a community, lessening stress, crime, vandalism and flight, and stimulating public involvement, self-governance, and altruistic behavior" (Hynes, 1996, p. 114).

There is also research which supported passive benefits of greenery in an urban setting on quelling violent behavior, reducing crime, advance physical healing and promoting feelings of well-being and the quality of life benefits of those participating in a community garden setting (Kuo and Sullivan, 2001a; Kuo and Sullivan, 2001b; Stainbrook, 1973; Ulrich and Parsons, 1992; Waliczek et al., 1996). There are those members of the community who take an active part in community building while there are also those who may have the propensity to commit crimes within the neighborhood. Those that may commit the crimes may not have an active role in community building efforts such as participation in a community garden, but certain community building efforts may affect residents passively.

With past research and anecdote supporting the many benefits of green space, both passive and active interaction with plants, and the lack of green space in many urban areas, it may be wise for city municipalities to consider the support of gardening activities in vacant city lots. The 1992 Research Agenda for the Impact of Community Greening by the American Community Gardening Association supported research efforts that dealt with security and safety issues such as the impact of gardening on crime and crime statistics (American Community Gardening Association, 1992).

United States Crime Facts and Research

According to the Federal Bureau of Investigation Crime Clock 2002, one violent crime occurs every 22.1 seconds in the United States. Violent crimes may include aggravated assault, robbery, forcible rape and murder. One property crime occurs every three seconds includes burglary, theft and motor vehicle theft (FBI, 2003). The likelihood of becoming a victim of a property crime is greater than becoming a victim of a violent crime. According to the FBI Uniform Crime Reports from 2004, an estimated 10,328,255 property crimes were committed in the United States representing a 1.1% decrease from the 2003 estimate, a 1.4% increase compared with the 2000 estimate, and a 14.4% decrease from the 1995 estimate (FBI, 2004).

In 2004, each of the individual property crimes showed a decrease from the 2003 estimates. The number of motor vehicle thefts was down 1.9%, the number of larceny-thefts was down 1.1%, and the number of burglaries was down 0.5%. The UCR Program aggregated data by three community types: Metropolitan Statistical Areas (MSAs), cities outside metropolitan statistical areas, and non-metropolitan counties. In 2004, an estimated 82.9% of the nation's population lived in an MSA. The rate in this community type was 3,697.1 property crimes per 100,000 inhabitants (FBI, 2004).

According to the Bureau of Justice Statistics Crime Characteristics, urban households are typically the most vulnerable to property crimes in the United States. "In 2003, urban households experienced all forms of property crimes at rates higher than those for suburban or rural households" (United States Department of Justice, 2006, Property Crime section, ¶ 5). In the FBI preliminary Uniform Crime Report, released December 19, 2005, the number of property crimes that were reported from January 2005

to June 2005 had decreased by 2.8 % when it was compared to reported property crimes from January 2004 to June 2004 (FBI, 2005, ¶ 1).

The FBI website also estimated the costs associated with reported property crimes. "The estimated dollar loss attributable to property crimes (excluding arson) in 2004 was $16.1 billion, representing a 5.0-percent decrease when compared with the 2003 estimate. Among the individual property crimes, the dollar losses were an estimated $3.5 billion for burglary, nearly $5.1 billion for larceny-theft, and $7.6 billion for motor vehicle theft" (FBI, 2004, ¶ 12).

According to the United States Department of Justice (2006) all types of property crimes happened more frequently to people who occupied rental property. In 2005, there were 192 property crimes per 1,000 rental homes, while there were only 137 property crimes per 1,000 for owner occupied homes (United States Department of Justice, 2006, Property Crime section, ¶ 3). People living in rented property experienced more than twice the rate of motor vehicle theft than those in owner occupied property (US Department of Justice, 2006, Property Crime section, ¶ 3). Research using violent crime rather than property crime as a variable indicated that an increased percentage of people living in rental units were positively associated with violent crime (Lockwood, 2004). Lockwood (2004) concluded from his study that violent crime is associated with renters because socially disadvantaged people rented. As social disadvantage went down, so did violent crime regardless of whether housing was rental or owner occupied (Lockwood, 2004).

The trend in property crimes outnumbering violent crimes also holds true for the city of Houston. According to the 2003 city wide uniform crime report for Houston,

property crimes totaled 83.3% while violent crimes totaled 16.6 % of all Part I crimes (City of Houston, 2005).

Using a social disadvantage index from United States census variables comprised of percent of people below the poverty level, percent of households receiving public assistance, percent female head of households with children and percent unemployed, researchers found that there was a positive association between the social disadvantage index and violent crimes including homicide, aggravated assault and simple assault (Lockwood, 2004). Lockwood (2004) also concluded that his results indicated that violent crime was less associated with race than it was with social disadvantage.

Fear of Crime

Although national crime rates have decreased significantly over the past several years, crime remains a top concern among citizens. In addition to actual reported crime rates, fear of crime plays a role in people's perceptions of physical safety (Evenson et al., 2006). At the American Heart Association's 46th Annual Conference on Cardiovascular Disease Epidemiology and Prevention, research reported that the perception of high crime kept people from engaging in physical activity such as walking within their neighborhoods (Evenson et al., 2006).

Often, signs of neighborhood deterioration spur on fear of victimization. "Visible physical decay may spark fear of crime, because Americans have come to associate it with higher levels of risk. Like observable social disorders, physical decay is taken by many as a "sign of crime" (Skogen, 1990, p. 47). Skogen aligned this with Wilson and Kelling's 1982 article, "Broken Windows," which implied that an effect of disorder in a neighborhood is more disorder. Fear can be a reaction to visible disorder

such as vacant buildings, trash dumped in vacant lots and gang graffiti tagging (Skogen, 1990).

Research reported findings that there was a negative relationship between disorder and neighborhood solidarity (Skogen, 1990). Skogen stated that, "Where levels of disorder were high, respondents were more likely to report that people in their area tended to 'go their own way'" (Skogen, 1990, p. 70). Skogen reported the findings of a study that found that neighborhood levels of fear were correlated positively (+ 0.67) with disorder. If disorder was high, feelings of safety were low (Skogen, 1990).

A major finding in another study published in 1999 indicated that fear of crime is most firmly associated with a lack of community (Schweitzer et al., 1999). In a 2004 study conducted in Italy, researchers found that fear of crime is more widespread than crime itself and among some of the best predictors of fear of crime are urbanization, and degradation of residential areas (Miceli et al., 2004).

A recent study, called the Whitmire Study, conducted at the Gateway Greening Public Policy Research Center at the University of Missouri in St. Louis has examined the impact of community gardens on the neighborhoods they serve (Whitmire Study, 2004). In areas surrounding community gardens, they 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, 2004). Signs of neighborhood stabilization may often mean a perceived reduction in crime (Skogen, 1990).

In light of recent crime statistics and the constant efforts and struggles of local governments to prevent crimes, it may be a worthwhile effort to consider the benefits of

greening inner city neighborhoods. Research has stated that, all too often, city planners and local governments forgo greening efforts due to cost considerations (Ulrich, 1984). The cost of incarceration is also very high. An average cost for one incarcerated person can run up to $30,000 for operating costs and as much as $50,000 in the construction of new jail cells (Hynes, 1996). Those that have political and economic control of local funding and programs may need more evidence that supports certain social reform efforts as opposed to building bigger correctional facilities.

Building Community and Social Capital

The definition of community may vary depending on the source, but each definition will almost always hold similar principles. The Oxford Dictionary defined community as, "a body of people living in one place, district or county" (Thompson, 1996, p. 167). Another source defined community as follows: "It is a network of relationships among individuals, families and groups that binds them in a mutually supportive and dependent construct" (Marshall, 2000, p. 193). Marshall's definition goes a step beyond the Oxford Dictionary definition and has included the emotional ties and connections people may make within a community.

Some people believe that community building has been more difficult in recent decades than it had been previously. Some may even argue that community involvement is on a sharp decline (Putnam, 2000). When asked why there has appeared to be such a slump in community interest, many reasons come to mind including the advent of television or even the changes that occurred from generation to generation (Putnam, 2000). Marshall in, *How Cities Work,* (2000) suggested that urban sprawl and anti-community political choices have been among the reasons for the lack of community. He

suggested that there was a trade-off between this warm, fuzzy sense of community and the strong individualism that has become pervasive. Marshall likened the trade off between individualism and community to those we make for family: "Like family, it can be both a joy and a burden" (Marshall, 2001, p.193).

Others have believed more strongly that the face of community involvement has not necessarily declined but has changed form due to the many technological changes in recent years. In *Community,* Gerard Delanty (2001) suggested that virtual connections were not a separate reality but has had the capacity of transforming social relations and was merely a form of communication among individuals capable of building community. Those that may have considered this new form of community as a valid one believed that humans have not necessarily needed to be physically present to engage in community building (Delanty, 2001).

Some, like Sirianni and Freidland (2001) have argued that community involvement has become more efficient or as the title of their book, *Civic Innovation in America* suggested, more innovative. Sirianni and Freidland have also argued that America's focus has shifted due to the many changes that have occurred in recent decades. One example given was a greater awareness of environmental issues. According to the authors, these issues were collectively tackled by a hierarchy of organizations, which included grassroots efforts up to and including federal organizations like the Environmental Protection Agency (EPA). They stated a belief that this hierarchy now dominates civic life (Sirianni and Freidland, 2001).

According to Putnam (2000), author of *Bowling Alone,* part of the reason for the decline in community was due to generational changes. He explored this concept

in detail by looking at the differences between the World War II generation and the subsequent baby boomers and generation X'ers. He implied that the World War II generation had a strong need to keep community ties due to the uncertainty of the times and that shared adversity builds connections among individuals. Putnam (2000) argues that the same adversity has not existed in modern times.

Delanty (2001), in *Community*, referred to 'thick' and 'thin' forms of community. While never explicitly defining them, one could assume based on their context that 'thick' forms of community are those that make many, strong social connections between individuals or a group of individuals while 'thin' forms are community ties that are easily broken or never strongly formed in the first place.

The idea of social capital was first alluded to in 1961 by Jane Jacobs in her well-known book on urban planning, *The Death and Life of Great American Cities,* and has subsequently been used by researchers in various fields of study. Social capital has been defined as "connections among individuals-social networks and the norms of reciprocity and trustworthiness that arise from them" (Putnam, 2000, p.19).

Collective Efficacy

A widely renowned study of Chicago neighborhoods by Sampson et al. (1998) was based on broad survey and crime data and found that two characteristics including mutual trust and altruism among neighbors as well as their readiness to intercede when they see children misbehaving helped explain why some neighborhoods are less prone to crime when compared to others. The researchers found that "collective efficacy" was a better predictor than was its poverty or residential volatility of whether a person is likely

to be victimized in the neighborhood. The Chicago study considered measures of social capital such as individual participation in local organizations, number of neighborhood-based programs, and extent of kin and friendship ties in the neighborhood. They determined that the reductions in violence are due to unofficial social control and solidarity among neighborhood residents (Sampson et al., 1998).

Urban Communities

According to Ray Suarez, author of *The Old Neighborhood: What We Lost in the Great Suburban Migration, 1966-1999,* "Starting in 1945, one of the Great Migrations of American history took place, and it continues to shape the country to this day, politically, economically, and socially" (Suarez, 1999, p. 2). Urban sprawl and white flight have left many major American urban cores abandoned and neglected. In a 1998 study, researchers found that, on average, fifteen percent of the land in the average American city is classified as vacant (Pagano and Bowman, 2000). Vacant lots are often breeding grounds for gang activity, drug trafficking, trash accumulation and prostitution. Shukoske (2000) notes the following:

> "This land is abandoned for a number of reasons, including population shifts from the cities to the suburbs due to de-industrialization and re-location by employers; changing views on desirable housing stock; and residential shifts due to the declining reputations of school systems and racial prejudices. In declining neighborhoods, vacant houses often fall prey to trespass and arson, resulting in rapid deterioration. Some of the most dangerous structures are condemned and razed, leaving vacant lots as monuments to neighborhood disinvestment. In addition to being economically unproductive, vacant lots endanger public health and safety by becoming illegal dumps for refuse that can contain noxious chemicals and breed disease" (Shukoske, 2000, p. 353).

People still residing within deteriorating neighborhoods with vast parcels of vacant land often feel powerless and afraid. "Redlining is a process by which goods or

services are made unavailable, or are available only on less than favorable terms, to people because of where they live regardless of their relevant objective characteristics" (Squires, 1992, p. 2). Disinvestment has left inner city neighborhoods out of the economic revitalization loop (Squires, 1992). Fear among residents of decaying inner cities can take hold and limit normal day-to-day activities including interaction with neighbors thereby limiting potential social capital and community ties (Evenson et al., 2006; Putnam, 2000; Skogen, 1990). Research defined collective efficacy as follows: "mutual trust among neighbors, combined with willingness to intervene on behalf of the common good, specifically to supervise children and maintain public order" (Sampson et al., 1998, p.18). The researchers believe that collective efficacy is, "the most powerful influence keeping violent crime low" (Sampson et al., 1998, p.18).

Research has indicated distrust of police by members of certain demographic groups such as African-Americans of all income and education levels and low-income individuals despite race (Hagan and Albonetti, 1982; Weitzer and Tuch, 1999). Researchers found that police patrolling high crime, minority neighborhoods were more likely to use coercive power and less apt to document crimes reported by victims (Smith, 1986). Communities comprised of minorities, especially those with high levels of poverty were likely to have lower levels of involvement in local groups, which has contributed to decreased social capital (Bursik and Grasmick, 1993). Decreased social capital has contributed to higher levels of distrust in police but according to research social capital only partly resolves the mistrust of African-Americans in regard to police (MacDonald and Stokes, 2006).

Social Capital and Community Gardens

Social capital has been defined as "connections among individuals-social networks and the norms of reciprocity and trustworthiness that arise from them" (Putnam, 2000, p. 19). Bonding social capital is the type of social capital that may be more exclusive or homogenous in nature. Ties are formed and reinforced within a particular group.

Bridging social capital refers to social capital that forms connections between groups or individuals and may be more heterogeneous in nature (Putnam, 2000). Putnam (2000) clarifies that bridging and bonding social capital are not necessarily "either-or" categories that can be neatly divided. "Indeed, the decline in neighborhood social capital-community monitoring, socializing, mentoring, and organizing-is one important feature of the inner city crisis, in addition to purely economic factors" (Putnam, 2000, p. 312).

Community gardens have offered people familiarity and support in a foreign place and have contributed to bonding social capital. For example, Cambodian and Laotians refugees met in one of three nonprofit Asian gardens in Dallas, Texas to grow and share produce that was reminiscent of the food they had eaten back in their native countries (Warmack, 2003).

In addition to gardening activities, community gardens have provided a place for casual encounters among individuals who normally would not talk to each other. Community garden environments support that "over the fence" type of communication. Joan, a member of the Peralta Community Garden featured in *A Lot in Common*, is quoted as saying, "Within three months of being involved I had talked to more people

and made more friends than I had in three years of living in the neighborhood" (Bacigalupi, 2002). "Community gardens are less about gardening than they are about community" (Glover, 2004, p. 143). Community gardens have been a vehicle for providing bridging social capital. Gardens have created opportunities for people of different cultures and generations to meet and interact. When young people worked beside adults, it has built community by creating a common goal (Sherer, 2004).

According to professor and author, Gerald Frug (1999), community building should strive to "increase the capacity of metropolitan residents to live in a world composed of people different from themselves" (p. 115). A 1996 study revealed an intermingling of ethnic backgrounds in several San Jose, California Community Gardens. For example, in the Berryessa Community Garden, San Jose, California, 60% of the gardeners were Caucasians including a Croatian family, 24% were Asian which included, Japanese, Filipino and Malaysian families, 12% were Hispanic, more specifically Mexican or Puerto Rican, 4% were African-American and 2% were American-Indians (Gordon and Dotter, 1996).

Research has also noted that social capital has yielded a large amount of power to those in leadership positions (Glover, 2004). Glover (2004) concluded that those in leadership positions within their community gardens must not abuse their power by excluding people outside of the core group of community gardeners. He warns against corrupt leadership within neighborhoods with community gardens and the backlash and retaliation that could occur from excluding people from the garden (Glover, 2004).

Summary

Given the past success of so many community gardens within urban areas in the United States and the efforts to save gardens that have been threatened by development, the benefits of the presence of a community garden in urban neighborhoods has been noticed. Research has indicated that people can derive many quality of life benefits from being involved in a community garden, such as, social needs, self-esteem needs and safe environment needs (Waliczek et al., 1996). Urban lots that were once trash-strewn eyesores and magnets for criminal behavior have become havens of safety, and provided valuable interaction among neighbors due to their transformations into community gardens. While anecdotal evidence has pointed to a reduction in crime surrounding community gardens, research showing empirical data has been limited. However, a recent study, called the Whitmire Study, conducted at the Gateway Greening Public Policy Research Center at the University of Missouri in St. Louis has examined the impact of community gardens on the neighborhoods they served (Whitmire Study, 2004). In areas surrounding community gardens they 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, 2004). Signs of neighborhood stabilization may often mean a perceived reduction in crime (Skogen, 1990).

By exploring the history of community gardens, the influences of plants and green spaces on people, the need for food security and the needs of those residing in urban areas we can conclude that community gardens can potentially fill the gaps left in the lives of urban residents. With the largest number of reported crimes occurring in urban

areas, the importance of green space on quality of life and the potential for green space to be created in the form of a community garden, it may be worth the effort to explore the potential connection between community gardens and reported crimes.

CHAPTER III

METHODOLOGY

Community Garden Research Sites

The purpose of this study was to determine if community gardens had an effect on reported property crimes in neighborhoods surrounding several urban community gardens in Houston, Texas. The city of Houston, Texas 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. Eleven community gardens were used for this study. In summer of 2004, each garden was visited to ensure that the garden was active and to observe surroundings. Gardens were revisited in June of 2006.

The gardens that were included in the study were as follows: Meredith Gardens at 1500 Bonnie Brae, The Levy Park/ Upper Kirby District Community Garden located at 3015 Richmond Avenue, The Old Sixth Ward Community Teaching Garden at 1900 Kane Street, The SEARCH Garden at 2505 Fannin Street, The Brennan Park Garden located at 3307 Austin Street, The Kashmere Community Garden at 4600 Cavalcade Street, The El Shaddi Community Garden at 5907 Cavalcade Street, The Julia C. Hester House Community Garden located at 2020 Solo Street, The Alabama Garden at 2800 Alabama Street, the 17thStreet Garden at 17th Street and Yale Street and, lastly, The Garden Oaks Community Garden at Alba Street.

Interviews with Community Garden Representatives

Someone associated with each garden was contacted for a short interview either via e-mail, by letter, in person or by telephone. Six out of the 11 gardens contacted responded to the interview questions. Interviews were conducted in order to record information regarding the inner workings of each community garden. All gardens posted a website through Urban Harvest (Urban Harvest, n.d.), a non-profit organization which supported Houston's community gardens. Some of the information requested through the interview that could not be obtained due to a lack of response was acquired from the garden's website and the researcher's observations at the garden site. Information that was gathered was taken into consideration during evaluation of data. Interview questions were as follows:

1) When was the community garden founded?
2) Who or what entity founded the community garden?
3) Does the community garden hold special functions such as plant sales, planting days, workshops or festivals?
4) How is the community garden organized? For example: Do people have individual plots? Are plots rented? Is the garden open to anyone?
5) How is the garden funded?
6) How do you see the community garden has affected the neighborhood? For example: Any notable reactions to the garden from passers-by? Were there notable reactions from neighborhood residents?
7) Have you perceived changes within the neighborhood since the inception of the community garden?

Interview questions were designed to determine specific facts that might explain potential outcomes of the crime data. In question one, researchers attempted to establish the length of time the community garden was in operation. Question two, pertaining to founding entity, was designed to ascertain whether the garden was created by a community member(s) or by an outside entity. In question three, special functions such as plant sales, planting days, workshops or festivals or other events that could have increased awareness and visibility of the garden in the community were determined and established the potential impact of the garden on the neighborhood. Question four was asked to determine if garden organization possibly made the garden accessible to fewer people and perhaps made the garden less visible or less important to neighborhood residents. Question five was asked to determine if funding, or lack thereof, may have an influence on the quality of the garden and subsequently on the neighborhood perception of the garden. Reactions from neighborhood residents and people passing by would have indicated to researchers that the garden is noticed within the neighborhood and helped determine how it is received, either negatively or positively, by the neighborhood. Perceived changes in the neighborhood, as asked in question seven, would have further indicated a positive or negative reaction to the presence of the garden and established the garden as a potential influence on its surroundings.

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). Crime data were obtained using the monthly police reports called PIP stats or Positive Interaction

Program Statistics. PIP stats were provided monthly as Microsoft Access (Redmond, Washington) Databases or as Microsoft Excel (Redmond, Washington) Spreadsheets. To collect these data, the Excel Spreadsheets for each month in 2005 were downloaded from the Houston Police Department website. The spreadsheet format was used because the Microsoft Access Databases were inaccessible due to firewall issues.

Each month contained a list of reported crimes including both violent crimes and property crimes. All violent crimes were deleted from the spreadsheet so that the spreadsheet only included property crimes. Property crimes were used for this study because the majority of crimes that occurred nationally were property crimes (FBI, 2004). Property crimes included: burglary, theft and auto theft.

Mapping of Crime Data

The spreadsheets containing the edited crime data and the community garden addresses were sent to a San Antonio, Texas 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 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 ArcView Software" (City of Fort Collins, 2007)

Geocoded addresses were obtained using a nationwide street database. Crime data for each month in 2005 were geocoded separately and all months had an accuracy rate of 89% or higher with an average accuracy rate of 91.1% of block addresses that would geocode. The shapefile contained a single point for each address that was geocoded.

Mapping of Community Gardens

All 11 gardens were geocoded to create a shapefile and mapped into a Houston

city map using Arc View© 9.1 GIS software. An eighth of a mile radius was drawn around each community garden. The number of property crimes within an eighth of a mile radius of each community garden was determined and mapped (Figures 1-11). An eighth of a mile distance was chosen because it is walking distance from the garden and was likely to be more visible to passers-by from this distance.

Initial Analysis Using ArcView© 9.1 and Google Earth® Software

A grid was overlayed onto the map of the Houston community garden areas. The map and grid were viewed using Google Earth® Software (cite city). The number of crimes within each grid was determined. Based on the number of crimes, 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" (Appendix A).

This initial analysis allowed researchers an overall look at the mapped gardens and numbers of property crimes in the city in relationship to the community garden areas. However, numbers of property crimes surrounding the garden were difficult to quantify using this methodology. Therefore, quantities of crimes in garden areas were determined.

Mapping of Random Points

A one mile radius surrounding the garden was also determined and mapped (Figures 1-11). A one 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 random points within the one mile radius of each community garden were selected by GeoSpatial Training staff (Figures 1-11). An eighth of a mile radius was created surrounding each of the five random points. Property crimes within each eighth of a mile radius surrounding the random points were tallied (Figures 1-11).

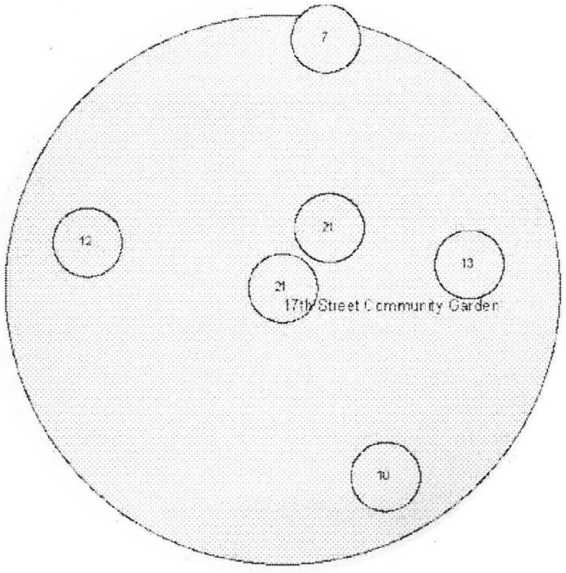


Figure 1. Total property crimes for an eighth of a mile radius surrounding the 17th Street Community Garden and for an eighth of a mile radius surrounding each of the five random points within a mile of the 17th Street Community Garden in the study of the effect of community gardens on numbers of property crimes in urban Houston.

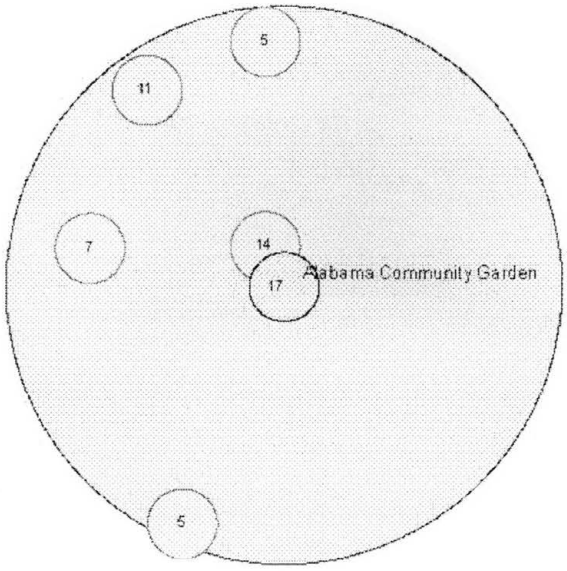


Figure 2. Total property crimes mapped for an eighth of a mile radius surrounding the Alabama Community Garden and for an eighth of a mile radius surrounding each of the five random points within a mile of the Alabama Community Garden in the study of the effect of community gardens on numbers of property crimes in urban Houston.

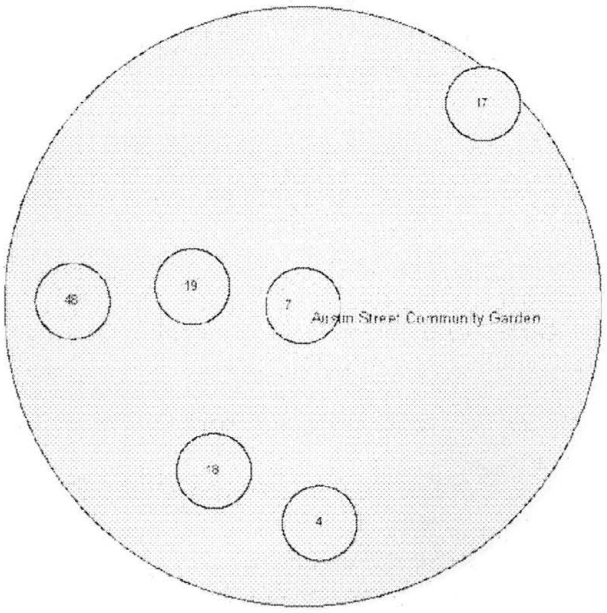


Figure 3. Total property crimes mapped for an eighth of a mile radius surrounding the Austin Street Community Garden and for an eighth of a mile radius surrounding each of the five random points within a mile of the Austin Street Community Garden in the study of the effect of community gardens on numbers of property crimes in urban Houston.

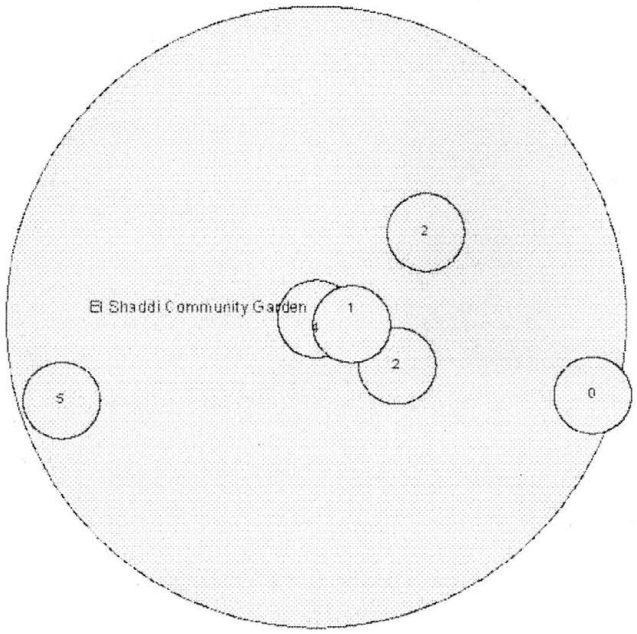


Figure 4. Total property crimes mapped for an eighth of a mile radius surrounding the El Shaddi Community Garden and for an eighth of a mile radius surrounding each of the five random points within a mile of the El Shaddi Community Garden in the study of the effect of community gardens on numbers of property crimes in urban Houston.

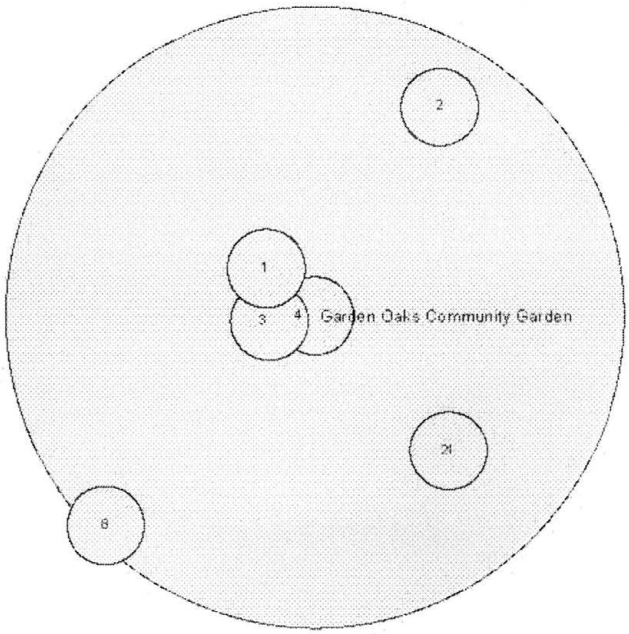


Figure 5. Total property crimes mapped for an eighth of a mile radius surrounding the Garden Oaks Community Garden and for an eighth of a mile radius surrounding each of the five random points within a mile of the Garden Oaks Community Garden in the study of the effect of community gardens on numbers of property crimes in urban Houston.

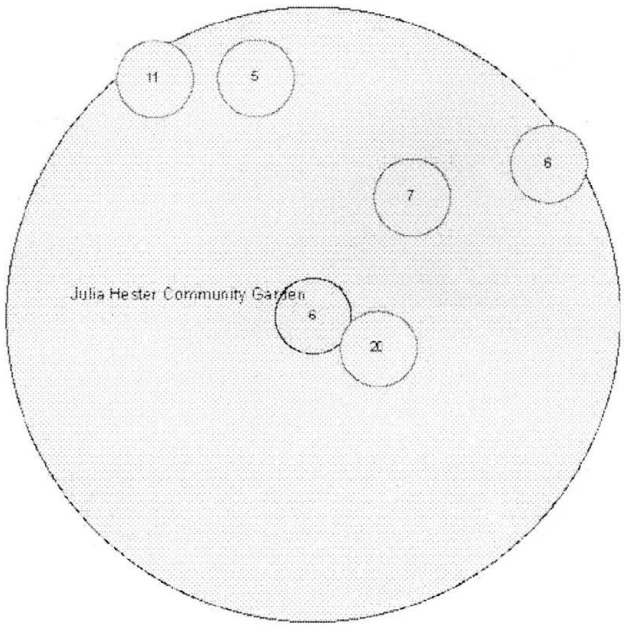


Figure 6. Total property crimes mapped for an eighth of a mile radius surrounding the Julia C. Hester House Community Garden and for an eighth of a mile radius surrounding each of the five random points within a mile of the Julia C. Hester House Community Garden in the study of the effect of community gardens on numbers of property crimes in urban Houston.

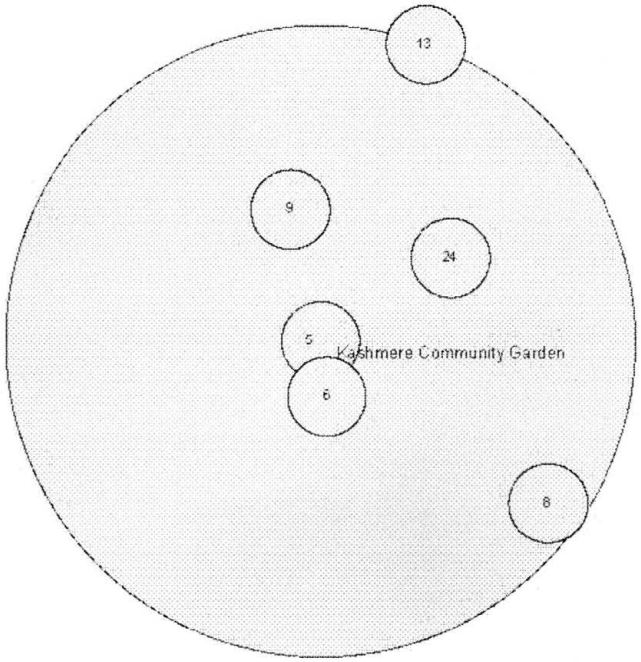


Figure 7. Total property crimes mapped for an eighth of a mile radius surrounding the Kashmere Community Garden and for an eighth of a mile radius surrounding each of the five random points within a mile of the Kashmere Community Garden in the study of the effect of community gardens on numbers of property crimes in urban Houston.

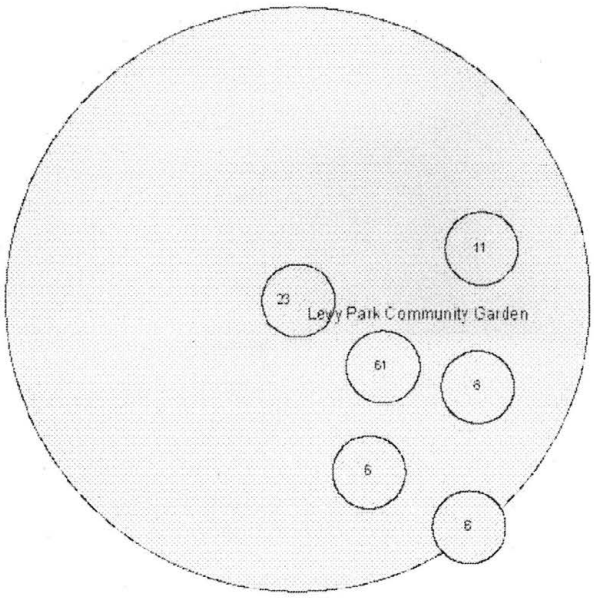


Figure 8. Total property crimes mapped for an eighth of a mile radius surrounding the Levy Park Community Garden and for an eighth of a mile radius surrounding each of the five random points within a mile of the Levy Park Community Garden in the study of the effect of community gardens on numbers of property crimes in urban Houston.

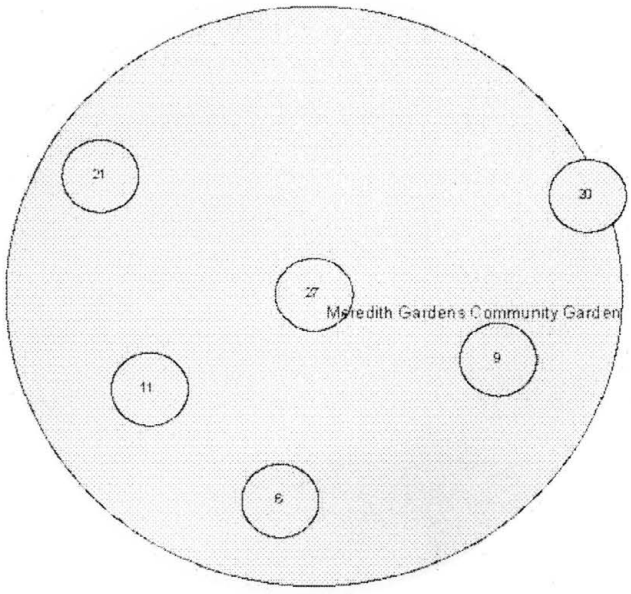


Figure 9. Total property crimes mapped for an eighth of a mile radius surrounding the Meredith Gardens Community Garden and for an eighth of a mile radius surrounding each of the five random points within a mile of the Meredith Community Garden in the study of the effect of community gardens on numbers of property crimes in urban Houston.

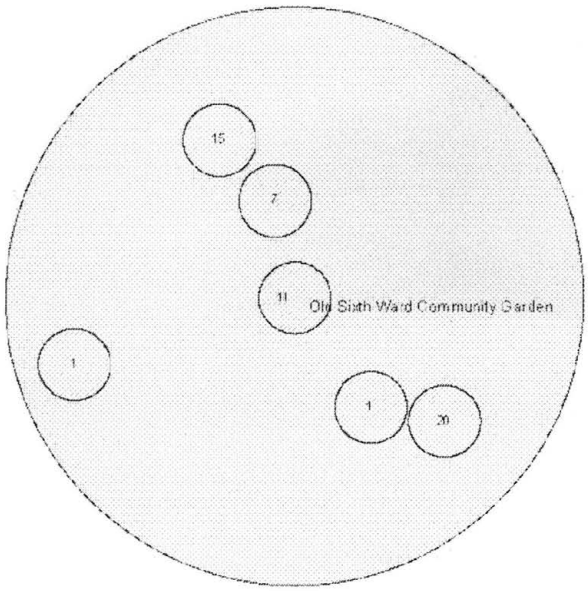


Figure 10. Total property crimes mapped for an eighth of a mile radius surrounding the Old Sixth Ward Community Garden and for an eighth of a mile radius surrounding each of the five random points within a mile of the Old Sixth Ward Community Garden in the study of the effect of community gardens on numbers of property crimes in urban Houston.

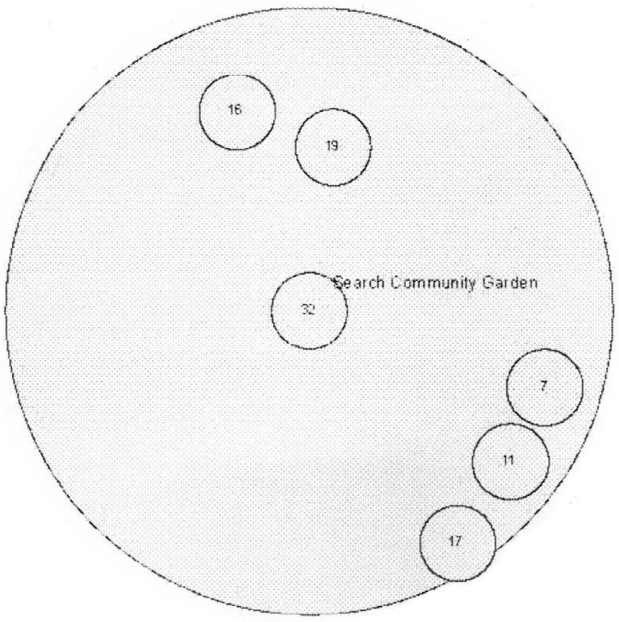


Figure 11. Total property crimes mapped for an eighth of a mile radius surrounding the SEARCH Community Garden and for an eighth of a mile radius surrounding each of the five random points within a mile of the SEARCH Community Garden in the study of the effect of community gardens on numbers of property crimes in urban Houston.

Demographic Data

Demographic data by census block from the Census Bureau, 2000 were overlayed onto the Houston, Texas city map along with the crime data and community garden data. Demographics that were considered in the study included median income and ethnicity of residents, and number of rentals and owner occupied dwellings. Demographic data were determined for each community garden as well as for each of the five random points within the mile radius surrounding 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

Property crimes within the eighth of a mile radius surrounding all 11 community gardens and property crimes within an eighth of a mile radius surrounding all of the random areas were entered into SPSS (Statistical Package for the Social Sciences 11.0) (New Jersey). The mean number of property crimes for the community garden areas and the random areas were compared statistically using paired t-tests.

Additionally, community gardens were coded with a two and randomly selected areas were coded with a one. A regression analysis was performed to determine if the presence of a community garden could predict greater or lesser numbers of reported property crimes.

CHAPTER IV

RESULTS

Purpose of the Study

The purpose of this study was to determine if community gardens had an effect on the number of reported property crimes in Houston, Texas. Descriptive statistics and data analyses are contained in this chapter concerning results from the comparisons between the average property crime occurrences within an eighth of a mile surrounding 11 community gardens and the average property crime occurrences within an eighth of a mile surrounding 55 randomly selected areas within a one mile radius of the 11 community gardens in urban Houston. Background information pertaining to the 11 selected community gardens was collected by personal interviews of community garden representatives, via e-mail contact or by written letter. Demographic data were gathered, compared and analyzed using paired t-tests to assist in explaining outcomes of the property crime data.

The objectives for this study were as follows: 1) To collect background information, asked either in person, via e-mail or by written letter, pertaining to the selected Houston community gardens, 2) To compare the mean number of property crimes occurring within an eighth of a mile radius of 11 active community gardens to the

mean number of property crimes occurring within an eighth of a mile radius surrounding 55 randomly selected areas within a mile of the 11 selected community gardens in Houston, TX, 3) To determine if the presence of a community garden could predict greater or lesser numbers of property crimes.

Community Garden Background Information and Interview Results: Findings Related to Objective 1

The first objective of the study was to collect background information, asked either in person, via e-mail or by written letter, pertaining to the selected Houston community gardens.

Attempts were made throughout the course of the research study to contact representatives from each garden to obtain answers to interview questions. Interviews were conducted in order to record information regarding the inner workings of each community garden and to gain information on how well established and recognized the garden was in the community. Information pertaining to each garden was also obtained through garden websites created by Urban Harvest (Urban Harvest, n.d.) and researcher observation. Results of the information compiled for each of the gardens used in this research project are contained within the following paragraphs as well as Tables 1-4. Six out of 11 gardens responded to questions.

The Gardens

Meredith Community Garden

On June 22, 2005, Lorelei de la Reza, a Meredith Garden representative, responded to interview questions via e-mail. The Meredith Garden located at 1500 Bonnie Brae was established in 1993 by Meredith Burke and the members of the Castle

Court Neighborhood Association (CCNA) after buildings were demolished to make way for a new library. When the library was built in a different location than what was originally planned, a large piece of vacant land was left. According to the garden's website, the lot became overgrown and attracted the dumping of trash including old sofas and mattress frames. The CCNA rented the lot for one dollar per year through the City of Houston's Adopt-a-Lot program.

The gardeners considered the garden inclusive of everyone and boasted of no fences. They relied on neighborhood volunteers as well as people from outside the neighborhood for assistance with maintenance. The association paid for water, seeds, soil and other necessities up until the beginning of 2005 when the garden was transferred to the Houston Parks and Recreation Department. In April of 2005, the Friends of Mandell Park non-profit was created and the board has taken responsibility for fund raising.

Ms. De la Reza stated that people have commented on the beauty of the garden and people will have lunch at the picnic table. She said that prior to the garden there was illegal activity and dumping, and after work began on the garden, the activity had stopped. Gardening days were every Wednesday and Saturday from 8:30 am through noon and they have hosted yearly functions such as Neighborhood Night Out, Halloween and Fourth of July Festivals (Tables 1-4).

Upper Kirby/Levy Park Community Garden

On March 21, 2006, Mr. James Thomas was interviewed. He was a member of the Upper Kirby/Levy Park Community Garden. The Upper Kirby/Levy Park Community Garden, located at 3015 Richmond, was near business parks and newer mid-rise apartments to the east and west of the garden. Levy Park was to the south and an office

building to the north. The garden was sandwiched between two of the wealthier areas of Houston: River Oaks and University. The Upper Kirby Business and Civic Club founded the garden in 2001. Garden plots were rented by gardeners, including several members from the new mid-rise apartments, for $40.00/six months. Plot rental helped to fund the garden. Funding also came from the Upper Kirby Civic and Business Association.

The fenced garden included 36, four foot by ten foot plots. The individual plots were surrounded by several communal areas, which included a grape arbor, native plant area, rose garden, herb garden and a pond. Approximately half of the garden was ornamental plants and the other half consisted of edible plants. The garden has had several garden functions, one of which was a Scarecrow Festival. A nearby business provided prizes for the scarecrow contest. The Urban Harvest Group had a Farmer's Market across the street from the garden every Saturday. There were workdays every third Saturday of the month or every third Thursday evening during daylight savings time. Because the garden was surrounded by businesses, office workers would take their lunches to the garden. The native plant section had a sitting area for children. At one time in the garden's history, autistic adults helped maintain the herb garden. The Harris County Master Gardeners and the Native Plant Society of Houston maintained a plot (Tables 1-4).

SEARCH Community Garden

There was no response from anyone associated with the SEARCH Garden. The SEARCH Garden was located in downtown Houston, Texas outside of the SEARCH homelessness program building. The SEARCH homelessness program served 2,300 homeless people and provided health services, housing and job training. The garden was

founded in 1998 by an employee of the SEARCH homelessness program at a different location and moved to its current location in 2002.

There were two large raised beds measuring four feet by fifty feet. The garden was surrounded by tall buildings on three sides and visible from a small sitting area accessible from the sidewalk (Urban Harvest, n.d.). During a site visit in June of 2006, the garden appeared to be inactive for at least as long as the spring, 2006 garden season. Days of Caring participants from Exxon/Mobile have provided assistance in garden maintenance. According to the Urban Harvest website, the SEARCH garden harvest was used in the SEARCH soup kitchen and for the culinary arts job training provided to residents (Urban Harvest, n.d.) (Tables 1-4).

Old Sixth Ward Community Teaching Garden

On January 13, 2006, Dr. Bob Randall, the Executive Director of Urban Harvest, responded to interview questions via e-mail. Urban Harvest, a non-profit organization that supports Houston's community gardens, ran the Old Sixth Ward Community Teaching Garden. They have provided technical support such as horticultural education in the form of gardening classes, access to a comprehensive gardening library, networking opportunities as well as assistance with creating websites for the gardens within its network (Urban Harvest, n.d.). Both the garden and the Urban Harvest office were located at 1900 Kane Street in a residential area.

Urban Harvest founded the garden in January 1996. Special functions included classes almost every Tuesday and Friday on gardening topics such as pruning, a large fruit tree sale once per year and summer gardening classes for children. The garden was open to any adult or accompanied minor. Urban Harvest staff guided volunteers on

garden maintenance activities. Volunteers were rewarded with in-season harvest. Urban Harvest general revenues funded the garden, which was touted as being over $500,000 in 2005.

Dr. Randall's response to the potential effects the community garden has played in the neighborhood was as follows: "The garden is located at a neighborhood youth center. It attracts children and sometimes others who have other business at the site. The neighborhood is generally proud of the garden and some of them have planted fruits they see us growing. Our garden has been designed to influence the entire metro area and it has." He also stated that the property values have doubled or tripled, but he does not relate the rise in property values to the presence of the garden (Tables 1-4).

The Target Hunger Gardens

Target Hunger was a non-profit organization founded in 1989. Target Hunger was dedicated to lessening hunger as one of its core causes. Among the services offered were food distribution, nutritional education and the management of 27 community gardens. At the time of the study, the Target Hunger Gardens were producing an average of 3,000 servings of vegetables per month during peak months. Property owners loaned land to Target Hunger for their community garden program. Volunteers worked in the gardens. Volunteers were said to be residents from the Fifth Ward and Kashmere Garden areas and caring people from the Houston community (Urban Harvest, n.d.). Three Target Hunger Gardens were used in this study: The El Shaddi Garden, The Julia C. Hester House Garden and the Kashmere Garden.

El Shaddi

No response was received for an interview request from The El Shaddi Garden. The garden was located at 5907 Cavalcade Street in the northeast portion of the area inside Houston's 610 loop on a busy street in a predominately residential area. The garden was behind a small house that appeared to be used as a clubhouse for the garden. There was a church next door to the west of the garden and two drinking establishments across the street to the southeast of the garden (Tables 1-4).

Julia C. Hester House

The Julia C. Hester House, a non-profit organization established in 1943, offered services to children, youth, seniors and emergency aid to people in crisis. The Hester House was in a residential area with an elementary school and a church located to the east. The garden was fenced and located on the northeast corner of the property where two streets intersected.

On June 27, 2006, Mr. Alan Squares, an active Hester House gardener, and Mr. Hector Garcia, Associate Executive Director of the Julia C. Hester House were interviewed in person. The United Way and Target Hunger founded the Hester House Garden in 1982. The food harvested by Hester House gardeners went to the Hester House Community Center food pantry and was made available to eligible community members.

The community garden hosted an occasional workshop and was open to a handful of volunteers. Target Hunger organizers relied on volunteers and community service workers to keep the garden maintained. Target Hunger and the United Way provided funding for the garden.

Mr. Squares and Mr. Garcia noticed that people stopped to ask questions about

the crops that were grown and passers-by asked to buy the harvest. Mr. Garcia perceived some immunity from crime because vandalism to both the building and the garden were minimal. He referred to this immunity as a "halo effect" surrounding the property due to what he called "community ownership" (Tables 1-4).

Kashmere

There was no response to a request for information from anyone at the Kashmere Garden. The Kashmere Garden was located at 4600 Cavalcade Street on a busy residential street in the northeast portion of the area inside Houston's 610 loop. The garden was surrounded by houses on all sides. The Kashmere Garden was Target Hunger's largest garden (Tables 1-4).

Alabama Community Garden

The Alabama Community Garden, 2800 Alabama Street, was located in Houston's Third Ward in a residential area. It was surrounded by homes on all sides except for the tavern immediately to the northwest of the garden. Researchers made contact with an Alabama Community gardener on June 26, 2006 and also the garden's coordinator, J.D. Green, responded via regular mail to interview questions and the response was received by researchers on July 18, 2006. The garden was founded in 1985 by a group of community residents led by Various Smith (Urban Harvest, n.d.) and was considered to be the oldest garden in Houston. Both the coordinator and the gardener said that plots were rented. Rent was $5.00 per month and people paid whatever and whenever they could. The gardener also stated that people who held plots were given a key to the garden gate so that they could come and go when they pleased.

The garden coordinator said that there were reactions to the garden from both

neighborhood residents and passers-by, but gave no specific reactions. He also stated that he had seen changes within the neighborhood since the inception of the garden but, again, gave no specific details. They had received several donations over the years from Hands Across the Hood, the United States Department of Agriculture (USDA) and Bank of America (Urban Harvest, n.d.) (Tables 1-4).

17th Street Community Garden

The 17th Street Community Garden was founded in June of 2004 by a Houston Heights resident, Dennis Virgadamo. Mr. Virgadamo responded to interview questions via a letter left at the garden site on June 26, 2006. Researchers received his response on June 28, 2006. Information was also gathered from the gardens website (Urban Harvest, n.d.). Mr. Virdigamo stated that special garden functions included demonstrations, vegetable sales and tours. Garden membership was $25.00 annually and gardeners maintained outside areas aside from their own plots and assisted with payment for the water expenses. Mr. Virgadamo said that neighborhood residents loved the garden and supported the concept. The Houston Heights Neighborhood Association had shown its support by granting the garden a Community Improvement Award. In Mr. Virgadamo's opinion, he had seen more redevelopment in the area since the inception of the garden (Tables 1-4).

Austin Street/Brennan Park Community Garden

On July 13, 2006, the caretaker of the Brennan Park Garden was interviewed. The garden was established in 1998 and was the vegetable garden for the St. Joseph Club House. At the time of the study, the garden was located behind a large wrought iron fence close to downtown Houston. There was an art center to the northwest and San Jacinto

Community College to the southwest. The garden was not currently holding any special functions, but had future plans to bring produce to market. The caretaker was primarily responsible for the maintenance of the garden but had some help from the residents of St. Joseph Club House. The garden was a source of organically grown produce for the residents of St. Joseph Club House. The caretaker said that people had stopped and asked for produce and some had commented on the beauty of the garden. The caretaker had only been working on the garden for four weeks and did not know if there have been changes in the neighborhood since the garden's inception (Tables 1-4).

Garden Oaks Community Garden

On March 19, 2006, Mr. Bob Gabrysch was contacted via telephone by researchers and interviewed. The Garden Oaks Community Garden was located at 4400 Alba Street just outside of the Northwest portion of Houston's 610 loop in a residential area. There were houses on all sides of the garden. Jan Koenig founded the garden in 1991 at Garden Oaks Elementary School. It was there for less than a year before it was moved to its current site that previously housed a water storage facility owned by The City of Houston. Beth Galiano became the main caretaker in 1992 and in 2002 Mr. Gabrysch voluntarily tended the gardens. Mr. Gabrysch had funded most of the materials for the garden and the Garden Oaks Civic Club paid for the water. There were fourteen beds in the garden that totaled 2,000 square feet of garden space. Most of the garden's harvest went to area groups such as Kid Care, St. Rose of Lima Church, St. Matthew's United Methodist Church and the Salvation Army. Mr. Gabrysch said that people seemed surprised to see the garden there and that they had stopped to take pictures and ask

questions. He said that a park was proposed to take the place of the garden and people from the neighborhood protested (Tables 1-4).

Table 1. Compilation of garden founding dates gathered through interviews in person, via e-mail or written letter, with community garden representatives and through information available on garden websites, in the study of the effect of community gardens on numbers of property crimes in urban Houston.

Garden	Founding Date
Meredith	1993
Levy Park/Upper Kirby	2001
SEARCH	2002
Old Sixth Ward	1996
El Shaddi	N/A*
Julia C. Hester House	1982
Kashmere	N/A*
Alabama	1985
17th Street	2004
Austin Street/Brennan Park	1998
Garden Oaks	1991

*N/A= Not Available

Table 2. Compilation of information pertaining to each of the gardens' founding entity and special functions held at the community garden gathered through personal interviews, via e-mail or written letter, with community garden representatives and garden websites in the study of the effect of community gardens on numbers of property crimes in urban Houston.

Garden	Founding Entity	Special Functions
Meredith	Individual: Meredith Burke	Yes
Levy Park /Upper Kirby	Upper Kirby Business and Civic Club	Yes
SEARCH	N/A*	N/A*
Old Sixth Ward	Urban Harvest	Yes
El Shaddi	Target Hunger and United Way	N/A*
Julia C. Hester House	Target Hunger and United Way	Yes, Not on a regular basis
Kashmere	Target Hunger and United Way	N/A*
Alabama	Various Smith and other Community Members	Yes
17th Street	Individual: Dennis Virgidamo	Yes
Austin Street/Brennan Park	St. Joseph's Clubhouse	No
Garden Oaks	Individual: Jan Koenig	No

*N/A= Not Available

Table 3.Compilation of information pertaining to each of the community gardens organization and community gardens source(s) of funding gathered through personal interviews, via e-mail or written letter with community garden representatives and garden websites in the study of the effect of community gardens on numbers of property crimes in urban Houston.

Garden	Organization and Maintenance	Funding
Meredith	Garden open, no individual plots, weekly workdays	City, Neighborhood Association Grant
Levy Park /Upper Kirby	Individual plots, communal plots and monthly workdays	Business and Neighborhood Association, plot fees
SEARCH	SEARCH residents and Days of Caring volunteers	N/A*
Old Sixth Ward	Maintained by Urban Harvest Staff and volunteers	Urban Harvest
El Shaddi	N/A*	United Way and Target Hunger
Julia C. Hester House	Volunteers and community service maintain the garden	United Way and Target Hunger
Kashmere	N/A*	United Way and Target Hunger
Alabama	Individual Plots	Donations and plot fees
17th Street	Individual Plots	Plot fees
Austin Street/Brennan Park	Maintained by a caretaker and St. Joseph's House residents	N/A*
Garden Oaks Garden	Maintained by one caretaker	Caretaker; Bob Gabrysch

*N/A= Not Available

Table 4. Compilation of information pertaining to neighborhood reactions to the community garden and perceived changes within the neighborhood since the inception of the community garden, gathered through personal interviews, via e-mail or written letter with community garden representatives and garden websites in the study of the effect of community gardens on numbers of property crimes in urban Houston.

Garden	Reactions	Neighborhood Changes
Meredith	Comments on beauty from passers-by. People stop or take lunch breaks.	Illegal dumping has stopped.
Levy Park /Upper Kirby	Local office workers use the garden frequently during their lunch breaks.	None noted.
SEARCH	N/A*	N/A*
Old Sixth Ward	Attracts Children from the Youth Center. Neighbors plant things they see in the garden.	Property values tripled (interviewee does not attribute this to the presence of the garden).
El Shaddi	N/A*	N/A*
Julia C. Hester House	People stop to ask questions and ask to buy produce.	Perceived some immunity from crime.
Kashmere	N/A*	N/A*
Alabama	Yes (no specific information given by interviewee).	Yes (no specific information given by interviewee).
17th Street	Residents love the garden and support the concept. The garden received a community improvement award from the Heights Neighborhood Association.	More redevelopment in neighborhood.
AustinStreet/Brennan Park	People stop and ask for produce and comment on the beauty of the garden.	N/A*
Garden Oaks	People take pictures, ask questions. Neighbors protested a proposed park, which would have displaced the garden.	Previous drug activity next door has ceased.

*N/A= Not Available

Mean Number of Property Crimes in Community Garden Areas Compared to Mean Number of Property Crimes in Random Areas: Findings Related to Objective 2

The second objective of the study was to compare the mean number of property crimes occurring within an eighth of a mile radius of 11 active community gardens to the mean number of property crimes occurring within an eighth of a mile radius of 55 randomly selected areas within a mile of the selected community gardens in Houston, Texas.

Initial Analysis: Mapping Objective 2

After community garden addresses and 2005 property crime data were collected they were organized into a table to be geocoded and placed into a shapefile. All the data were mapped using Arc View© 9.1 GIS software and viewed using Google Earth® Software.

Initially, a grid was overlayed onto the map. The number of crimes within each grid was determined. Based on the number of crimes, 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" (Appendix A).

The initial analysis allowed researchers an overall look at the mapped gardens and numbers of property crimes in relationship to the community gardens. However, numbers of property crimes surrounding the garden were difficult to quantify using this methodology.

As mentioned previously, researchers redesigned the map to include a one mile radius surrounding each community garden. Within each of the one mile radii five points were selected randomly. An eighth of a mile radius was placed around each community garden and each randomly selected area. Property crimes were tallied in each community garden area as well as each randomly selected area (Figures 1-11).

Initial Analysis: Statistical Comparisons
Objective 2

The number of property crimes per community garden area and the number of property crimes per random area and their frequencies were tabulated using SPSS (Statistical Package for the Social Sciences 11.0) (New Jersey) (Table 5). A paired t-test was used to compare the mean number of property crimes for all 11 community gardens with the mean number of property crimes for all 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 6). Therefore, the neighborhoods with community gardens in this study did not appear to have statistically significant fewer property crimes in comparison to the areas that were selected randomly.

Previous research has stated that greenspace and passive and active interactions with plants have contributed to fewer crimes, feelings of well-being and reduced stress and fatigue (Kuo, 2001; Kuo and Sullivan, 2001a; Kuo and Sullivan, 2001b; Snelgrove et al., 2004; Waliczek et al., 1996). Research has also shown that the presence of a community garden can raise property values and contribute to more owner occupied dwellings (Whitmire Study, 2004), which in turn typically have less property crime

(United States Department of Justice, 2006). The findings in this study did not appear to support previous research.

Table 5. Number of property crimes per community garden area and randomly selected neighborhood areas and their frequencies in the study of the effect of community gardens on numbers of property crimes in urban Houston.

Property Crimes (no.)	
Garden Areas	**Frequency (no.)**
4	2
5	1
6	1
7	1
11	1
17	1
21	1
23	1
27	1
32	1
Random Areas	
0	1
1	4
2	3
3	1
4	1
5	4
6	5
7	5
8	3
9	2
10	1
11	5
12	1
13	2
14	1
15	1
16	1
17	2
18	1
19	2
20	3
21	3

Table 5. (*continued*) Number of property crimes per community garden area and randomly selected neighborhood areas and their frequencies in the study of the effect of community gardens on numbers of property crimes in urban Houston.

Property Crimes (no.)	
Garden Areas	**Frequency (no.)**
24	1
48	1
61	1

Table 6. 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.

Property Crimes	**Sample Size (no.)**	**Mean**	**SD**	**df**	***P***
Community Garden Areas	11	14.272	10.169	10	0.270
Random Areas	55	11.600	10.655		

Further Analysis: Demographic Comparisons
Objective 2

Random points were selected within one mile from each community garden. The relative closeness of each random point to the community garden in which it was compared was intentionally selected to increase the likelihood that demographics for each random point would be similar to the area surrounding the community gardens. Demographics, such as renter occupied dwellings, have been associated with incidence of crime (United States Department of Justice, 2006). Demographic information for each community garden area and each randomly selected area was retrieved by census block from the Census Bureau, 2000 and was overlayed onto the Houston, Texas city map along with the crime data and community garden data using Arc View© 9.1 GIS software (Tables 7-8).

Table 7. Number of crimes and demographic information from the United States Census Bureau, 2000 for renter occupied dwellings, owner occupied dwellings and vacant dwellings in 11 community garden areas and 55 randomly selected areas in the study of the effect of community gardens on numbers of property crimes in urban Houston.

Area	Property Crimes (no.)	Renter (no.)	Owner (no.)
Old Sixth Ward cg[z]	11	128	86
Old Sixth Ward 1[y]	1	676	81
Old Sixth Ward 2[y]	1	457	26
Old Sixth Ward 3[y]	7	125	77
Old Sixth Ward 4[y]	15	125	77
Old Sixth Ward 5[y]	20	457	26
Alabama cg[z]	17	195	103
Alabama 1[y]	5	276	123
Alabama 2[y]	5	281	74
Alabama 3[y]	7	297	104
Alabama 4[y]	11	87	140
Alabama 5[y]	14	271	83
Austin Street cg[z]	7	412	70
Austin Street 1[y]	4	184	82
Austin Street 2[y]	17	350	3
Austin Street 3[y]	18	297	104
Austin Street 4[y]	19	950	267
Austin Street 5[y]	48	926	285
Garden Oaks cg[z]	4	269	710
Garden Oaks 1[y]	1	258	970
Garden Oaks 2[y]	2	289	139
Garden Oaks 3[y]	3	269	710
Garden Oaks 4[y]	8	182	547
Garden Oaks 5[y]	21	269	547
Julia Hester House cg[z]	6	241	171
Julia Hester House 1[y]	5	147	147
Julia Hester House 2[y]	6	160	241
Julia Hester House 3[y]	7	160	241
Julia Hester House 4[y]	11	108	140
Julia Hester House 5[y]	20	241	171
Kashmere cg[z]	5	404	165
Kashmere 1[y]	6	404	165
Kashmere 2[y]	8	336	206
Kashmere 3[y]	9	125	155
Kashmere 4[y]	13	316	161
Kashmere 5[y]	24	319	316

Table 7 *(continued)*. Number of crimes and demographic information from the United States Census Bureau, 2000 for renter occupied dwellings, owner occupied dwellings and vacant dwellings in 11 community garden areas and 55 randomly selected areas in the study of the effect of community gardens on numbers of property crimes in urban Houston.

Area	Property Crimes (no.)	Renter (no.)	Owner (no.)
El Shaddi cg[z]	4	319	316
El Shaddi 1[y]	0	139	236
El Shaddi 2[y]	1	139	236
El Shaddi 3[y]	2	139	236
El Shaddi 4[y]	2	319	316
El Shaddi 5[y]	5	262	210
Levy Park cg[z]	23	1143	278
Levy Park 1[y]	6	70	423
Levy Park 2[y]	6	164	272
Levy Park 3[y]	8	311	192
Levy Park 4[y]	11	444	238
Levy Park 5[y]	61	1249	193
Meredith cg[z]	27	623	181
Meredith 1[y]	6	207	331
Meredith 2[y]	9	569	370
Meredith 3[y]	11	213	207
Meredith 4[y]	20	482	205
Meredith 5[y]	21	821	132
SEARCH cg[z]	32	87	140
SEARCH 1[y]	7	281	74
SEARCH 2[y]	11	281	74
SEARCH 3[y]	16	248	2
SEARCH 4[y]	17	271	83
SEARCH 5[y]	19	45	6
17th Street cg[z]	21	443	201
17th Street 1[y]	7	134	115
17th Street 2[y]	10	310	415
17th Street 3[y]	12	161	194
17th Street 4[y]	13	76	155
17th Street 5[y]	21	560	244

z =Community garden area

y=One of the five randomly selected points within one mile from the community garden.

Table 8. Number of crimes and demographic information from the United States Census Bureau, 2000 for race including number of black residents, number of white residents, number of Hispanic residents, number of other races and median household income in 11 community garden areas and 55 randomly selected areas in the study of the effect of community gardens on numbers of property crimes in urban Houston.

Area	Black (no.)	White (no.)	Hispanic (no.)	Median Household Income	Other Race (no.)
Old Sixth Ward cg[z]	68	328	364	41,667	264
Old Sixth Ward 1[y]	141	914	366	37,109	126
Old Sixth Ward 2[y]	91	696	81	65,822	50
Old Sixth Ward 3[y]	56	300	662	20,208	401
Old Sixth Ward 4[y]	56	300	662	20,208	396
Old Sixth Ward 5[y]	91	696	81	65,822	50
Alabama cg[z]	647	23	31	28,068	30
Alabama 1[y]	739	61	80	29,333	89
Alabama 2[y]	674	96	157	17,059	129
Alabama 3[y]	565	258	427	22,891	297
Alabama 4[y]	397	379	179	71,354	118
Alabama 5[y]	713	71	116	15,150	70
Austin cg[z]	298	615	858	24,565	576
Austin 1[y]	521	25	29	13,977	20
Austin 2[y]	95	398	72	30,000	44
Austin 3[y]	565	258	427	22,891	297
Austin 4[y]	229	1642	366	54,551	456
Austin 5[y]	120	1489	278	33,203	140
Garden Oaks cg[z]	71	1852	713	41,681	418
Garden Oaks 1[y]	293	2426	610	60,387	337
Garden Oaks 2[y]	185	813	837	31,313	377
Garden Oaks 3[y]	71	1852	713	41,681	418
Garden Oaks 4[y]	39	1431	699	45,192	402
Garden Oaks 5[y]	71	1852	713	41,681	418
Julia Hester House cg[z]	943	149	181	14,730	66
Julia Hester House 1[y]	340	310	593	23,182	167
Julia Hester House 2[y]	160	942	1231	28,625	336
Julia Hester House 3[y]	160	942	1231	28,625	336
Julia Hester House 4[y]	146	363	718	25,714	366
Julia Hester House 5[y]	943	149	181	14,730	66
Kashmere cg[z]	1227	127	246	15,191	129
Kashmere 1[y]	1227	127	246	15,191	129
Kashmere 2[y]	1154	180	353	20,000	198
Kashmere 3[y]	728	14	38	22,604	40
Kashmere 4[y]	1152	38	55	23,750	40

Table 8 (*continued*).Number of crimes and demographic information from the United States Census Bureau, 2000 for race including number of black residents, number of white residents, number of Hispanic residents, number of other races and median household income in 11 community garden areas and 55 randomly selected areas in the study of the effect of community gardens on numbers of property crimes in urban Houston.

Area	Black (no.)	White (no.)	Hispanic (no.)	Median Household Income	Other Race (no.)
Kashmere 5[y]	1545	31	94	16,174	79
El Shaddi cg[z]	1545	31	94	16,174	69
El Shaddi 1[y]	638	226	493	18,533	275
El Shaddi 2[y]	638	226	493	18,533	275
El Shaddi 3[y]	638	226	493	18,533	275
El Shaddi 4[y]	1545	31	94	16,174	69
El Shaddi 5[y]	1026	119	215	14,063	130
Levy Park cg[z]	48	1972	188	58,723	254
Levy Park 1[y]	3	1067	83	108,485	105
Levy Park 2[y]	11	806	39	87,880	72
Levy Park 3[y]	10	776	45	67,273	57
Levy Park 4[y]	12	988	131	36,012	89
Levy Park 5[y]	55	1936	168	44,861	189
Meredith cg[z]	40	1049	197	35,081	143
Meredith 1[y]	3	1102	56	110,420	61
Meredith 2[y]	85	1317	140	46,400	230
Meredith 3[y]	5	783	43	78,519	53
Meredith 4[y]	67	910	195	43,382	176
Meredith 5[y]	42	1147	556	27,540	427
SEARCH cg[z]	397	379	179	71,354	118
SEARCH 1[y]	674	96	157	17,059	129
SEARCH 2[y]	674	96	157	17,059	129
SEARCH 3[y]	180	135	105	34,853	239
SEARCH 4[y]	713	71	116	15,150	70
SEARCH 5[y]	140	242	54	2,499	17
17th Street cg[z]	63	912	536	16,563	374
17th Street 1[y]	546	33	61	17,105	32
17th Street 2[y]	21	1193	421	50,037	227
17th Street 3[y]	11	595	619	36,691	407
17th Street 4[y]	8	380	215	42,500	98
17th Street 5[y]	21	1116	549	33,964	327

z = Community garden area

y=One of five randomly selected points within one mile from community garden.

Paired t-test Results for Demographic Comparisons of Each Community Garden and the Five Random Areas

In order 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 community garden areas and their respective five randomly selected neighborhood areas without community gardens: Old Sixth Ward Community Garden, Alabama Community Garden, Garden Oaks Community Garden, Kashmere Community Garden and Meredith Community Garden (Table 9). Therefore, no further considerations due to demographic influences were necessary in these particular areas.

Table 9. Paired t-test results for Old Sixth Ward Community Garden, Alabama Community Garden, Garden Oaks Community Garden, Kashmere Community Garden and Meredith Community Garden demographic comparisons including the variables of number of blacks, whites, Hispanics and other ethnicities, renter or owner occupied dwellings and median income and the five randomly selected neighborhood areas within a one mile radius from the community garden in the study of the effect of community gardens on numbers of property crimes in urban Houston.

Old Sixth Ward Community Garden	**t**	**df**	***P***
Community Garden Blacks- Random Area Blacks	-1.218	4	0.290
Community Garden Whites- Random Area Whites	-2.084	4	0.106
Community Garden Hispanics-Random Area Hispanic	-0.049	4	0.963
Community Garden Other- Random Area Other Ethnicities	0.739	4	0.501

Table 9 (*continued*). Paired t-test results for Old Sixth Ward Community Garden, Alabama Community Garden, Garden Oaks Community Garden, Kashmere Community Garden and Meredith Community Garden demographic comparisons including the variables of number of blacks, whites, Hispanics and other ethnicities, renter or owner occupied dwellings and median income and the five randomly selected neighborhood areas within a one mile radius from the community garden in the study of the effect of community gardens on numbers of property crimes in urban Houston.

Old Sixth Ward Community Garden	**t**	**df**	***P***
Community Garden Renter- Random Area Renter Occupied	-2.244	4	0.088
Community Garden Owner- Random Area Owner Occupied	2.227	4	0.090
Community Garden Income- Random Area Median Household Income	-0.016	4	0.988
Alabama Community Garden	**t**	**df**	***P***
Community Garden Blacks- Random Area Blacks	0.469	4	0.663
Community Garden Whites- Random Area Whites	-2.394	4	0.075
Community Garden Hispanics-Random Area Hispanic	-2.627	4	0.058
Community Garden Other- Random Area Other Ethnicities	-2.733	4	0.052
Community Garden Renter- Random Area Renter Occupied	-1.212	4	0.292
Community Garden Owner- Random Area Owner Occupied	-0.147	4	0.890
Community Garden Income- Random Area Median Household Income	-0.299	4	0.780
Garden Oaks Community Garden	**t**	**df**	***P***
Community Garden Blacks- Random Area Blacks	-1.284	4	0.268
Community Garden Whites- Random Area Whites	0.663	4	0.544
Community Garden Hispanics-Random Area Hispanic	-0.039	4	0.971
Community Garden Other- Random Area Other Ethnicities	1.802	4	0.146
Community Garden Renter- Random Area Renter Occupied	0.842	4	0.447
Community Garden Owner- Random Area Owner Occupied	0.942	4	0.399
Community Garden Income- Random Area Median Household Income	1.535	4	0.200

Table 9 (*continued*). Paired t-test results for Old Sixth Ward Community Garden, Alabama Community Garden, Garden Oaks Community Garden, Kashmere Community Garden and Meredith Community Garden demographic comparisons including the variables of number of blacks, whites, Hispanics and other ethnicities, renter or owner occupied dwellings and median income and the five randomly selected neighborhood areas within a one mile radius from the community garden in the study of the effect of community gardens on numbers of property crimes in urban Houston.

Kashmere Community Garden	**t**	**df**	***P***
Community Garden Blacks- Random Area Blacks	0.505	4	0.640
Community Garden Whites- Random Area Whites	1.523	4	0.202
Community Garden Hispanics-Random Area Hispanic	1.451	4	0.220
Community Garden Other- Random Area Other Ethnicities	1.059	4	0.349
Community Garden Renter- Random Area Renter Occupied	2.234	4	0.089
Community Garden Owner- Random Area Owner Occupied	-1.178	4	0.304
Community Garden Income- Random Area Median Household Income	-2.566	4	0.062
Meredith Community Garden	**t**	**df**	***P***
Community Garden Blacks- Random Area Blacks	-0.024	4	0.982
Community Garden Whites- Random Area Whites	-0.030	4	0.978
Community Garden Hispanics-Random Area Hispanic	1.073	1	0.478
Community Garden Other- Random Area Other Ethnicities	-0.679	4	0.534
Community Garden Renter- Random Area Renter Occupied	1.423	4	0.228
Community Garden Owner- Random Area Owner Occupied	-1.545	4	0.197
Community Garden Income- Random Area Median Household Income	-1.766	4	0.152

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 (Table 10).

Table 10. Paired t-test results comparing 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 demographic comparisons including the variables of number of blacks, whites, Hispanics and other ethnicities, renter or owner occupied dwellings and median income and the five randomly selected neighborhood areas within a one mile radius from the community garden in the study of the effect of community gardens on numbers of property crimes in urban Houston.

Austin Street/Brennan Park Community Garden	**t**	**df**	***P***
Community Garden Blacks- Random Area Blacks	-0.800	4	0.940
Community Garden Whites- Random Area Whites	-0.441	4	0.682
Community Garden Hispanics-Random Area Hispanic	7.892	4	0.001*
Community Garden Other- Random Area Other Ethnicities	4.683	4	0.009*
Community Garden Renter- Random Area Renter Occupied	-0.788	4	0.475
Community Garden Owner- Random Area Owner Occupied	-1.648	4	0.175
Community Garden Income- Random Area Median Household Income	-9.400	4	0.401
Julia C. Hester House Community Garden	**t**	**df**	***P***
Community Garden Blacks- Random Area Blacks	3.888	4	0.018*
Community Garden Whites- Random Area Whites	-2.343	4	0.079*
Community Garden Hispanics-Random Area Hispanic	-3.042	4	0.038*
Community Garden Other- Random Area Other Ethnicities	-3.206	4	0.033*
Community Garden Renter- Random Area Renter Occupied	3.592	4	0.023*

Table 10 (*continued*). Paired t-test results comparing 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 demographic comparisons including the variables of number of blacks, whites, Hispanics and other ethnicities, renter or owner occupied dwellings and median income and the five randomly selected neighborhood areas within a one mile radius from the community garden in the study of the effect of community gardens on numbers of property crimes in urban Houston.

Julia C. Hester House Community Garden	**t**	**df**	***P***
Community Garden Owner- Random Area Owner Occupied	-3.674	4	0.021*
Community Garden Income- Random Area Median Household Income	-0.764	4	0.487
El Shaddi Community Garden	**t**	**df**	***P***
Community Garden Blacks- Random Area Blacks	3.629	4	0.022*
Community Garden Whites- Random Area Whites	-3.406	4	0.027*
Community Garden Hispanics-Random Area Hispanic	-3.098	4	0.036*
Community Garden Other- Random Area Other Ethnicities	-3.082	4	0.037*
Community Garden Renter- Random Area Renter Occupied	3.127	4	0.035*
Community Garden Owner- Random Area Owner Occupied	3.841	4	0.018*
Community Garden Income- Random Area Median Household Income	-1.103	4	0.332
Levy Park/ Upper Kirby Community Garden	t	df	*P*
Community Garden Blacks- Random Area Blacks	3.192	4	0.033*
Community Garden Whites- Random Area Whites	4.035	4	0.016*
Community Garden Hispanics-Random Area Hispanic	3.809	4	0.019*
Community Garden Other- Random Area Other Ethnicities	6.563	4	0.003*
Community Garden Renter- Random Area Renter Occupied	3.308	4	0.030*
Community Garden Owner- Random Area Owner Occupied	0.338	4	0.752

Table 10 (*continued*). Paired t-test results comparing 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 demographic comparisons including the variables of number of blacks, whites, Hispanics and other ethnicities, renter or owner occupied dwellings and median income and the five randomly selected neighborhood areas within a one mile radius from the community garden in the study of the effect of community gardens on numbers of property crimes in urban Houston.

SEARCH Community Garden	**t**	**df**	***P***
Community Garden Blacks- Random Area Blacks	-0.612	4	0.574
Community Garden Whites- Random Area Whites	8.288	4	0.001*
Community Garden Hispanics-Random Area Hispanic	3.902	1	0.160
Community Garden Other- Random Area Other Ethnicities	0.032	4	0.976
Community Garden Renter- Random Area Renter Occupied	-3.041	4	0.038*
Community Garden Owner- Random Area Owner Occupied	5.131	4	0.007*
Community Garden Income- Random Area Median Household Income	10.477	4	0.000*
17th Street Community Garden	**t**	**df**	***P***
Community Garden Blacks- Random Area Blacks	-0.550	4	0.612
Community Garden Whites- Random Area Whites	1.130	4	0.322
Community Garden Hispanics-Random Area Hispanic	1.568	4	0.192
Community Garden Other- Random Area Other Ethnicities	2.241	4	0.089
Community Garden Renter- Random Area Renter Occupied	2.239	4	0.089
Community Garden Owner- Random Area Owner Occupied	-0.452	4	0.674
Community Garden Income- Random Area Median Household Income	-3.557	4	0.024*

* Statistically significant at 0.05 level

Austin Street/Brennan Park Community Garden

Statistically significant demographic differences were found after a paired t-test was conducted between the Austin Street/ Brennan Park Community Garden and the five random areas surrounding the garden. The differences were found in comparisons regarding the number of Hispanic residents and number of residents falling under the "other ethnicity" category. Results also revealed that there were no statistically significant demographic differences in comparisons between the community garden area and the five random areas in regards to the number of black or white residents, number of renter or owner occupied dwellings and median household income (Table 10).

Descriptive statistics showed that all random areas surrounding the Austin Street/ Brennan Park Community Garden had fewer Hispanic and "other ethnicity" residents when compared to the community garden area. However, two of the random areas had significantly fewer Hispanic and other ethnicity residents in relation to the community garden area and the three remaining randomly selected areas. The three random areas that were more similar to the community garden area contained at least 278 Hispanic residents and 140 other ethnicity residents while the community garden area had 852 Hispanic residents and 576 residents in the other ethnicity category (Tables 7-8).

Julia C. Hester House Community Garden

Paired t-test results indicated that there were statistically significant differences demographically between the Julia C. Hester House Community Garden and the five randomly selected areas surrounding the garden in regards to blacks, Hispanics, "other ethnicities", renter occupied dwellings and median household income. There were no

statistically significant differences between the community garden area and the five randomly selected areas in regards to whites and owner occupied dwellings (Table 10).

Descriptive statistics showed that the randomly selected area closest to the community garden was demographically the same, while the other four randomly selected areas were more similar to each other than to the community garden. The community garden area and the randomly selected area that was demographically the same as the community garden had a higher number of blacks, fewer Hispanics, fewer "other ethnicities," fewer renters and a lower median household income than the other four randomly selected areas (Tables 7-8).

Each of the four randomly selected areas that were not similar demographically to the community garden area had no more than 340 black residents, no fewer than 593 Hispanic residents, no less than 167 residents in the "other ethnicity" category and no more than 160 renter occupied dwellings and no less than $23,182 median household income (Tables 8-9). The community garden area and the one randomly selected area that was most similar demographically each had 943 black residents, 181 Hispanic residents, and 66 residents in the "other ethnicity" category, 241 renters and $14,730 median household incomes.

El Shaddi Community Garden

Results of a paired t-test analysis revealed that there were statistically significant differences demographically between the El Shaddi Community Garden and the five random areas surrounding the garden in regards to the number of blacks, whites, Hispanics, "other ethnicities," and numbers of renter and owner occupied dwellings. Results also revealed that there was not a statistically significant difference between the

community garden area and the five surrounding random areas in regards to median household income (Table 10).

Descriptive statistics showed that three of the six areas were demographically the same while the other three areas, which included the community garden, were demographically more similar to each other, although, not the same as the initial three areas. The first three randomly selected areas had a lesser number of blacks, greater number of whites, a greater number of Hispanics and a greater number of "other ethnicities" compared to the other three areas that included the community garden (Tables 7-8). The three randomly selected areas, which did not include the community garden, that were statistically the same in all demographic categories, each had 638 black residents, 226 white residents, 493 Hispanic residents and 275 residents in the "other ethnicity" category. Residents who claimed to be renters numbered 139 in each random area while owners numbered 236. Residents' annual median income for all three random areas was $18,533.

The El Shaddi Community Garden area was demographically more similar to two of the five randomly selected areas in the number of black, white, Hispanic and "other ethnicity" categories as well as the number of renters and median income. In regards to owner occupied dwellings, one random area was demographically the same as the community garden area and the second random area contained fewer owner occupied dwellings than all of the El Shaddi random areas including the garden area.

Levy Park/Upper Kirby Community Garden

A paired t-test indicated statistically significant differences demographically between the community garden area and the five random areas in regards to the number

of blacks, whites, Hispanics, "other ethnicities" and renter occupied dwellings (Table 10). The Levy Park Community Garden area was demographically most similar to the random area closest to it. Results also revealed that statistically there were no significant demographic differences between the community garden and the five randomly selected areas in the owner occupied dwelling category or the household median income category.

Descriptive statistics showed that the random area closest to the community garden area was demographically most similar, while the other four random areas were least like the community garden area demographically. The random area and the community garden area, that were demographically the most similar, had no less than 48 black residents, no less than 1,936 white residents, no less than 168 Hispanic residents, no less than 189 "other ethnicities" and no less than 1,143 renter occupied dwellings. The four random areas that were demographically most different from the community garden had less black, white, Hispanic and "other ethnicity" residents as well as fewer renters (Tables 7-8). The four randomly selected areas that were least like the community garden area demographically contained no more than 12 black residents, no more than 1,067 white residents, no more than 131 Hispanic residents, no more than 105 "other ethnicity" residents and no more than 444 renter occupied dwellings.

SEARCH Community Garden

Results of a paired t-test analysis pointed to statistically significant differences demographically between the SEARCH community garden area and the five randomly selected areas (Table 10). Results revealed statistically significant demographic differences in numbers of white residents, numbers of renter occupied dwellings, and numbers of owner occupied dwellings and household median income. Paired t-test results

also indicated that no statistically significant differences existed demographically in regards to numbers of black residents, Hispanic residents and numbers of "other ethnicities."

In studying descriptive statistics, researchers recognized that the community garden was not very similar to any of the randomly selected areas in all demographic categories (Tables 7-8). Instead, the garden area was most similar to each of the randomly selected areas in all but one or two categories, which made finding demographic similarities difficult. The community garden area was most similar to one of the randomly selected areas in the number of white residents with the community garden area having 379 and the randomly selected area having 242. The community garden area was also most similar to the same randomly selected area in regards to renter occupied dwellings. The community garden area had 87 renter occupied dwellings and the randomly selected area had 45. However, when comparing the two areas in regards to Hispanic residents, owner occupied dwellings and median income, the two areas were very dissimilar.

Three of the randomly selected areas were demographically similar to each other and least like the community garden area in all but the category of number of Hispanic residents.

17th Street Community Garden

Paired t-test results showed statistically significant differences demographically between the 17th Street Community Garden area and the five randomly selected areas in regards to median household income (Table 10). No statistically significant differences demographically were found in the number of black, white or Hispanic residents or

residents identified as "other ethnicities." Renter and owner occupied dwellings also had no statistically significant differences demographically.

According to descriptive statistics, the community garden area was most similar to one of the randomly selected areas in regards to income. The community garden area had a median household income of $16,563 and the randomly selected area had a median household income of $17,105 (Tables 7-8).

Paired t-test Results for Mean Number of Crime Occurrences for Each Community Garden and the Demographically Similar Random Areas

Since demographic differences may have influenced results of previous analyses (Hagan and Albonetti, 1982; Lockwood, 2004; Smith, 1986; United States Department of Justice, 2006; Weitzer and Tuch, 1999; Whitmire Study, 2004), the community garden areas that were statistically significantly different demographically from the randomly selected areas surrounding them were subjected to further analysis.

Six of the 11 community gardens had statistically significant demographic differences from their respective randomly selected areas. These community garden areas were subjected to further analyses. They were: Austin Street/ Brennan Park Community Garden, Julia C. Hester House Community Garden, El Shaddi Community Garden, Levy Park/ Upper Kirby Community Garden, 17th Street Community Garden and SEARCH Community Garden (Table 10).

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 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.

Austin Street/ Brennan Park Community Garden

After removing two randomly selected areas from the paired t-test analysis and administering the analysis using the remaining three randomly selected areas that were demographically most similar to the community garden, previous statistically significant differences disappeared in regards to the category of "other ethnicities." Numbers of Hispanic residents remained statistically significantly different (P= 0.007) (Table 11). The result may be explained due to the comparatively high number of Hispanic residents in the community garden area.

A second paired t-test between the community garden area and the demographically most similar areas in regards to property crime indicated that there was a statistically significant difference between the community garden area and the randomly selected areas in the Austin Street/Brennan Park Community Garden area (P=0.028) (Table 11). The community garden area had seven reported property crimes within the eighth of a mile radius compared to 48, 19 and 18 in the three randomly selected areas that were demographically most similar to the community garden. The Austin Street/ Brennan Park Community Garden was located at a facility for low functioning adults and was located on a big parcel of land that may have taken up a large portion of the eighth of a mile radius. This may have influenced the number of property crimes.

Results of the additional analysis in this study supported previous research that pointed toward a reduction of violence and criminal activity in areas with access to

greenspace and passive and active plant interactions (Kuo, 2001; Kuo and Sullivan, 2001a; Kuo and Sullivan, 2001b; Snelgrove et al., 2004; Waliczek et al., 1996).

El Shaddi Community Garden

Demographic differences may have influenced previous outcomes, therefore a second analysis was conducted between the two random areas that were statistically more similar demographically to the El Shaddi Community Garden area. Results revealed that there were no statistically significant differences demographically between the community garden area and the two random areas that were more similar demographically in regards to black residents (P= 0.500), white residents (P= 0.500), Hispanic residents (P= 0.500), other ethnicities (P= 0.500) and renter (P= 0.500) or owner occupied dwellings (P= 0.500) (Table 11).

A second paired t-test analysis was then conducted between the community garden area and the two randomly selected areas that were demographically most similar to compare mean numbers of property crimes. Results indicated that there were no statistically significant differences in property crimes between the community garden neighborhood area and the two randomly selected areas (P=0.500) (Table 11).

There were four reported property crimes within the El Shaddi Community Garden area and one, two and zero within the eighth of a mile surrounding the three randomly selected areas that were demographically most similar to the garden. There were two drinking establishments across the street from the community garden, which could have influenced the number of property crimes. Also, the garden may have lacked some visibility within the neighborhood because it was located behind a building.

SEARCH Community Garden

Further analysis was conducted using a paired t-test between the community garden area and the two randomly selected areas that were most similar demographically. After the analysis there were statistically significant differences between the community garden area and the randomly selected areas that were demographically most similar to the community garden in regards to white residents (P=0.174), renter occupied dwellings (P= 0.662) and median household income (P=0.190). Statistically significant differences demographically remained in regards to owner occupied dwellings (P=0.009) (Table 11). The community garden area had 140 owner occupied dwellings compared to two and six owner occupied dwellings in the randomly selected areas that were demographically most similar.

A paired t-test was conducted comparing the number of property crimes between the community garden area and the two randomly selected areas that were most similar demographically. Results indicated that there were no statistically significant differences in property crimes between these comparisons (P= 0.066) (Table 11).

Table 11. Results from paired t-test analysis conducted comparing the Austin Street/Brennan Park Community Garden, El Shaddi Community Garden, SEARCH Community Garden and the randomly selected areas that were demographically most similar to them in the study of the effect of community gardens on numbers of property crimes in urban Houston.

Austin Street/Brennan Park Community Garden	**t**	**df**	***P***
Community Garden Hispanic- Random Area Hispanic	11.585	2	0.007*
Community Garden Other-Random Area Other	3.051	2	0.093
Austin Street/ Brennan Park Community Garden/ Randomly Selected Areas	**t**	**df**	***P***
Property Crimes	-23.000	1	0.028*

Table 11 (*continued*). Results from paired t-test analysis conducted comparing the Austin Street/Brennan Park Community Garden, El Shaddi Community Garden, SEARCH Community Garden and the randomly selected areas that were demographically most similar to them in the study of the effect of community gardens on numbers of property crimes in urban Houston.

El Shaddi Community Garden	**t**	**df**	***P***
Community Garden Black- Random Area Whites	1.000	1	0.500
Community Garden White-Random Area Hispanic	-1.000	1	0.500
Community Garden Hispanic- Random Area Renter Occupied	-1.000	1	0.500
Community Garden Other - Random Area Owner Occupied	-1.000	1	0.500
Community Garden Renter-Random Area Renter Occupied	1.000	1	0.500
Community Garden Owner- Random Area Owner Occupied	1.000	1	0.500
El Shaddi Community Garden/ Randomly Selected Areas	**t**	**df**	***P***
Property Crimes	-1.000	1	0.500
SEARCH Community Garden	**t**	**df**	***P***
Community Garden Whites- Random Area Whites	3.561	1	0.174
Community Garden Hispanics-Random Area Hispanic	3.902	1	0.160
Community Garden Renter- Random Area Renter Occupied	-0.586	1	0.662
Community Garden Owner- Random Area Owner Occupied	68.000	1	0.009*
Community Garden Income- Random Area Median Household Income	3.256	1	0.190
SEARCH Community Garden/ Randomly Selected Areas	**t**	**df**	**P**
Property Crimes	9.667	1	0.066

* Statistically significant at 0.050 level

Julia C. Hester House Community Garden

There was only one randomly selected area that was similar demographically to the Julia C. Hester House Community Garden area. Since researchers did not have more

than one random area data point, no standard deviation existed to make t-test comparisons between the community garden area and the random area that was demographically the same as the community garden area. Therefore, descriptive data was used to make comparisons.

In 2005, there were six reported property crimes within the eighth of a mile surrounding the Julia C. Hester House Community Garden and 20 reported property crimes within the eighth of a mile surrounding the randomly selected area that was demographically most similar to the garden. In this instance, there were fewer property crimes surrounding the community garden when compared to the demographically similar randomly selected area that did not have a community garden.

Levy Park/ Upper Kirby Community Garden

Only one randomly selected area was similar demographically to the Levy Park/ Upper Kirby Community Garden area. Researchers did not have more than one random area data point to make comparisons. Therefore, no standard deviation existed. Again, researchers relied on descriptive data to make comparisons.

In 2005, the Houston Police Department reported 61 property crimes in the eighth of a mile surrounding the community garden and 23 property crimes reported within the eighth of a mile radius surrounding the randomly selected area that was demographically most similar to the community garden area. In this instance, there were more crimes in the community garden area when compared to the randomly selected area.

17th Street Community Garden

Demographic differences may have influenced outcomes therefore, a second analysis was made between the 17th Street Community Garden area and the randomly

selected area that was most similar demographically in regards to median household income. Since researchers did not have more than one random area data point, no standard deviation existed. Therefore, descriptive data were used to make comparisons.

Property crime data collected from the Houston Police Department for 2005 reported 21 property crimes within the eighth mile radius surrounding the community garden and seven property crimes within the eighth of a mile radius surrounding the randomly selected area that was demographically most similar in regards to median household income. In the instance of the 17th Street Community Garden, reported property crimes were higher within the community garden area when compared to the randomly selected area.

Summary

Five of the 11 community gardens were not subjected to further analysis because there were no demographic differences between the community garden areas and their respective randomly selected areas. The results of the initial paired t-test analysis which compared the mean number of property crimes in community garden areas to the mean number of property crimes in random areas indicated that no statistically significant difference existed (P =0.270) (Table 6).

Six of the 11 community garden areas were subjected to further analysis since statistically significant differences existed.

Of the six community gardens that were subjected to further analysis, the 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 eighth of mile of each

of the randomly selected areas. Two of the six community gardens that were subjected to further analysis, SEARCH Community Garden and the El Shaddi Community Garden, produced results that did not indicate that the presence of the community gardens had a statistically significant influence on property crimes.

According to HPD crime data from 2005 two of the six community gardens that were further analyzed, the Levy Park/ Upper Kirby Community Garden and the 17th Street Community Garden, had greater numbers of reported property crimes in the eighth of a mile radius surrounding the community gardens when compared to the numbers of reported property crimes within the randomly selected areas.

One community garden, the Julia C. Hester House Community Garden, had fewer reported property crimes within the community garden area when compared to the randomly selected area that was demographically most similar to it.

According to other research, areas surrounding community gardens have had signs of neighborhood stabilization such as an increase in owner occupied dwellings, an increase in residents' incomes overall from attracting people with higher incomes, as well as rent increases in areas surrounding community gardens (Whitmire Study, 2004). Signs of neighborhood stabilization may often mean a perceived reduction in crime (Skogen, 1990). This research did not indicate an actual reduction in reported property crimes, but perhaps a perceived reduction was sensed due to the revitalization of the area.

Table 12. Summary of results for all 11 community garden areas in the study of the effect of community gardens on numbers of property crimes in urban Houston.

Community Garden Area	**Difference (Higher, Lower, No)**
Old Sixth Ward	No Difference
Alabama	No Difference
Garden Oaks	No Difference
Kashmere	No Difference
Meredith	No Difference
Austin Street/ Brennan Park	Lower
Julia C. Hester House	Lower
El Shaddi	No Difference
Levy Park/ Upper Kirby	Higher
SEARCH	No Difference
17th Street	Higher

Regression Analysis: Findings Related to Objective 3

The third objective of this study was to determine if the presence of a community garden could be used as a predictor in neighborhoods for greater or lesser numbers of property crimes.

Community garden areas were coded with a two and randomly selected areas were coded with a one in a regression analysis. Results of the analysis indicated that the presence of a community garden was not a predictor of property crimes in neighborhoods (P=0.447) (Table 13).

Previous research has identified that there is a statistically significant correlation between the amount of greenness and the number of crimes reported (Snelgrove et al., 2004). Researchers have reported that areas with less than 34% average greenness had a greater number of crimes (Snelgrove et al., 2004).

Table 13. Results of a regression analysis using community garden presence as a predictor and number of crimes as a dependant variable in the study of the effect of community gardens on numbers of property crimes in urban Houston.

Number of Property Crimes/Presence of a Community Garden	df	Mean Square	F	R Square	*P*
Regression	1	65.482	0.585	0.009	0.447
Residual	64	111.959			
Total	65				

Further Regression Analysis

Because the demographic variations in random areas compared to the community garden areas could have influenced results, (Hagan and Albonetti, 1982; Lockwood, 2004; Smith, 1986; United States Department of Justice, 2006; Weitzer and Tuch, 1999; Whitmire Study, 2004) another regression analysis was conducted after removing the randomly selected areas that were demographically different from their particular community garden areas. Again, community garden areas were coded with a two and randomly selected areas that were demographically most similar to the community gardens were coded with a one.

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 (Table 14).

Table 14. Results of a regression analysis after removing demographically less similar random neighborhood areas using community garden presence as a predictor and number of crimes as a dependant variable in the study of the effect of community gardens on numbers of property crimes in urban Houston.

Number of Property Crimes/Presence of a Community Garden	df	Mean Square	F	R Square	*P*
Regression	1	62.486	0.418	0.006	0.520
Residual	72	149.465			
Total	73				

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Purpose of the Study

The purpose of this study was to determine if community gardens had an effect on the number of reported property crimes in Houston, Texas. The objectives for this study were as follows: 1) To collect background information, asked either in person, via e-mail or by written letter, pertaining to the selected Houston community gardens, 2) To compare the mean number of property crimes occurring within an eighth of a mile radius of 11 active community gardens to the mean number of property crimes occurring within an eighth of a mile radius surrounding 55 randomly selected areas within a mile of the 11 selected community gardens in Houston, TX, 3) To determine if the presence of a community garden could predict greater or lesser numbers of property crimes.

Summary of the Review of Literature

In a 1995 Regional Plan Association poll, two key factors of an acceptable quality of life were safe streets and access to greenery and open spaces (The Trust for Public Land, 1999). The per capita percentage of green space played a role in determining the quality of life of American cities (The Trust for Public Land, 1999). Physical safety has also gone hand in hand with an acceptable quality of life. Some research has indicated

that a higher level of green space or vegetation has led to reduced crime activity (Kuo and Sullivan, 2001b). In a 2004 study in which crime occurrences were plotted across inner city Austin and compared to average greenness values, it was determined that "83% of all crimes occurred in areas that had greenness values below 34%" (Snelgrove et al., 2004, p. 6).

In a 1998 study, researchers found that, on average, 15% of the land in the average American city was classified as vacant (Pagano and Bowman, 2000). Vacant land in urban areas was caused by population shifts from inner cities to suburbs (Shukoske, 2000). Vacant lots have often been breeding grounds for gang activity, drug trafficking, trash accumulation and prostitution (Shukoske, 2000). In many cities where green space was limited and vacant lots were abundant, community gardens have been a possible option.

Historically, the basis for gardening communally throughout the last century was because of economic instability and lack of food security. Examples of past communal gardening efforts included World War II Victory Gardens and Anti-Inflation Gardens of the 1970's. In 2004, the American Community Garden Association (ACGA) estimated that around 150,000 community gardens were in existence in the United States (ACGA, 2004).

A professor at Virginia Tech, Diane Relf, redefined the term horticulture to include the benefits of horticulture for "human life quality" (Relf, 1992, p.159). Relf's definition read as follows: "Horticulture- the art and science of growing flowers, fruits, vegetables, trees and shrubs, resulting in the development of the minds and emotions of individuals, the enrichment and health of communities, and the integration of the garden

in the breadth of modern civilization" (Relf, 1992, p. 159). Research has shown that both passive and active plant interactions have affected human health and well-being. There was research which supported passive benefits of greenery on quelling violent behavior, reducing crime, reducing recuperation time in a hospital setting and promoting feelings of well-being and the quality of life benefits of those participating in a community garden setting (Kuo and Sullivan, 2001b; Ulrich and Parsons, 1992; Waliczek et al., 1996).

Past research has indicated the benefits of active plant/people interactions as well. Active involvement in gardening has helped people develop new skills such as improved communication (Relf, 1981). Researchers have found that gardening fosters emotional growth and gives people a positive self-image, a feeling of responsibility and increases feelings of self-worth (Relf, 1981). A study published in 1989 indicated that gardening satisfaction among gardeners was strong in the categories of 'nature fascination' and 'peacefulness and quiet' (Kaplan and Kaplan, 1989). Research has shown that active participation in horticulture satisfied both sides of human creativity, "fostering life" as well as "acquiring objects" (Matsuo, 1996). Examples of active plant/people interactions included school and youth gardens, which have been a popular trend in school curriculums and juvenile justice programs. Research has reported fewer emotional problems, increased interest in science, improved behavior and more positive environmental attitudes (Cammack et al., 2002; Cummings and Boleman, 2002; Ornstein, 2004).

According to the Bureau of Justice Statistics Crime Characteristics, urban households have typically been the most vulnerable to property crimes in the United States. "In 2003, urban households experienced all forms of property crimes at rates

higher than those for suburban or rural households" (United States Department of Justice, 2006, Property Crime section, ¶ 5). Therefore, in urban areas, there was a greater likelihood that people would be victims of a property crimes rather than violent crimes (FBI, 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, 2004). Skogen (1990) reported findings that there was a negative relationship between disorder and neighborhood solidarity. He stated that, "Where levels of disorder were high, respondents were more likely to report that people in their area tended to 'go their own way'" (Skogen, 1990, p. 70). Skogen reported the findings of a study that found that neighborhood levels of fear were correlated positively (+ 0.67) with disorder. If disorder was high, feelings of safety were low (Skogen, 1990).

Social capital, as defined by Putnam (2000) in the national bestseller, *Bowling Alone- The collapse and revival of American community,* "refers to connections among individuals-social networks and the norms of reciprocity and trustworthiness that arise from them" (Putnam, 2000, p. 19). Community building efforts such as community gardening have contributed to collective efficacy. Researchers define collective efficacy as follows: "mutual trust among neighbors, combined with willingness to intervene on behalf of the common good, specifically to supervise children and maintain public order" (Sampson et al., 1998, p. 18). The researchers believed that collective efficacy was, "the most powerful influence keeping violent crime low" (Sampson et al., 1998, p. 18).

Community gardens have been one potential way of increasing collective efficacy and social capital while utilizing unproductive land lessening neighborhood disorder, which may have contributed to reduced crime.

Methodology

Eleven active community gardens were chosen in Houston, Texas. Houston was selected because it is an urban area with a suitable number of community gardens and property crimes were present in measurable rates.

Someone associated with each garden was contacted for a short interview either via e-mail, letter, in person or telephone. Six out of the 11 gardens contacted responded to the interview questions. Information related to the garden that could not be gathered through a personal interview was found on garden websites and by researcher observations while visiting the site. Information gathered was taken into consideration during evaluation of data. Interview questions were as follows:

1) When was the community garden founded?
2) Who or what entity founded the community garden?
3) Does the community garden hold special functions such as plant sales, planting days, workshops or festivals?
4) How is the community garden organized? For example: Do people have individual plots? Are plots rented? Is the garden open to anyone?
5) How is the garden funded?
6) How do you see the community garden has affected the neighborhood? For example: Any notable reactions to the garden from passers-by? Were there notable reactions from neighborhood residents?

7) Have you perceived changes within the neighborhood since the inception of the community garden?

Crime data from 2005 were collected from the Houston Police Department Public Affairs Division, Open Records Section website (City of Houston, 2005). Crime data, available to the nearest block address, were obtained using monthly police reports known as Positive Interaction Program Statistics or PIP stats. PIP stats were downloaded from the website as a Microsoft Excel (Redmond, Washington) spreadsheet and all violent crimes were deleted. The remaining crimes were property crimes that included burglary, burglary of a vehicle and auto theft.

The crime data spreadsheets and community garden addresses were sent to a San Antonio, Texas company called GeoSpatial Training Services where property crimes and community garden addresses were geocoded to create a shapefile and mapped using Arc View© 9.1 GIS software and viewed using Google Earth® Software (cite city).

The number of crimes within each grid was determined. Based on the number of crimes, 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" (Appendix A).

This initial analysis allowed researchers an overall look at the mapped gardens and numbers of property crimes in the city in relationship to the community garden areas. However, numbers of property crimes surrounding the garden were difficult to quantify using this methodology. Therefore, quantities of crimes in garden areas were determined by tallying crime within an eighth of a mile radius surrounding each community garden. A one mile radius surrounding each community garden was also created. Five random points within the mile radius were selected and an eighth of a mile radius was created

surrounding each random point. The property crimes that occurred within each eighth mile radius of the community gardens and the five random points were tallied.

Demographic data by census block from the Census Bureau, 2000 were overlayed onto the Houston city map along with the crime data and community garden data. Demographics that were considered included: income and ethnicity of residents, and number of rentals versus owner occupied dwellings.

Demographic data were determined for each community garden area as well as for each of the five random areas within the mile radius surrounding each community garden. Demographic data for each garden and each random point surrounding the community gardens were placed into a table to organize data. 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 if any statistically significant differences were present for demographics for all of the areas. Any statistically significant demographic differences between community garden areas and their respective randomly selected areas were observed and further analysis was conducted when necessary.

The number of property crimes within each eighth of a mile radius surrounding the community gardens was calculated. The number of property crimes surrounding each random point was also calculated. All property crimes were then entered into SPSS (Statistical Package for the Social Sciences 11.0) (New Jersey). The mean for the community gardens and the random areas were compared using paired t-tests. If demographic differences were present between community garden areas and randomly selected areas, then further paired t-test comparisons were made using only

demographically similar random points.Community garden areas were coded with a two and random areas without community gardens, were coded with a one. A regression analysis was used to determine if the presence of a community garden could predict the higher or lower numbers of property crimes.

Conclusions

This study did not indicate that community gardens effected property crime rates in neighborhoods in urban Houston, Texas. No statistically significant differences were found in the initial analyses of either the paired t-test analysis or from the regression analysis. Statistically significant differences were found between the Austin Street/ Brennan Park Community Garden and the randomly selected areas after demographically different random areas were removed (P=0.028). According to descriptive statistics, the Julia C. Hester House Community Garden had fewer property crimes than the randomly selected areas that were demographically most similar. Conclusions drawn from research and results presented in previous chapters are summarized as follows:

Objective 1

The first objective of this study was to collect background information, asked either in person, via e-mail or by written letter, pertaining to the selected Houston community gardens. Interviews were conducted in order to record information regarding the inner workings of each community garden and to gain information on how well established and recognized the garden was in the community, as well as to determine specific facts that might explain potential outcomes of the crime data. Since only six out of 11 gardens responded to questions, information pertaining to each garden was also

obtained through garden websites created by Urban Harvest (Urban Harvest, n.d.) and researcher observation.

Ten of the 11 community gardens were located within the 610 loop of Houston, Texas. The Garden Oaks Community Garden was located just outside of the 610 loop in the northeast portion of Houston. The selected gardens appeared to represent many of the different demographic possibilities typical of an urban area in the United States.

Ten of the 11 community gardens appeared active and established. The SEARCH Community Garden appeared inactive for at least the spring 2006 gardening season. The Alabama Community Garden and the Julia C. Hester House Community Garden were the oldest gardens of all that were included in this research project. According to interview results each had been established for over 20 years, which may have made them highly visible within their communities. The 17th Street Garden, established in 2004, was the newest addition to the gardens within this study. 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 founding entity. Six of the 11 community gardens affirmed that they held special functions and/or workdays. Two garden representatives stated that they did not have special functions or work days 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 the Levy Park/ Upper Kirby Community Garden were designed to support individual plots. In all three cases plots were rented. Four gardens were designed to be gardened communally. They included:

Meredith Community Garden, SEARCH Community Garden, Old Sixth Ward Community Garden and the Julia C. Hester House Community Garden. A caretaker or an individual maintained two community gardens in this study, Austin Street/Brennan Park Community Garden and Garden Oaks Community Garden. Since most gardens appeared active and established, researchers could surmise that garden organization may not have influenced the gardens' impact on their respective neighborhoods negatively.

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 those that were individually funded.

Most community gardens in this study prompted reactions from passers-by and/or seemed to be influential in their communities. Several 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 indicated that the community gardens used in this study were established and visible enough to possibly have had an effect on their communities. Most of the community gardens were placed in such a way as to be visible from the street and to passers-by. Exceptions may have included Levy Park/ Upper Kirby Community Garden, which was obstructed by tall office buildings and fences and the El Shaddi Community Garden, which was located behind a small clubhouse. According to the interview response, the

Levy Park/ Upper Kirby Community Garden was used by local businesses and likely gained notice due to the weekly farmer's market. The El Shaddi Community Garden, although blocked by the clubhouse, displayed a large sign visible from the street.

Objective 2

The second objective of this study was to compare the mean number of property crimes occurring within an eighth of a mile radius of the 11 active community gardens to the mean number of property crimes occurring within an eighth of a mile radius surrounding 55 randomly selected areas within a mile of the selected community gardens in Houston, Texas. The researchers' goal was to compare community garden areas and randomly selected areas and to be sure that they were demographically similar before drawing final conclusions.

Results of the initial paired t-test analyses indicated that there were no statistically significant differences between mean crime occurrences in community garden areas and the randomly selected areas (P =0.270) (Table 7). Therefore, the community gardens in this study did not appear to have a statistically fewer property crimes than the areas that were selected randomly prior to removing the randomly selected areas that were demographically most similar to the community gardens.

The Old Sixth Ward Community Garden, Alabama Community Garden, Garden Oaks Community Garden, Kashmere Community Garden and Meredith Community Garden did not have statistically significant differences demographically from their respective randomly selected areas.

However, upon further investigation, several of the community gardens in this study had statistically significant differences demographically from the randomly

selected areas that were within one mile from them. These 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.

Researchers conducted further analysis to attempt to remove demographic differences between community gardens and their respective randomly selected areas since demographics may have had an influence on property crime occurrences. Descriptive statistics were re-evaluated to find the randomly selected areas that were most similar to their respective community gardens. Community gardens were compared only to those randomly selected areas that were most similar demographically using paired t-tests and observations of descriptive statistics. Three of the six community gardens could not be re-analyzed using paired t-tests because researchers did not have more than one random area data point. Of the six gardens that were re-evaluated after removing demographically different random areas, two gardens showed no statistically significant differences, two gardens produced results showing a higher number of property crimes surrounding the community garden and the two remaining gardens indicated a lower number of crimes surrounding the community garden.

Therefore, of the 11 community garden sites, seven garden sites in this study resulted in no statistically significant differences according to the initial paired t-test between the community garden areas and their respective randomly selected areas. After demographic differences were adjusted, two of the 11 community gardens resulted in a lower number of property crimes surrounding the community garden and the remaining two had a higher number of property crimes surrounding the community garden.

Overall, there were no differences between the community garden areas and the randomly selected areas used in this study. However, interviews with community garden representatives indicated that the gardens had a positive impact within their neighborhoods. Interviewees touted signs of neighborhood improvement such as cessation of illegal dumping, neighborhood pride and emulation of gardening practices in the garden by neighbors, minimal vandalism due to a perceived halo effect and redevelopment within the neighborhood. One interviewee recognized property values doubling and tripling but did not specifically attribute the rise in value to the presence of the garden. Neighborhoods also showed support to community gardens by providing funding, attracting community volunteers and visitors to the gardens.

This particular research method did not take into account the number of reported property crimes within community garden areas prior to the inception of the community gardens. Even though community garden areas within this study did not specifically indicate a lower number of property crimes surrounding the community gardens because of the gardens' presence, crime may have been worse prior to the initiation of the community gardens.

Neighborhood disorder may be allayed due to community efforts to beautify by cleaning up vacant lots and creating community gardens (Skogen, 1990). Also, research suggests that community building efforts, especially in the form of community greening, may help reduce a community's fear of crime (Kuo, 2001; Kuo and Sullivan, 2001a; Kuo and Sullivan, 2001b; Snelgrove et al., 2004; Waliczek et al., 1996; Whitmire Study, 2004). People who perceive a reduction in crime after implementing a community garden may only feel less afraid especially if the crime rate surrounding the community garden

has not changed. The garden may have empowered neighborhood residents to give them the feeling that they have taken back their neighborhood. Therefore, they are less afraid of becoming a victim of a crime. Other research has suggested that signs of neighborhood stabilization may often mean a perceived reduction in crime (Skogen, 1990).

Since government officials cannot possibly alleviate all societal problems, solutions to negative inner city conditions may lie in the hands of residents. Community gardens may be one form of grassroots organizing that could solve issues, such as crime, facing urban residents. Even if crime rates remained the same, residents maybe cultivating feelings of well-being and safety by coming together and performing peaceful acts such as gardening. Community gardening, while not necessarily being the cure for crime, may spur on further revitalization and community improvements. It may still be a wise choice for municipalities to invest money into community gardens and greenspace, especially when such projects are in the hands of residents, since doing so may reduce the potential costs of policing and managing urban disorder such as abandoned, vacant lots.

Objective 3

The third objective of this study was to determine if the presence of a community garden could predict greater or lesser numbers of property crimes. Community garden areas were coded with a two and randomly selected areas that were demographically most similar to the community gardens were coded with a one. Results of a regression analysis indicated that the presence of a community garden is not a predictor of numbers of reported property crimes (P=0.447) (Table 13).

Several of the community gardens in this study had statistically significant differences demographically from the randomly selected areas that were within one mile

from them. 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. A regression analysis was conducted after removing the randomly selected areas that were demographically different from their particular community garden areas.

Results indicated that no statistically significant relationship existed. Therefore, in this particular study, the presence of a community garden was not a predictor of numbers of reported property crimes (P= 0.520) (Table 14).

Previous research has stated that greenspace and passive and active plant interactions have contributed to fewer crimes, feelings of well-being and reduced stress and fatigue (Kuo, 2001; Kuo and Sullivan, 2001a; Kuo and Sullivan, 2001b; Snelgrove et al., 2004; Ulrich and Parsons, 1992; Waliczek et al., 1996). The scope of this study did not specifically measure feelings of well-being and safety of the community gardeners however, interviewee response indicated that the community gardens used in this research were having a positive impact within their communities. Research has also shown that average greenness greater than 34% reduces the number of reported crimes (Snelgrove et al., 2004).

Programmatic Implications

The objectives of this study were as follows: 1) To collect background information, asked either in person, via e-mail or by written letter, pertaining to the selected Houston community gardens, 2) To compare the mean number of property crimes occurring within an eighth of a mile radius of 11 active community gardens to the mean number of property crimes occurring within an eighth of a mile radius surrounding

55 randomly selected areas within a mile of the 11 selected community gardens in Houston, TX, 3) To determine if the presence of a community garden could predict greater or lesser numbers of property crimes.

1. The results of this study indicated that the community gardens used in this study had a positive impact on their neighborhoods according to interview response.
2. The results of this study indicated that there was no difference in the number of reported property crimes in areas with community gardens versus areas without community gardens.
3. The results of this study indicated that the presence of a community garden was not a predictor of property crimes in urban areas in Houston, TX.

Recommendations for Further Research

1. It is recommended that research be conducted which compares crime rates before the inception of a community garden to crime rates after a community garden has been established. Research should consider the overall, national reduction in crime rates since the mid-1990's.

2. It is recommended that robbery victimization be used as an index for local crimes especially if fear of crime may be a factor in the research (Skogen, 1990).

3. It is recommended that survey questions include community gardeners and neighborhood residents' perceptions of safety.

4. It is recommended that research be conducted on community gardens and crime rates while taking into account differences in demographics such as ethnicity and income in regards to people's willingness to report crimes.

5. It is recommended that research be conducted using crime data points with exact addresses. One limitation within this study was the lack of availability of exact addresses. Houston Police Department crime data was only available to the nearest block.

6. It is recommended that similar studies be conducted with other cities with community gardens within the United States.

7. It is recommended that research be conducted which includes more land use demographics such as retail, commercial, residential areas in relation to their proximity to an active community garden.

8. It is recommended that a research study be done that includes a larger number of community gardens than the current study.

9. It is recommended that a research study be conducted that considers the potential negative implications of social capital that is created during community building efforts such as community gardening. Further research should examine the perceptions of those outside of the core gardening group, such as measuring any resistance to the garden within the neighborhood (Glover, 2004).

10. It is recommended that further research consider the presence of other land uses such as community recreation centers, parks, schools and churches or programs meant to reduce crime (e.g. community policing programs and neighborhood watch groups).

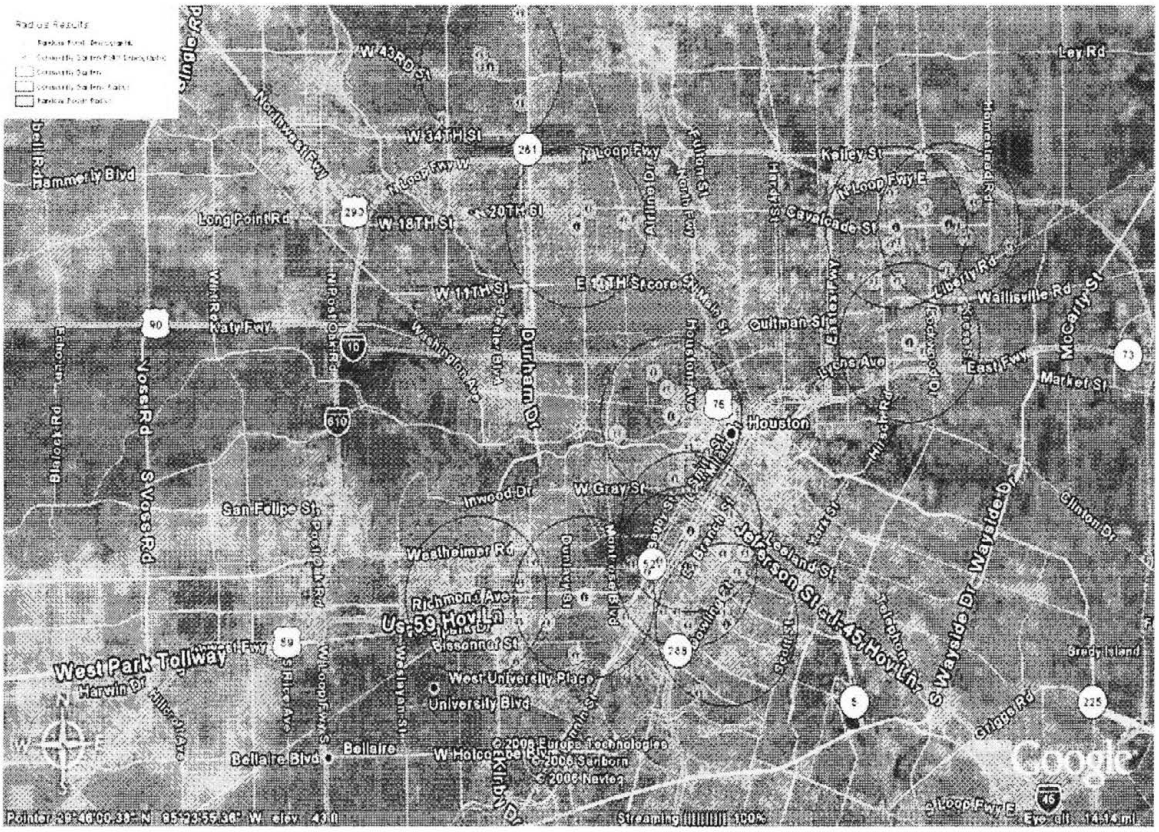
11. It is recommended that further research consider government incentives for economic revitalization within neighborhoods that have a community garden.

Other revitalization efforts and efforts to stabilize a neighborhood may impact crime.

12. It is recommended that further research using property crime as an indicator of crime occurrences considers which demographic is more willing to report crimes. People residing in wealthier areas or homeowners may be more willing to call the police as opposed to low income areas than might potentially resist or avoid police involvement. Some research has indicated that blacks are less trusting of police and are less likely to report crimes and police patrolling high crime, minority neighborhoods were less likely to document crimes reported by victims (Hagan and Albonetti, 1982; Smith, 1986; Weitzer and Tuch, 1999). Also, researchers should consider whether or not property crimes not totaling a certain amount go unreported.

APPENDIX A


Google Earth Pro
File Edit View Add Tools Help
Places
My Places
Temporary Places
Crime_CommunitySardensKmz
Legend
Crime Anaysis Grid
Community Gardens
Layers
Crime Anaysis Grid
NumCrimes
Houston
Old Sixth Ward Garden
SEARCH Garden
W Dallas St
Saulnier St
Rokin
Image © 2006 Sanborn
© 2006 Europe Technologies
© 2006 Sanborn
© 2006 Navteq
Google


W 43RD St
W 34TH St
W 18TH St
W 11TH St
20TH St
Hammerly Blvd
Long Point Rd
Katy Fwy
Yoss Rd
S Voss Rd
Durham Dr
N Loop Fwy
Houston Ave
Kelley St
Cavalcade St
Wallisville Rd
McCarty St
Market St
Houston
W Gray St
Inwood Dr
San Felipe St
Westheimer Rd
Richmond Ave
Us-59 Hov Ln
West Park Tollway
West University Place
University Blvd
Bellaire Blvd
Bellaire
Jefferson St
Wayside Dr
Shaver Rd
Brady Island
Ley Rd
Clinton Dr
Google

LITERATURE CITED

Alexander, J., & Hendren, D. (1998). Bexar County Master Gardener Classroom Garden Research Project: Final Report. San Antonio, Texas. Retrieved on September 8, 2006 from http://www.jmgkids.us/index.k2?did=12180&sectionID=2015.

American Community Garden Association (1992). *A Research Agenda for the Impact of Community Greening.* Retrieved on November 8, 2004 from http://www.communitygarden.org/Researchagenda92.pdf.

American Community Garden Association (2004). Retrieved on November 8, 2004 from http://www.communitygarden.org/

Bacigalupi, R. (Producer). (2002). *A Lot in Common.* Oley, PA: Bullfrog Films.

Bassett, Thomas. (1979). "Vacant Lot Cultivation: Community Gardening in American 1893-1978" Unpublished MA thesis. University of California, Berkeley.

Boston Natural Areas Network (BNAN). (2006). Boston Community Garden Council. Retrieved on June 9, 2006 from http://www.bostonnatural.org/garden_council.php.

Bowman, A., & Pagano, M. (1998). Urban Vacant Land in the United States. Lincoln Institute of Land Policy Working Paper. 18-19. Retrieved on September 8, 2006 from http://www.brookings.edu/es/urban/pagano/paganofinal.pdf.

Bursik, R .J. Jr. & Grasmick, H. G. (1993). *Neighborhoods and Crime.* Lexington, KY: Lexington Books.

Cammack, C., Waliczek,T. M., Zajicek, J .M. (2002). The Green Brigade: The effects of a community based horticultural program on the horticultural knowledge and environmental attitude of juvenile offenders. *HortTechnology,* 12(1) 82-86.

City Farmer (2001). Urban Agriculture in Philadelphia. Canada's Office of Urban Agriculture. Retrieved on June 11, 2006 from http://www.cityfarmer.org/Phillyurbag9.html.

City of Houston. (2005). Houston Police Department. Retrieved on April 10, 2006 from http://www.houstontx.gov/police/index.html.

City of Houston. (2005). Houston Police Department 2003 Uniform Crime Report. Retrieved on August 25, 2006 from http://www.houstontx.gov/police/cs/pdfs/ucr/2003.citywide.pdf.

City of Fort Collins. (2007). Glossary of GIS Terms. Retrieved on April 3, 2007 from http://www.ci.fort-collins.co.us/gis/terms.php.

Clinton Community Garden. (n.d.) Retrieved on June 11, 2006 from http://www.clintoncommunitygarden.org/about_the_garden.htm.

Crompton, J. L. (2001). *Parks and Economic Development.* Washington D.C.: American Planning Association.

Cummings, S., & Boleman, C. (2002). Executive Summary of the Junior Master Gardener ® Program Coordinator Implementation Evaluation. The Department of Agricultural Education Extension Education Unit. Retrieved on September 8, 2006 from http://www.jmgkids.us/index.k2?did=2727.

Delanty, G. (2003). *Community.* London: Routledge.

Environmental Design Research Association. (1985). The Garden of Eden: An Environmental "Radical Transformation". Retrieved on November 9, 2004 from http://www.eclectart.com/edra.html.

Englander, D. (2001). New York's Community Gardens: A Resource at Risk. *The Trust for Public Land.* Retrieved May 5, 2005 from http://www.tpl.org/tier3_cd.cfm?content_item_id=4401&folder_id=631

Environmental Defense. (2006). Environmental Defense, Mayor Hahn and Verde Coalition Plan to Create Network of Green Spaces In Urban Core of L.A. Retrieved on June 9, 2006 from http://www.environmentaldefense.org/pressrelease.cfm?contentid=2259.

Evenson, K. R., Herring, A. H., Huston, S. L, Rodriguez, D. A. (2006). Perception of Crime Affects Physical Activity in Communities. *American Heart Association,* 46th Annual Conference on Cardiovascular Disease Epidemiology and Prevention. Retrieved on May 19, 2006 from http://www.americanheart.org/presenter.jhtml?identifier=303839.

Federal Bureau of Investigation. (2003) Crime in the United States 2002-Crime Clock. Retrieved December 1, 2003 from www.fbi.gov/ucr/cius_02/html/web/offreported/crimeclock.html.

Federal Bureau of Investigation (2004). Crime in the United States, 2004. Retrieved February 15, 2005 from http://www.fbi.gov/ucr/cius_04/offenses_reported/property_crime/index.html.

Federal Bureau of Investigation. (2005). Uniform Crime Reports. Retrieved on January 24, 2006 from http://www.fbi.gov/ucr/2005prelim/2005openpage.htm.

Frug, G. (1999). *City Making: Building Communities without Building Walls.* New Jersey: Princeton University Press.

GeoSpatial Training (2007). *Personal Communication*

Glover, T. (2004). Social Capital and the Lived Experiences of Community Gardeners. *Leisure Sciences.* 26(2). 143-162.

Gordon, B. H .J., & Dotter, J. C. (1996). City Community Gardens in Partnership with the San Jose State University Interdisciplinary Student Garden Project for Education, Outreach, and Sustainable Agriculture Research, A model for Replication. In P. Williams and J. Zajicek (Ed.), People-Plant Interactions in Urban Areas: Proceedings of a Research and Education Symposium. Applying People-Plant Research in Classroom Education. (pp. 215-218) San Antonio, Texas.

Green Guerillas. (2002). Retrieved on June 9, 2006 from http://www.greenguerillas.org.

Hagan, J.,& Albonetti, C. (1982). Race, class and the perception of criminal justice in America. *American Journal of Sociology.* 88. 329-355.

Harvey, M. R. (1989). The Relationship between Children's Experiences with Vegetation on School Grounds and Their Environmental Attitudes. The Journal of Environmental Education. 21(2), 9-15

Huff, B. A. (1990). *Greening the City Streets: The Story of Community Gardens.* New York: Clarion Books.

Hynes, P. H. (1996). *A Patch of Eden: America's Inner City Gardens.* White River Junction, Vermont: Chelsea Green Publishing, Co.

Kaplan, R. (1993). The Role of Nature in the Context of the Workplace. *Landscape and Urban Planning.* 26, 193-201.

Kaplan, R. & Kaplan, S. (1989). *The experience of nature.* Cambridge University Press, New York: Cambridge, p. 164-174.

Kellert, S. R., & Wilson, E. O. (1993). *The Biophilia Hypothesis.* Washington, D.C.: Island Press.

Kuo, F. E. (2001). Coping with Poverty: Impacts of Environment and Attention in the Inner City. *Environment and Behavior.* 33(1), 5-34.

Kuo, F. E., & Sullivan, W. C. (2001). Aggression and Violence in the Inner City: Effects of Environment via Mental Fatigue. *Environment and Behavior.* 33(4), 543-571.

Kuo, F. E., & Sullivan, W. C. (2001). Environment and Crime in the Inner City: Does Vegetation Reduce Crime? *Environment and Behavior.* 33(3), 343-367.

Lancaster, R.A. (Ed.). (1990). *Recreation, park and open space standards and guidelines.* National Recreation and Park Association. Alexandria, Va.

Levine, K. (2006). Tending 'Defiant Gardens' During Wartime. [Review of the book *Defiant Gardens*]. National Public Radio. Retrieved on May 29, 2006 from http://www.npr.org/templates/story/stroy.php?storyId=5435131&ft=1&f=3.

Lewis, C. A. (1976). People/Plant Interaction: Human Perspectives in Horticulture. *Hortscience.* 11(1) 4-5.

Lockwood, D. (2004, March-April). Mapping Violent Crime in Savannah's Neighborhoods, 1993-1997: Social Disadvantage, Land Use, and Violent Crimes Reported to the Police. Paper presented at the International Crime Mapping Research Conference, Retrieved on September, 28, 2006 from http://www.ojp.usdoj.gov/nij/maps/boston2004/papers/Lockwood.doc.

Mac Donald, J., & Stokes, R. J. (2006). Race, Social Capital, and Trust in the Police. *Urban Affairs Review.* 14(3), 353-375.

Marshall, A. (2000). *How Cities Work: Suburbs Sprawl and the Roads Not Taken.* Austin, Texas: University of Texas Press.

Matsuo, E. (1995). Sociohorticulture: A New Field of Horticulture and Its Present Status in Europe, the U.S. and Japan. *J. Kor.Soc. Hort.Sci.* 37(1), 171-185.

Miceli, R., Roccato, M.,& Rosato, R. (2004). Fear of Crime in Italy. *Environment and Behavior.* 36 (6). Abstract retrieved on August 28, 2006 from http://eab.sagepub.com/cgi/content/abstract/36/6/776.

NeighborSpace. (2004). Retrieved on September 19, 2006 from http://neighbor-space.org/history.htm.

Newman, M. (1997). In Search of Food Security. *Seasonal Chef.* Retrieved on February 26, 2004 from http://www.seasonalchef.com/security.htm.

Not Bored. (n.d.). Retrieved November 8, 2004 from http://www.notbored.org/gardens.html.

Oregon Public Broadcasting. (2006). *The Oregon Story,* Retrieved on June 9, 2006 from www.opb.org/programs/oregonstory/land_trusts/glossary/.

Ornstein, P. (2004). Food Fighter: Alice Waters. The New York Times Magazine. 30-33.

Pagano, M. A., & Bowman, A. O'M. (2000). Vacant Land in Cities: An Urban Resource. Center on Urban and Metropolitan Policy. The Brookings Institution Survey Series. Washington, D.C.. 1-9.

Patel, I. C. (1991). Gardening's Socioeconomic Impacts-Communtiy Gardening in an Urban Setting. *Journal of Extension.* Winter. 7-9.

Pennsylvania Horticultural Society, The. (2006). Philadelphia Green. Retrieved on September 19, 2006 from http://www. Pennsylvaniahorticulturalsociety.org/phlgreen/index.html.

Putnam, R. D. (2000). *Bowling Alone: The Collapse and Revival of American Community.* New York: Simon and Schuster.

Reid. D. (1996). Community Garden Workshop. In P. Williams and J. Zajicek (Ed.), People-Plant Interactions in Urban Areas: Proceedings of a Research and Education Symposium. Workshops (pp. 223-226) San Antonio, Texas.

Relf, D. (1981). Therapy and Rehabilitation through Horticulture. *Chronica Horticulturae* 21(1), 1-2.

Relf, D. (1992). Human Issues in Horticulture. *HortTechnology.* 2(2) 159-171.

Richards, H. J., & Kaufami, D. M., (1992). The Impact of a Horticulture Therapy Program on Reducing Offender's Vulnerability and Resistance to Substance Abuse. [Abstract]. *People-Plant Council News.* 7(2). Retrieved on September 19, 2006 from www.hort.vt.edu/human/PPCFW98.html.

Sampson, R .J., Randenbush, S. W. & Earls, F. (1998). Reducing Violence Through Neighborhood Collective Efficacy. *Alternatives to Incarceration.* 4(4), pp. 18-19. Retrieved January 22, 2004 from http://proquest.umi.com.

SFGRO. (n.d.). *San Francisco Garden Resource Organization.* Retrieved on September 19, 2006 from http://www.sfgro.org.

Schukoske, J. E. (2000). Community Development Through Gardening: State and Local Policies Transforming Urban Open Space. *Legislation and Public Policy.* 3, 351-392.

Schweitzer, J. H., Kim, J. W., Mackin, J. R. (1999). The Impact of the Built Environment on Crime and Fear of Crime in Urban Neighborhoods. *Journal of Urban Technology.* 6 (3), 59-73.

Skogan, W.G. (1990). *Disorder and Decline: Crime and the Spiral of Decay in American Neighborhoods.* New York: The Free Press.

Sherer, P. M. (2004). A Healthier America? It's a Walk in the Park. *Land and People*, 16(1), 10-23.

Sherer, P. M. (2004). Park Power. *Land and People*, 16(2), 17-24.

Sirianni, C., & Freidland, L. (2001). *Civic Innovation in America: Community Empowerment, Public Policy, and the Movement for Civic Renewal.* Berkley and Los Angeles: University of California Press.

Small, V. (2002, November-December.). Gardens That Build Community. *Fine Gardening,* 64-67.

Smith, D. (1986), The neighborhood context of police behavior. In A. Reiss and M. Tonry (Eds.) *Crime and Justice*: Vol. 8, pp. 313-341. Chicago University Press.

Smith, L. L., & Motsenbocker, C. E. (2005). Impact of Hands-On Science Through School Gardening in Louisiana Public Elementary Schools. *HortTechnology.* 15(3), 439-443.

Snelgrove, A.G., Michael, J.H., Waliczek, T.M., Zajicek, J.M. (2004, January-March) Urban greening and criminal behavior: A Geographic Information System Perspective. *American Society for Horticultural Science,* 14(1), 48-51.

Squires, G. D. (Ed.). (1992). *From Redlining to Reinvestment- Community Responses to Urban Disinvestment.* Temple University Press: Philadelphia.

Stainbrook, E.(1973). Man's psychic needs for nature. The Environment Journal September: 22-23.

Stigsdotter, U. A. (2004). A Garden at Your Workplace May Reduce Stress. International Academy for Design and Health.147-157. In Dilani A (ed) Design & Health III - Health Promotion through Environmental Design, International Academy for Design and Health, Stockholm. Retrieved on June 9, 2006 from http://www.2.lpal.slu.se/skytfonstret/ulrika/a%20garden%20at%20your%20work place%20may%reduce%20stress.pdf.

Suarez, R. (1999). *The Old Neighborhood.* The Free Press: NewYork.

Texas Cooperative Extension, the Texas A & M University System. (n.d.). National Junior Master Gardeners Program®.

The Trust for Public Land. (1994). Urban Neglect Adds to Rising Crime. Retrieved June 25, 2003 from http://www.tpl.org/tier3_print.cfm?folder_id=728&content_item_id=889&mod_type=1.

The Trust for Public Land. (1994). The Link Between Recreation and Crime Prevention. Retrieved on June 25, 2003 from http://www.tpl.org/tier3_print.cfm?folder_id=728&content_item_id=890&mod_type=1.

The Trust for Public Land. (1994). Shortchanging Urban Parks. Retrieved on June 25, 2003 from http://www.tpl.org/tier3_print.cfm?folder_id=728&content_item_id=896&mod_type=1.

The Trust for Public Land. (1999). The Economic Benefits of Parks and Open Space (Chapter 2- Attracting Investment) Retrieved on March 16, 2006 from http://www.tpl.org/tier3_cd.cfm?content_item_id=1195&folder_id=727.

Thompson, D. (Ed.). (1996). Oxford Pocket Dictionary of Current English. Oxford University Press: New York.

Ulrich, R. S., & Parsons, R. (1992). Influences of Passive Experiences with Plants on Individual Well-Being and Health. College of Architecture, Texas A&M University.

Ulrich, R. S. (1984). The Psychological Benefits of Plants. 16-21.

Urban Community Gardens. (n.d.). Retrieved on June 9, 2006 from http://www.mindspring.com/~communitygardens/orgs.html.

Urban Harvest. (n.d.). Retrieved on June 9, 2006 from http://www.urbanharvest.org/community/community.html.

United States Department of Agriculture (2006). Cooperative State Research, Education, and Extension Service. Retrieved on September 20, 2006 from http://www.csrees.usda.gov/nea/food/in_focus/hunger_if_competitive.html.

United States Department of Justice- Office of Justice Programs- Bureau of Justice Statistics. (2006). Bureau of Justice Statistics Crime Characteristics. Retrieved on October 16, 2006 from http://www.ojp.usdoj.gov/bjs/cvict_c.htm.

Victory Garden, The (2006). Retrieved on September 15, 2006, from http://www.victoryseeds.com/TheVictoryGarden/page2.html.

Waliczek, T. M., Zajicek, J. M., Mattson, R. H. (1996). Can Gardening Improve Quality of Life? *People-Plant Interactions in Urban Areas: Proceedings of a Research and Education Symposium.*

Warman, D. S. (1999). Community Gardens: A Tool for Community Building. Retrieved on November 8, 2004 from http://www.cityfarmer.org/waterlooCG.html

Warmack, L. (2002). *Garden Gives Area Refugees a Place to Heal.* Global Action on Aging. Retreived on February 8, 2004 from http://www.globalaging.org/elderrights/us/dallas.htm.

Weitzer, R., & Tuch S. A. (1999). Race, class, and perception of discrimination by the police. *Crime and Delinquency.* 45. 494-507.

Westphal, L.M. (2003). Urban Greening and Social Benefits: A Study of Empowerment Outcomes. *Journal of Arboriculture.* 29(3). 137-147. Retrieved on January 13, 2004 from http://www.vnweb.hwwilsonweb.com/hww/results_single.jhtml?nn=12.

Whitmire Study, The. (2004). Gateway Greening Public Policy Research Center at the University of Missouri, St. Louis, MO. Retrieved on November 30th, 2004 from http://stlouis.missouri.org/gatewaygreening/WhitmireStudy.htm.

Wolf, K. (2005). Civic Nature Valuation: Assessments of Human Functioning and Well-Being in Cities. *Forging Solutions: Applying Ecological Economics to Current Problems, Proceedings of the 3rd Biennial Conference of the U.S. Society for Ecological Economics.* Tacoma, WA: Earth Economics. Retrieved on January 2, 2006 from http://www.cfr.washington.edu/research.envmind/Policy/ECO/EconConf.pdf.

Wolf, K. L. (2003). Public Response to the Urban Forest in Inner City Business Districts. *Journal of Arboriculture*, 29, 3, 117-126.

VITA

Michelle Renée Gorham was born in Glens Falls, New York, the daughter of Donna Marie Miner and Dwayne Peter Gorham. After graduating from South Glens Falls High School, South Glens Falls, New York in 1989 she attended Adirondack Community College in Queensbury, New York where she received an Associate in Arts degree, *cum laude* in 1993. In December of 1996 she graduated *summa cum laude* from Colorado State University in Fort Collins, Colorado with a Bachelor of Science degree in Landscape Horticulture. From 1996 until the present, Michelle has been building her career as a horticulturist. Her experience in the field of horticulture includes: plant tissue culture, greenhouse operation, retail nursery sales, organic gardening, biodynamic farming, landscape design and maintenance, teaching and public horticulture. Her career has brought her from the seasons of the northeast to the sunny front range of Fort Collins, Colorado to the Texas hill country in Austin and finally to South Texas, San Antonio. In the fall of 2003, Michelle enrolled in the Department of Agriculture at Texas State University-San Marcos as a master's in education student where her interest in human issues in horticulture was cultivated.

Permanent Address: 119 Dreiss Street

San Antonio, TX 78203

This thesis was typed by Michelle Renée Gorham.