UNDERSTANDING THE IMPORTANCE OF URBAN PARKS AND GREENERY AS

COPING MECHANISMS FOR CLIMATE CHANGE: A STUDY OF LOW-INCOME

HISPANICS IN TEXAS AND CALIFORNIA

by

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ABSTRACT

Research of satisfaction and happiness has demonstrated that a stable income and comfortable climates are two significant drivers of human well-being. The current research is concerned with low-income Hispanics due to the pressures caused by socio-economic barriers, which hastens their ability to cope with adverse weather conditions. A further stressor was found to arise out of the urban environment in the form of urban heat islands as well. Research in this area suggests that urban greening may be a sustainable alternative to reducing heat within cities and reducing air conditioning dependence. The purpose of this study is to investigate the perceptions and behaviors of low-income Hispanic families in hot and dry climates and to explore the significance of green-spaces and urban parks as adaptive strategies to climate change in their lives. This research aims to investigate the effect of income on the stress levels of respondents to heat and to the experience of 'going to the park'. Also, it investigates the perceptions and level of satisfaction that respondents feel towards their park visits and explores the effect of income on resiliency to heat.

An online survey was created after three focus group sessions and distributed among Hispanic residents in both California and Texas via a reputable market research company. The survey is composed of questions regarding behavior, perception, stress, and satisfaction. For data analysis, descriptive statistics, t-test, ANOVA, and multiple regression were used. There were a total of (N=761) respondents, with 54.6% from

California and 45.4% from Texas. Within the population 615 respondents had used a park at the time of taking the survey on September 2014. Initial findings showed a younger population with 78% of the population below the age of 45. There was a lower level of educational achievement to coincide with the younger group, as well as a higher level of unemployment. Income brackets were split by the median level of the survey, $50,000 total annual income for a family of four, to continue the analysis across the hypotheses. Hypothesis test results showed that income was associated with the satisfaction held towards the respondents' neighborhood and stress felt towards heat.

Such research will contribute to how we understand physical and subjective pressures affecting communities by applying a bottom-up method of management. If utilized as a tool of Adaptive Collaborative Management, this research may be applied to gain useful insights from stakeholders while maintaining analytical significance for policy makers. First, it will help to uncover inconsistencies and gaps in public policies surrounding the types of park that are created, where the parks are located, the features they exhibit, and the degree to which cities are committed to urban greening. And, secondly, patterns of usage among residents may be better understood so that equal and affective access is provided for residents of cities.

CHAPTER I

INTRODUCTION

With current concerns surrounding climate change in vulnerable areas such as California and Texas, it is imperative to understand how residents in these locations are adapting to such phenomena as record heat and lasting drought. It is assumed that high-income families can have easier access both physically and economically to amenities that promote well-being in times of adverse environmental conditions. Such opportunities include air-conditioning or vacationing to favorable locations. However, a growing concern lies with the vulnerability of low-income families due to the constraints placed on them by socio-economic pressures, which have a direct impact on the groups' ability to adapt to climate change scenarios. This research is interested in examining how low-income Hispanic families react to heat since it has been found that pressures, such as, unemployment and uneasy access to jobs, poor access to educational resources, and the lack of quality housing, contribute to the vulnerability of Hispanic families to climate change (Zambrana and Dorrington, 1998). Furthermore, it is interested in exploring the outcomes of those vulnerabilities on affected populations by examining how they are adapting to heat (Resser and Swim, 2011). Lastly, it is aimed at understanding the relationship of urban parks and green-spaces with urban environments as adaptive strategies to cope with heat (Lundgren and Kjellstrom, 2013; Shashua-Bar, Pearlmutter, and Erell, 2009; Searns, 1995). The current research will examine the behaviors, perceptions, stress, and satisfaction felt by low-income Hispanic families towards green spaces, urban parks, and heat in California and Texas.

This research serves as an example of sustainable development within urban planning by taking the perceptions, emotions, and experiences of the community into account in order to better understand the pressures weighing down on it. This research may serve as a tool in Adaptive Collaborative Management, which helps to bridge the gap between policy makers and various stakeholders with the intentions of fostering interdisciplinary collaboration. Conducting this research as part of an adaptive-collaborative approach and internalizing the results may help decision makers with two outcomes. First, possible policy initiatives and amendments may be found, which would contribute to residents having greater access and satisfaction towards amenities. And, secondly, strategic planning may be applied to amenity placement and coverage so that these assets can serve the greatest amount of people. This may help build resiliency within future target communities as they cope with extreme heat and lasting drought.

CHAPTER II

LITERATURE REVIEW

Climate Change, Heat and Human Risks

Accounting for climate change scenarios within urban planning is paramount to understanding the pressures generated by extreme weather events on less autonomous and sensitive populations. It is widely accepted by the scientific community that regardless of its source, climate change is occurring. The Intergovernmental Panel on Climate Change (IPCC) was created by the United Nations and continues to provide thorough research in order to calculate and track the causes and impacts of climate change. Kirtman et al. (2013) stated that near-term climate change predictions suggested that regions dominated by land will experience an increase in the frequency of warm days and nights in the next decade while the number cold days and nights will decrease. Also, in conjunction with previous reports, models are projecting near-term increases in the frequency, duration, intensity and spatial extent of extreme weather events including heat waves and droughts (Kirtman et al. 2013; Smith et al. 2009). Likewise, concerning the long-term trends in temperature, "It is virtually certain that, in most places, there will be more hot and fewer cold temperature extremes as global mean temperatures increase" (Collins et al., 2013, p.1031). Collins et al. (2013) states that the general pattern being seen indicates that high latitude landmasses will experience more precipitation than lower latitudes because of the increased specific humidity of a warmer troposphere. The conditions expressed previously, as applied to Texas and California, are currently affecting lives in those states as drought and heat persist. This underscores the need of the current research in determining effective coping strategies for vulnerable populations.

To better support the need for such strategies, Rehdanz and Maddison (2005; 2011) have done extensive research with cross-country analyses on the topic of climate and happiness or more precisely, climate as an amenity in itself. It was found that adverse climatic variables have strong subjective impacts across individuals and their ability to adapt and cope with such changes. This is because climate influences many domestic functions like heating and cooling requirements, clothing needs, caloric intake, and recreational opportunities; all of which are largely dependent on socio-economic status and stability.

In addition to large-scale climatic changes, urban environments further exacerbate natural perturbations in temperature due to the Urban Heat Island (UHI) effect and the inevitable increase in the ownership of central Air Conditioning (AC) units for growing urban populations. Lundgren and Kjellstrom (2013) conducted research on the sustainability of air conditioning usage in urban areas and found that increased AC usage during heat waves contributed not only to greenhouse gas emissions and the exacerbation of climate change, but also contributed toward the ambient temperatures within a city. UHI is caused by the built environments' ability to absorb solar radiation during the day and emitting it as long-wave radiation later in the day (Lundgren and Kjellstrom, 2013). The phenomena can generate noticeable differences in temperatures inside the city as compared to outside and puts less autonomous residents at risk. Lundrgen and Kjellstrom (2013), Bowler et al. (2010), and Shashua-Bar, Pearlmutter and Erell (2009) all support the idea that urban greening can be a natural, affective, and sustainable way at adapting to localized heating within cities.

The geography of happiness is a growing body of knowledge surrounding human well-being. The current research is rooted in the geography of happiness because the result is concerned with mapping the overall satisfaction of residents towards outdoor amenities. Dallimer et al. (2012) provided a deeper look into the relationship of biodiversity on human well-being. They analyzed the biodiversity of green-spaces in Sheffield, England and surveyed park users on their perceptions surrounding the amount of species richness. There was no direct correlation between increased biodiversity and human well-being. Explanations were provided for the findings and pointed to lack of biodiversity knowledge and lack of a sense of place or connection to the environment by the users. Dallimer et al. (2012) discussed Attention Restoration Theory and its importance to human well-being as well. This widely studied theory has examined nature's role in the restorative effects on psychological fatigue. Louv (2011) supported this by arguing that as our technological capacity grows, so too must our connection to nature. He cites health and well-being issues in his argument for expanding our exposure to the natural world and has termed this divorce from nature 'Nature Deficit Disorder'. Louv was convinced that the restorative effects of nature could cleanse many health concerns surrounding young children and adults including Attention Deficit Disorder and Asthma. Expanding into more practical research, the work of Brereton, Clinch, and Ferreira (2008) examines the importance of environmental factors on well-being. In their study, well-being and socio-demographic factors were analyzed from a sample of 1,500 men and women aged 18 and over in Ireland. Most prominent in the findings were proximity to the coast boosted happiness and negative influences such as landfills

decreased happiness. It was found that climate has a significant influence on well-being. These findings highlight the importance of the spatial distribution of positive environmental influences. Florida, Mellander, and Rentfrow (2013) have conducted research on what makes a city happy. Their study mapped well-being for 184 U.S. metropolitan regions and included 353,000 residents. Their work was concerned with understanding the geographical differences in happiness by determining the role of human capital when other variables, such as income, are controlled. Human capital, in this case, means the share of the labor force with a bachelor's degree and above. Climate, commute time, age, income, unemployment, housing, and density were all measured as well. The correlation between happiness and human capital were the strongest of the variables measured, meaning that educational status provided the most happiness, while income was significant but weaker. This shows that educational status preceded income in generating happiness, seemingly because of income security rather than actual income itself. Interestingly, it was found in this study that climate did not play much of a role in metropolitan happiness.

Guardiola, Gonzalez-Gomez, Garcia-Rubio, and Lendechy-Grajales (2013) provided interesting findings in their research on income and happiness. Their study is concerned with the 'happy poor' paradox among the Mayan descendants in Yucatan, Mexico and looks at why people who are poor are also happy. Among 373 households it was found that Mayans were very happy and are happier in comparison to the whole of Mexico and other Latin American countries. For the Mayans, income is only useful when basic needs are met, which cannot be practically done by income alone. A final

source of happiness for the Mayans lies in their cultural affinity for nature (Guardiola et al., 2013).

Outdoor Amenities and Resilience

Urban amenities such as civic space, urban parks, and greenbelts are all possible coping mechanisms for the inhabitants of a city when it is too hot outside. Air conditioning can be considered as the ideal coping mechanism for heat in the twenty-first century. Lundgren and Kjellstrom (2013) found that due to climate change and unprecedented heat exposures many places would require a dependence on indoor cooling systems. However, as was previously discussed, the increased use of air conditioning as a coping mechanism for heat will require increased electricity consumption and contribute to climate change and the urban heat island effect. Lundgren and Kjellstrom (2013) asserted that by limiting the number of trees and vegetation in urban areas actually decreases the cooling capacity of the air through evapotranspiration. These findings help to underscore the needs for increasing natural areas to help passively cool urban environments as opposed to increasing our active cooling strategies, which will only generate a positive feedback loop. To effectively achieve cooler urban environments the proliferation of green-spaces and urban parks are of key importance to sustainable development. However, this is not a new concept. Searns (1995) reported that green-spaces in America have evolved over time in order to perform different functions. The first series of 'greenways' dated from pre-1700s to roughly 1960 and were designed as boulevards and parkways that connected urban spaces (Searns, 1995). The second generation, ranging from 1960 to around 1985, became recreation and nature focused, emphasizing non-motorized modes of travel on trails and through linear parks,

as well as riparian environments. The third generation that has persisted since the mid-1980s has evolved into a multi-objective goal with green-spaces emphasizing the utility of urban greenery through functions like flood protection, wildlife habitats, water quality buffers, infrastructure needs, and urban aesthetics (Searns, 1995). Searns argued that greenways have persisted over time as more than just parks, but as adaptive sources of comfort from urban life for humans throughout the centuries. Smith, Nelischer, and Perkins (1997) conducted research in Toronto looking into the various physical urban forms that contributed to making a 'quality' place. On the list of the top 10 strongest design criteria of forms that contributed to quality in an urban environment, at number 2, were outdoor amenities. Chiesura (2003) researched the importance of urban nature for the well-being of urbanites and in building a sustainable and resilient community.   Her study focused on why people needed parks, what benefits were derived from them, and if those benefits really affected their quality of life. Quantitative and qualitative data were derived, as this was one of the few studies interested in perceptions on park experiences. Her survey was distributed amongst park goers in Vondelpark, the most popular park in Amsterdam. Chiesura (2003) found that urban nature fulfills important intrinsic human needs, not just utilitarian goals, such as relaxation, peace, and escaping the urban setting. As she points out, it is important to understand the perceptions and motivations of park users. Parks may be provided in some areas but not utilized, while other places may greatly desire parks but do not have any that are readily accessible or that provide a quality environment. Seaman, Jones, and Ellaway (2010) have studied why people use or do not use parks, differentiating the study by focusing on subjective motivations of individuals. In-depth interviews were conducted with 24 residents of Glasgow, United

Kingdom and found that besides the universal want of a quality green-space, socio-demographic niches were concerned with spaces that represented their lifestyle interests. Self-removal due to others was largely found to create the barrier to access for this location. Generally put, urban parks and green-spaces provide quality to both utilitarian functions for the city and its inhabitants, as well as providing key intrinsic resources for residents, which is why they should be of importance to public policy makers. Leung, Wang, Wu, and Busser (2011) were one of the only studies to include satisfaction and perceptions of park qualities as research parameters for their study. They conducted research on how park users evaluated the quality of parks in Wuxi City, China. Their study is mainly rooted in understanding service quality and what it takes to increase consumer satisfaction. This study is of importance to the current research because it is largely interested with subjective experiences. These experiences determine whether a product is consumed or not, in this case parks are the product and residents the consumer.

Pierce, Budd, and Lovrich Jr. (2011) state that understanding the causes of 'resilience' provides major contributions to understanding the sources of sustainability. Resilience for this study retains its usual definition as the capacity of a system to absorb and deal with disturbances. Their study measured the level of development among sustainability plans in U.S. urban areas, specifically those exhibiting attributes of resiliency. Through this literature review it has been found that to build resiliency into a place requires two components. First, physical resiliency provides outlets for coping during adverse conditions, in this case urban parks and green-spaces that serve both the city and its residents. As was previously discussed, urban parks, green-spaces, and greening provide ideal conditions for coping with heat. Gomez, Jabaloyes, Montero, De

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Vicente, and Valcuende (2011) supported urban greening due to the regulating role that nature plays in an urban area, this being cooling effects of evapotranspiration, filtering air and water pollutants, and helping to mitigate flood waters. They argue that these attributes generate resilience for communities. Jabareen (2013) supports the idea of urban greening because of the many positive contributions it makes to the lived-in experience of the urban environment. Secondly, social resiliency requires that vulnerable communities be targeted as areas of concern for action against a perceived threat. Gomez et al. (2011) stated that the role of vegetation in a city helps to provide social cohesion of different groups and personal psychological wellness. Jabareen (2013) suggests that resilience requires that poor and vulnerable communities be included in decision making in order to help build resilience. Jabareen (2013) conducted research on how cities and communities can progress towards building resiliency as a coping mechanism for climate change. He asserted that to reduce the risks, impacts, and vulnerabilities of residents in cities to climate change their communities must be more resilient and prepared (Jabareen, 2013). Furthermore, he states that a resilient city is one that has less social inequalities and a fairer distribution of resources that provide strategies for coping (Jabareen, 2013).

Low-Income Hispanic Disparities and Coping with Stress

Low-income Hispanic families have been identified as being at risk towards climate change because they are less autonomous than high-income families. The U.S. Census Bureau (2013) estimated that as of 2013 California had a population in 2010 of 37,253,956 and is 38% Hispanic. Likewise, Texas had a population of 25,145,561 and is also 38% Hispanic. This shows that both states are more than one-third Hispanic. Zambrana and Dorrington (1998) described this group as being viewed collectively in the

research, which tends to mask the vulnerabilities of Hispanics as a sub-group. They asserted that this group bears an unequal burden of persistent poverty and lower education levels, leaving many families vulnerable due to both economic and social inequality. Cortes et al. (2007) provided the figures that supported this by pointing out that two-fifths or 44% of Hispanic households earn less than $30,000 annually. Hispanics are distributed unevenly across the United States but represent 25% or more of the state populations of Arizona, California, New Mexico, and Texas (Cortes et al., 2007). As one can imagine, the marginalization of this group has made it hard for advancement in society. This has led to the underrepresentation of Hispanics in the policy-making process (Zambrana and Dorrington, 1998), reducing what little voice they may have had.

Oppenheimer et al. (2014) pointed out that poverty was of critical importance in determining the vulnerability of societies to extreme events. Smith et al. (2009) agreed with this notion by finding increasing evidence that there is greater vulnerability of sensitive populations, such as the poor and elderly, to climate change in both developing and developed countries. In order to understand the climatic pressures acting on specific populations Hansen, Bi, Saniotis, and Nitschke (2013) have studied ethnic subgroups in Australia. They reported "…there is an increased need for identification of sub-groups and evidence-based adaptation and prevention strategies to boost resilience in those at risk" (p.1). It was found that populations with relative social disadvantage are disproportionately affected by weather extremes, especially if there are financial barriers to maintaining thermal comfort (Hansen et al., 2013). Comber et al. (2008) support these disadvantages by providing the findings of a previous study by Gobster (2002) who

found that ethnic minority users of parks in Chicago travelled larger distances to reach green-spaces and used them less frequently than non-minority users. This shows the need for further analyses on barriers to park use by marginalized ethnic groups.

To help understand how individuals and populations react to adverse conditions coping theory was explored. Mitrousi, Travlos, Koukia, and Zyga (2013) have conducted research on the psychological functioning of coping. They provide a definition of coping through the work of Lazarus and Folkman (1984) which suggests that 'coping' is an ongoing struggle against external and internal adversities that are caused by the lack of resources of the individual (Mitrousi et al., 2013). Stress arises out of the attempt to cope with adversity when one has little resources to work with. Stress can be defined as the relationship between the individual and their environment, when mental resources to a situation are overburdened this endangers mental balance (Mitrousi et al., 2013). O'Brien, O'Keefe, Meena, Rose, and Wilson (2008) studied climate adaptation from the perspective of poverty in East Africa and found that poverty creates more poverty and it erodes the resilience of societies to adverse conditions. As such, O'Brien et al. (2008) asserted that adapting to climate change and variability in seasons is essential for the sustainable development of societies and for reducing poverty. Resser and Swim (2011) expanded on the relationship between the individual and their environment and point out that viewing climate change adaptation strategies from an environmental stress perspective provides an appropriate framework for combining the complexities of the human/environment relationship. They pointed out that climate change could be perceived as continuous or discrete events. In the case of heat and drought, continuous events that occur slowly over time are termed 'ambient stressors' and represent regional

conditions of the natural environment (Resser and Swim, 2011). Resser and Swim (2011) found that place-based strategies and community responses to coping with the impacts of climate change were important due to differing geographic locations and socio-economic circumstances of each individual place.

Research Model and Hypotheses

Based on the literature review it was assumed that low-income Hispanic families would require adequate levels of quality park space due to it being a cost affective alternative to being inside. A research model was developed to understand the relationships between potential park users and their experience of using parks from a bottom-up approach. This model is a form of basic supply and demand. As a question of supply, demand and ultimately quality, increasing the continued use of parks is an important endeavor as was discussed in the literature review. In the research model (see Figure 1), income was thought to affect park use frequency and the perceptions of the parks and surrounding area. Income was also thought to affect the perceptions and attitudes that users have to local parks, generating stress or satisfaction by being (or not being) a useful adaptive strategy. Lastly, income has a direct relationship to coping ability to climate change. This is really a question of the quality of service that the product (parks) provides, similar to the research of Leung et al. (2011). By providing the best possible product, just as any consumer item, more people will consume it helping to make the actual greening of cities salient and wanted.
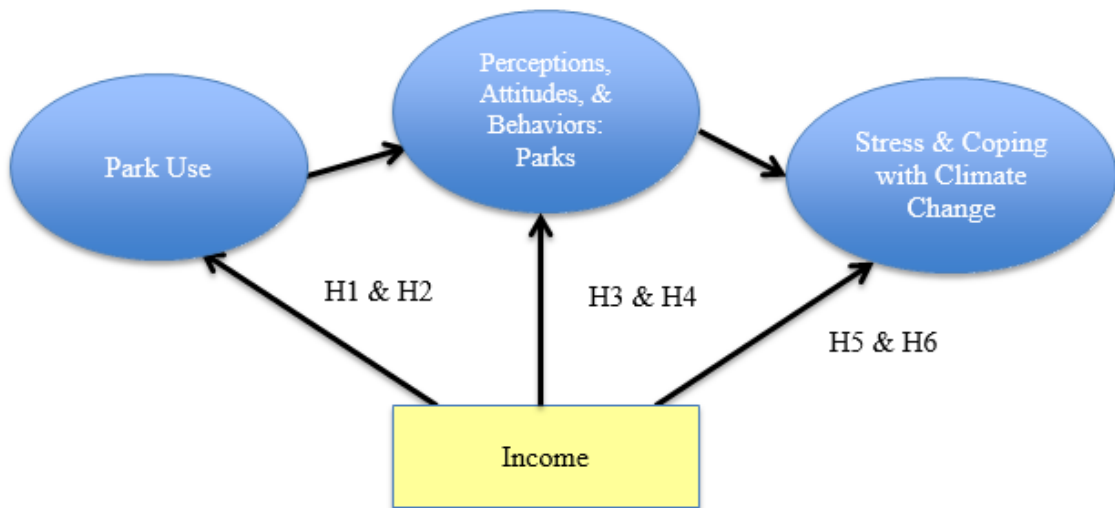
Figure 1 – Research Model

Based on the previous discussion this research was developed: (a) to examine the behaviors of people when it is too hot outside; (b) to investigate the stress levels of respondents to heat and to the experience of 'going to the park'; (c) to investigate the level of satisfaction that respondents feel towards their park visits; (d) to examine the perceptions held by respondents towards their local parks and neighborhoods; (f) to understand the importance of shade and greenery for a cities inhabitants; and (g) to explore how people are adapting to heat. In order to explore answers to these questions, the following hypotheses were developed:

H1. Low-income Hispanic families will seek parks more frequently than higher income earners.

H2. The perceptions held towards parks and the surrounding area by low-income Hispanic families will be more critical of the conditions.

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H3. Low-income Hispanic families will experience higher stress and lower satisfaction with their visits to the park.

H4. The levels of satisfaction with local parks will generally be lower among low-income Hispanic families than higher income.

H5. Low-income Hispanic families will experience more stress to heat than higher income families.

H6. It will be harder for low-income Hispanic families to cope with heat as compared to higher income.

H7. Perceived stress to heat will be associated with socio-economic factors (total combined annual household income, age, education, gender, employment and marital status), perception to heat (perceived 'too hot' temperature ratings), and coping strategies (staying home and going to a park).

CHAPTER III

METHODOLOGY

<u>Scope</u>

This research is primarily interested in the levels of stress and satisfaction surrounding urban parks and green-space usage. As discussed previously, low-income Hispanics have been targeted for this study due to their low level of autonomy within the socio-economic system. Samples were drawn from California and Texas to develop a comparison between two highly Hispanic-populated states that are both in the grips of drought and high heat. It has been found that continual dependence on air conditioning by city residents can contribute to climate change and the urban heat island effect, creating a need for alternative cooling strategies. Urban greening has been shown to passively cool locations in which the technique is applied. This research is an attempt to measure the effect that parks have among low-income Hispanic respondents and to understand the patterns surrounding outdoor amenity usage.

<u>Data Collection and Analysis</u>

Before collecting data, IRB approval was received from Texas State University. Collection then took place through two stages. First, focus groups were administered at the onset of the research in order to determine the scope of the study, to explore general hypotheses, and to help determine pertinent survey questions. Three sessions were held in San Marcos, Texas and was comprised of 20 participants of differing ages. Initial findings through the focus group sessions revealed that participants felt safe in local parks, although some were uneasy about their liberties being infringed upon in river parks due to the tightening of laws from increases in tourism. There were mixed perceptions

about using outdoor amenities with the majority of younger participants using green-spaces or the river, while the older respondents mostly stayed in air conditioning, only going outside for family activities. An evenly agreed upon response was the importance of shade. For those who used outdoor amenities a common theme was the affinity for the environment. Lastly, a random sample of Hispanic respondents in California and in Texas was purchased from a large and reputable U.S. market research company. The survey was aimed at exploring and attempting to understand subjective behaviors, perceptions, levels of stress to heat and ability to cope with heat, and stress and satisfaction surrounding local outdoor amenities for residents across both states. It was composed of four major sections and twenty-two questions (Appendix A) that asked respondents about their behaviors surrounding park usage, perceptions of local parks, stress towards heat and park use, and the level of satisfaction towards parks and park use.

The survey results were analyzed using descriptive statistics, t-tests, ANOVA, and multiple regression. This process was achieved through IBM SPSS 22 Statistics Software. First, an analysis of the demographics was conducted. The next step was to determine the respondents who had not used a park at the time of taking the survey. This was done in order to target active park users so that the most accurate responses could be analyzed. Next, the total population was recoded to make a new variable so that those who make above median and those that make below median could be split dichotomously for further analysis. The analysis tested income across the hypotheses using the various methods described above.

CHAPTER IV

RESULTS

Profile of Respondents

Descriptive statistics of the respondents (N=761) are presented in Table 1.

Table 1

Profile of the Respondents (N=761)

	n	*%*
Gender		
Male	220	28.9
Female	541	71.1
Age		
18-24	269	35.3
25-34	223	29.3
35-44	104	13.7
45-54	67	8.8
55-64	65	8.5
65+	33	4.3
Marital Status		
Single	366	48.1
Married or living married	346	45.5
Divorced, separated, or widowed	49	6.4
Education		
4-year college or graduate degree	273	35.9
High school degree or other	488	64.1
Employment		
Full-time working	241	31.7
Part-time working	150	19.7
Unemployed/retired	370	48.6
Total Combined Annual Household Income		
Under $15,000	111	14.6
$15,000 to just under $24,999	108	14.2
$25,000 to just under $34,999	126	16.6
$35,000 to just under $49,999	126	16.6
$50,000 to just under $74.999	156	20.5
$75,000 to just under $99,999	63	8.3
$100,000 and over	71	9.3
State of Residence		
California	415	54.6
Texas	346	45.4

Overall, 28% were male and 71% were female. The majority of respondents were below the age of 45, comprising 78% of the population. There was a near even split among those who were single and those that were married, being 48% and 45% respectively. The other 6% were divorced, separated, or widowed. The level of education was slightly more unbalanced with 64% having earned a High school degree, vocational, or 2-year and 35% having earned a 4-year degree or higher. Employment across the population shows that 31% were working full-time, 19% part-time, and 48% unemployed or retired. Overall, 62% of the respondents earned less than $50,000. There were slightly more respondents that lived in California, 54%, whereas 45% lived in Texas. On average, respondents felt that 94.3 degrees Fahrenheit was too hot. When asked what they did when it was too hot outside 72% responded as staying inside in AC, while only 2% said they actively seek parks to cool off in.

In anticipating a low number of active park users, respondents were also asked if they had used a park at all by the time of taking the survey. This was done in order to gather data from people who are familiar with the parks around them. Table 2 was made to capture a big picture of these park users according to income levels and location. This classification will help to describe some of the findings in the next section.

Table 2

Prior Park Use by State Based On Household Income

	Household Income Levels (n)		Total
	<$49,999	>$50,000	
Yes			
California	205	139	344
Texas	176	95	271
Total	381	234	615
No			
California	41	30	71
Texas	49	26	75
Total	90	56	146
Total (combined)	471	290	761

<u>Characteristics of Parks and Park Users</u>

A total of 80% (n=615) of the respondents answered they had used a park this year at the time of taking the survey. Table 3 shows the characteristics of parks and park users. Of the park goers 48% used the amenities less than once a week and 30% once or twice, comprising the majority of responses. Almost half of the respondents (54%) said they drive to the park while the rest of them used a more sustainable mode of travel, such as by walk (35%), bicycle (5%), or public transportation (5%). Regarding the distance to the park, 31% said they traveled less than one mile to get to the park and 27% traveled less than 1 to 2 miles. This finding shows that the parks being used are mostly within reasonable distances for park goers.

The survey broke 'parks' down into two categories, urban parks and green-spaces. First, urban parks are more integrated into a city and have features for group sports and other exercise activities and have little to no vegetation or natural amenities. Urban parks

can offer better safety but may lack in seclusion and relaxation. Second, green-spaces are

parks that may be integrated into a city or on a fringe but retain all the natural qualities of

the land. This type of park offers trails for hiking and other outdoor activities and can

provide more seclusion from a busy urban setting. There was a near even split among

park users between urban parks, 51%, and green-spaces, 48%. Favorite uses amongst

respondents were asked in the survey on a 'check all that apply' basis (designated with *

in Table 3). The top uses, in order, were for relaxation (54%), family activities (43.8%),

and outdoor exercise (35.1%). Water features were targeted as ideal cooling features for

a park to incorporate and based on the findings the majority of respondents said there

were no recreational water features, with natural water features ranking last. The

qualities of parks that were most liked ranked as water features with 35%, location of the

park 16%, and seclusion/relaxation 12%. Alternatively, lack of water to cool off in

ranked as the top disliked feature, with lack of shade and lack of functionality and

features following. An option of 'other' was provided for this survey question so that

respondents could expand on disliked qualities.   The most frequent response was

'nothing' or 'I like my park'. Other responses of note included broken equipment and

lack of equipment for children, no bathrooms/dirty bathrooms, fees, strict rules,

undesirables such as homeless and unsupervised teenagers, dirty water, not enough

parking, park size is small, and bothersome wildlife. Overall, the improvements that

were desired most from the respondents were ranked as including usable water features

(25%) and increasing shade (25%) followed by better safety measures (15%), and

providing water fountains to drink from (12%). Table 3 shows the characteristics of

parks and park users.

Table 3

Park and Park User Characteristics

	n	%
Frequency of Use Per Week		
Less than weekly	296	48.1
1-2	190	30.9
3-4	83	13.5
5-6	26	4.2
7-8	6	1.0
9-10	9	1.5
11+	5	0.8
Mode of Travel		
Drive	336	54.6
Walk	217	35.3
Bicycle	32	5.2
Public Transportation	30	4.9
Perceived Distance		
Less than a mile	194	31.5
1-2 miles	170	27.6
3-4 miles	96	15.6
5-6 miles	76	12.4
7-8 miles	31	5.0
9-10 miles	26	4.2
11+	22	3.6
Park Type		
Urban Park	316	51.4
Greenspace	299	48.6
Favorite Uses/Activities*		
Relaxation (solo or with friends)	414	54.4
Family activity	333	43.8
Outdoor exercise	267	35.1
Personal expansion (inspiration/meditation)	165	21.7
Group sports	120	15.8
Water recreation	108	14.2
Present Water Features*		
No recreational water features	329	43.2
Play fountain	138	18.1
Pool	129	17.0
Lake	76	10.0
River	49	6.4
Ocean/Beach	15	2.0

Table 3 – Continued

Qualities Liked		
Water features	219	35.6
Location	104	16.9
Seclusion/relaxation	78	12.7
Shade	66	10.7
Recreation & sports features	61	9.9
Safety	50	8.1
Quality of park	37	6.0
Qualities Disliked*		
Lack of water to cool off in	291	38.2
Lack of shade	191	25.1
Lack of functionality and features	152	20.0
Other	93	12.2
Poor quality	78	10.2
Location	61	8.1
It's not safe	59	7.8
Desired Improvements		
Include usable water features	157	25.5
Increase shade	157	25.5
Better safety measures	94	15.2
Provide water fountains to drink from	76	12.4
Build one close to me	73	11.9
Provide more features for recreation	46	7.5
Provide better public transportation to park areas	12	2.0

Results of Hypotheses Tests

Hypotheses were tested using Chi-square and ANOVA with a significance level of $\alpha = .05$.

H1: Low-income Hispanic families will seek parks more frequently than higher income earners.

Survey question 4, "Have you been to a park so far this year?" and question 5, "How many times per week do you visit a park?" were used to test hypothesis 1. Sixty-two percent of lower income families reported to go to the park, whereas 38% of higher

income families visited the park. Chi-square test results show there was no significant difference between two income groups, X^2 (1, N=761) = .005, p = .945. Regarding the frequency of visiting the park, 51.3% of lower income families reported to visit the park per week, followed by 48.6% who visited the park less than weekly. Whereas 52.6% of higher income families reported to visit the park per week, followed by 47.4% who visited the park less than weekly. Chi-square test results showed there was no significant difference between two groups either, X^2 (6, n=615) = 7.164, p = .306. Being that there were no significant differences between income groups from both tests, H1 was rejected.

H2: The perceptions held towards parks and the surrounding area by low-income Hispanic families will be more critical of the conditions.

H2 was tested across question 6, "Thinking of the park you visit most, is it easy for you to get to this park" and question 46, "Overall, how satisfied are you with your neighborhood?" Respondents were then asked to rate the question from 1: very dissatisfied to 7: very satisfied. A one-way ANOVA was conducted to compare the effects of income on the condition of perceived ease of access to parks. Initially the group did not exhibit much of a variance between average ease of access with below median (M=6.03, S.D.=1.32) and above median (M=6.11, S.D.=1.26) rating the criteria highly. ANOVA test results showed there was no significant difference between below median income earners and higher income earners on perceived ease of access to parks, [F (1, 613) = .520, p = .471] at the p < .05 level. H2 was rejected based on this finding, showing that there was no difference between below and above median income earners and ease of access to park space. Lastly, a one-way ANOVA was conducted to compare

the effect of income on the condition of perceived level of satisfaction with the respondents' neighborhood. There appeared to be little difference between the groups initially, below median (M=5.07, S.D.=1.61), and above median (M=5.42, S.D.=1.46). Table 4 shows that there was a significant effect of income on perceived satisfaction towards the neighborhood of residence, $[F (1, 759) = 9.42, p = .002]$ at the $p < .05$ level. H2 was accepted on this criterion only. Therefore, H2 may be partially accepted. It may be assumed that based on income, the strongest perception that respondents felt was directed more at the quality of neighborhoods rather than the quality of the parks surrounding them.

H3: Low-income Hispanic families will experience higher stress and lower satisfaction with their visits to the park.

To test H3, ANOVA tests were conducted to compare the findings of stress and satisfaction towards the experience of 'going to the park'. Respondents were asked to evaluate their stress levels on a scale from 1 to 7. The level of stress was much lower than expected among the sample (n=615), finding below median earners at (M=1.89, S.D=1.54) and above median earners at (M=1.94, S.D.=1.77). A one-way ANOVA was conducted to compare the effect of income on the condition of stress towards park visits. There was no significant effect of income on the perceived amount of stress that respondents experienced while using parks, $[F (1, 613) = .433, p = .687]$ at the $p < .05$ level. Thus, this portion of H3 was rejected; income has no effect on the amount of stress felt while going to the park. There were similar findings in testing the amount of

satisfaction felt by park users. Satisfaction was again rated from 1: very dissatisfied to 7: very satisfied. Satisfaction was above average with below median income earners showing (M=5.37, S.D.=1.31), while above median earners showed (M=5.44, S.D.=1.28). A one-way ANOVA was conducted to compare the effects of income on the condition of satisfaction felt towards park visits. There was no significant effect of income on the level of satisfaction felt towards park visits, [F (1, 613) = .579, p = .557] at the p < .05 level. Therefore H3 was rejected entirely with the results showing that stress and satisfaction to park visits was not disproportional between low-income and high-income earners.

H4: The levels of satisfaction with local parks will generally be lower among low-income Hispanic families than higher income families.

H4 was tested across income groups to see if low-income earners felt less satisfaction towards local parks. Initially, averages between income groups showed little difference with below median at (M=4.99, S.D.=1.48) and above median at (M=5.07, S.D.=1.53). One-way ANOVA was conducted to compare the effect of income on the condition of satisfaction towards local parks. One-way ANOVA was conducted to compare the effect of income on the condition of satisfaction towards local parks. There was no significant effect between income level and overall satisfaction towards area parks, [F (1, 613) = .843, p = .541] at the p < .05 level. Thus, H4 was rejected with the results showing that there is no difference between income and the level of satisfaction with area parks.

H5: Low-income Hispanic families will experience more stress to heat than higher income families.

Stress to heat by individuals was tested across income for H5. Initial findings showed an average level of stress to heat (rated from 1 to 7) across the two income groups, with below median earners at (M= 4.38, S.D.= 1.90) and above median earners at (M= 4.02, S.D.= 2.07). A one-way ANOVA was conducted to compare the effect of income on the condition of stress levels to heat. Table 4 shows that there was a significant effect of income on stress levels to heat, $[F (1, 759) = 5.89, p = .015]$ at the $p < .05$ level. Therefore, H5 was accepted, showing that there was an effect of income on varying levels of stress towards heat.

H6: It will harder for low-income Hispanic families to cope with heat as compared to higher income families.

Lastly, H6 was tested across income groups and the perceived ability to cope with heat based on a scale of 1 to 7 (1 being least able, to 7 being most able). Both groups showed below normal ratings with those below median income at (M= 3.89, S.D.= 1.89) and above median at (M= 3.88, S.D.= 1.87). A one-way ANOVA was conducted to compare the effect of income on the condition of the respondents' overall ability to cope with heat. There was no significant effect of income on the respondents' overall ability to cope with heat, $[F (1, 759) = .002, p = .964]$ at the $p < .05$ level. Therefore, H6 was rejected showing that coping ability to heat was not contingent upon income.

Table 4

Significant ANOVA Findings

	Sum of Squares	df	Mean Square	F	Sig.
H2: Median Income/Satisfaction with neighborhood					
Between groups (Combined)	22.77	1	22.77	9.42	.002
Within groups	1834.66	759	2.42		
Total	1857.43	760			
H5: Median Income/Stress to heat					
Between groups (Combined)	22.91	1	22.91	5.90	.015
Within groups	2948.61	759	3.89		
Total	2871.51	760			

H7. Perceived stress to heat will be associated with socio-economic factors (total combined annual household income, age, education, gender, employment and marital status), perception to heat (perceived 'too hot' temperature ratings), and coping strategies (staying home and going to a park).

To test hypothesis 7, a multiple regression test was used. For doing regression analysis, nominal and categorical variables were converted to dummy variables. As seen in table 5, about 7% of variance of respondents' perceived stress to heat was accounted for by socio-economic factors (total combined annual household income, age, education, gender, employment and marital status), perception to heat (perceived 'too hot' temperature ratings), and coping strategies (staying home and going to a park) ($R^2 = .071$,

$p < .05$). The regression model was statistically significant with $F_{(9, 751)} = 6.380$, $p <$

.05. In table 5, the results showed income ($\beta = -.080$, $p < .05$), 'too hot' temperature

ratings ($\beta = -.209$, $p < .05$), age ($\beta = -.088$, $p < .05$), 'staying inside' ($\beta = .082$, $p < .05$) had

significant effects on respondents' perceived stress to heat.

Table 5

Summary of Multiple Regression Analysis

	B	SE	β
Income	-.086	.042	-.080*
Age	-.119	.053	-.088*
Education	.178	.152	.043
Gender	-.164	.158	-.038
Employment	.050	.148	.013
Marital Status	.079	.159	.020
'Too Hot' Temperature	-.056	.009	-.209*
Staying Inside	.364	.159	.082*
Prior Park Use	-.024	.184	-.005

$P < .05^*$, $R^2 = .071$

CHAPTER V

DISCUSSION & CONCLUSION

<u>Parks, Park Users, and Resilience</u>

Initial findings from the respondents found the group to be younger than expected but still provided the range of ages that were desired for this study. Due to the amount of respondents below the age of 45 the findings on education, employment, and income showed many similarities to the arguments made for low-income Hispanics in the literature review. Upon looking at the behaviors of the respondents during conditions of excessive heat, this study found that many of the respondents opted to stay indoors in AC rather than seeking alternative methods of cooling off. Many people drove to reach a park but almost just as many walked to their favorite park. Also the majority of respondents traveled less than two miles to reach their favorite park showing a mostly adequate coverage of parks from the basis of this study. Based on Q13 and Q18 of the survey, water features were the most liked quality of parks and most desired, increased shade was also highly desired. Likewise, the lack of water features was the most disliked quality. Those who responded 'other' had similar responses to those found in the initial focus group sessions, with responses such as undesirables around, strict rules, and the need for better safety measures. Others felt that the quality of the parks and features could be increased citing issues of dirty or closed facilities and dirty water.

This section will now consider matters surrounding the hypotheses. Hypothesis 2 was tested across four different questions as they (Q3, Q6, Q9, and Q46) offered the most critical perceptions out of the questions that were asked. Q46 offered the only significant

finding for hypothesis 2, showing that low-income Hispanic families were more critical of their neighborhood satisfaction than higher income earners. This coincides with a population who is concerned more with the quality of their immediate surroundings rather than that of an amenity. Hypothesis 3 was tested across median income, as it was determined that income would play a role in the perceived satisfaction and stress towards park visits. It was assumed that low-income Hispanic families would be stressed in their park experiences due to the lower quality of parks and the surrounding areas. Even though low-income families were critical of their neighborhoods, they seemed to be satisfied overall with the parks around them, rejecting H4. Hypothesis 5 was tested the way it was because it was assumed that low-income families would have increased stress to heat. This hypothesis was accepted in this case finding an effect on the level of ones income to their perceived level of stress towards heat. This confirms the hypothesis and the speculation throughout the literature review, showing that those who have less monetary resources can reflect that vulnerability as stress when it is too hot outside (Resser and Swim, 2011; Smith et al., 2009). Hypothesis 6 further tested the coping ability to heat of individuals. While the average responses were quite low, it did not produce a significant effect between income groups.

The bigger issue at hand is the amount of adaptive capacity that communities hold towards natural perturbations in climate conditions. Resilience, or the ability to bounce back from an adverse condition, is the opposite of vulnerability. Based on the findings, it may be determined that the resilience of the low-income respondents is of questionable integrity and disserves a closer look. Resilience for humans in the face of drought and heat is seen as the ability to cope with heat effectively. Although hypothesis 6 was

accepted, the low-income families significantly reflected stress to heat in hypothesis 5. Finding sustainable alternatives to cooling off in cities will help to define the role that parks and urban greenery have as coping mechanisms towards heat and also the role that these components play in building resilience into urban environments.

<u>Implications for Policies and Policy Makers</u>

This research, and adaptations of it, may serve as comprehensive methods to interface with communities in determining the quality of supply and the barriers to use of park facilities. This method was applied as a bottom-up approach for policy makers to gather information about parks and park users and serves as a viable way to collaborate between policy makers and various levels of stakeholders. Adaptive Collaborative Management (ACM) is a growing management schema that is concerned with issues of evaluating equity and adapting to changing conditions through the life of a policy or action. The ACM method is concerned with gathering data holistically so that the best possible policy may be created. By including the voice of the community in this process many underlying issues may be addressed. This method then encompasses both the policy making side of development and also community outreach in a cycle that fosters feedback. By providing education and outreach for communities, city governments may be able to respond to vulnerabilities that are outside of their immediate capabilities. ACM revisits the implemented policy throughout a set timeline so that it may be adapted to better fit its role in the community. The current research could be applied to ACM as a tool to be used before policy formation and after implementation to gauge the performance of the action. Figure 2 is a basic representation of how ACM fits into this process.
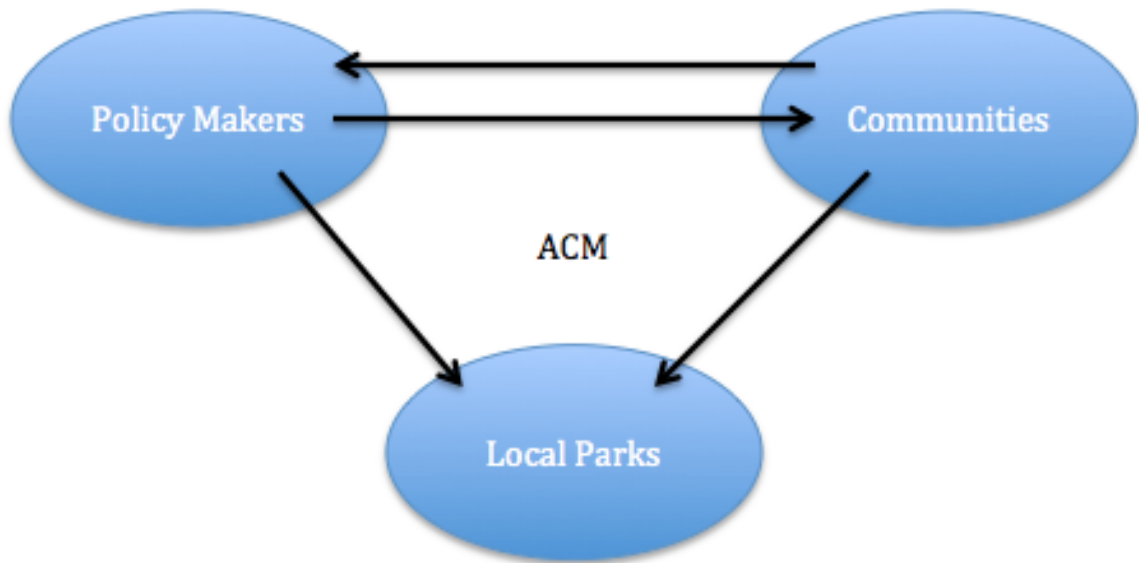
Figure 2 – Model for Policy Makers

Lal, Lim-Applegate, and Scoccimarro (2001), discussed the need for better resource management plans. They pointed out that this form of management is known by different names such as adaptive decision-making process, systems analysis, and integrated natural resource management. The process may be used for many forms of decision-making and provides an integrated and structured approach to participatory planning. ACM may be understood as an interdisciplinary approach that joins the top down analytical structure of research with the key insights that a bottom-up approach provides from stakeholders. In implementing a plan such as this, two outcomes may be achieved. First, possible policy initiatives and amendments may be uncovered by engaging stakeholders, which would contribute to residents having greater access and satisfaction towards amenities. And, secondly, strategic planning based on an interdisciplinary approach may be applied to amenity placement and coverage so that these assets may provide equitable use for surrounding communities. When realized as

an issue of human health and well-being, urban greening takes on a different meaning other than environmental utility and urban aesthetics. By increasing the adaptive capacity of cities to heat we may begin to build resiliency within communities as they cope with extreme heat and lasting drought.

Researchers in different disciplines can utilize this kind of approach to study the insights of varying demographics. This research has utilized theories from disciplines such as geography, sociology, psychology, and family and consumer sciences. Although the first few have obvious connections, the latter warrants some explanation. Family and consumer sciences typically research the home environment. While parks are in the public domain, they do have proximal effects on private property and family life by offering added value, health benefits, and many other effects. Family and consumer sciences might explore the effects of urban parks and greenery on households to better understand these relationships.

Conclusion

This study aimed at understanding the role of parks and urban greenery as coping mechanisms for less autonomous populations in two similar states experiencing conditions of drought and prolonged heat. This research tested many criteria surrounding heat and park use between below and above the national median income families. Hypotheses and research questions were developed around low-income Hispanic families from California and Texas, and were concerned with the effects of income and location on behaviors, perceptions, stress, and satisfaction towards heat, parks, and park experiences. There were two significant findings across two hypotheses. First, there was a significant effect ($p = .015$) between the two median income groups on perceived stress

to heat. According to the literature review this finding may be typical of vulnerable

populations (Oppenheimer et al., 2014; Smith et al., 2009). Second, a significant effect

(p = .002) was found between two income groups on satisfaction towards the

neighborhood of residence. The findings of this study showed that outdoor amenities,

such as parks, are underutilized by the respondents because they do not reflect the

immediate needs of populations that are less autonomous and who require more basic

needs to be met first. Due to the convenience of instant household cooling methods most

respondents said they stayed indoors, using AC or taking a cold shower to cool down on

hot days. As was discussed throughout this study, finding alternatives to active cooling

will prevail as an important issue in the 21st century. Other important areas of focus for

this study included the role of parks and urban greenery as a possible alternative to being

a sustainable coping mechanism for cities to heat and other natural phenomena. The

studied population was stable in regards to most hypotheses, but did show stress to heat

as being significant towards low-income Hispanic populations. Urban planners and other

policy makers may be able to utilize such methods by gaining deeper insights into a

communities needs. This should help to deliver the best possible product to consumers

so that satisfaction may be increased. If done correctly, adaptive capacity and resilience

may be built into locations and would provide equity in use and coverage for city

inhabitants.

Building natural adaptive capacity (vegetation) into a city would help to reduce

urban heat islands by directing the sunlight off of asphalt and other heat absorbing

materials. Evapotranspiration, the process of moisture exchange between a plant and the

atmosphere through the uptake of carbon dioxide and release of oxygen, produces a

cooling effect on the ambient temperatures around the vegetation. This would help to passively cool a city when used strategically and in mass. Other benefits include better storm water management and increasing vegetation would help improve carbon sequestration and air quality. This study can be applied as a bottom-up method of engaging communities so that policy makers may better understand individual subjective motivations, behaviors, perceptions, and feelings held by stakeholders towards the components of an urban environment. In applying it to green spaces and urban parks, policy makers may further understand the importance of urban greenery on human well-being.

Limitations and Future Research

This research was limited by the assumption that income would be the best indicator to explore the amount of stress felt to heat. Further research might want to explore various predictors to find the most significant one. Another limit was the breadth of the data. Future research might explore urban and rural differences, regional, census tract, and differences across zip codes.

Future research should include a GIS analysis of the findings to map the coverage of parks from a stakeholder point of view. This would be differentiated from a traditional network analysis by mapping subjective but quantifiable perceptions of stress and satisfaction across varying scales. This would help policy makers to better understand the areas of cities that need more natural space built into them. When applied to other amenities, civic attributes, and combined with other interdisciplinary data it can become a measure of civic happiness.

Being that this study focused on low-income Hispanic families, future research could also focus on other vulnerable populations or be expanded to entirely focus upon the population of a city. The method of analysis used in this study is not contingent upon the scale of data, but accuracy will be affected by the frequency of responses in future research.

Further research should also be conducted on the motivations that keep people indoors and how to motivate them towards using outdoor amenities more. The findings showed average acceptance and satisfaction towards parks, but not a staggering amount was seen. Future studies should work towards finding the barriers that impede a fulfilling park experience in order to get people outside more. This will take collaboration on both ends of the process, between stakeholders and users, and policy makers so that the best possible products are created. Another barrier to use that warrants further research is the mode of travel used to reach a park. Although this study showed a large amount of people who walked to the park, the majority of respondents used a personal vehicle. If imagined as a best possible scenario, growing vegetation into a city could help create alternate connections throughout that place making effective urban trails that would foster a truly pedestrian friendly, adaptable, and resilient community.

APPENDIX SECTION

A. Survey Questions

Type of Question	Question	Format	Source
Perception	Q1. At what temperature is it "too hot" for you?	Range of Temps.-Slider	Hansen et al. (2003). "Vulnerability to extreme heat and climate change: is ethnicity a factor?" Glob Health Action
Behavior	Q2. What do you usually do when it is too hot outside?	MultipleChoices-	Chiesura, A (2004).. "The role of urban parks for the sustainable city." Landscape and Urban Planning.
Perception	Q3. Are there enough ways to cool off in your city when it is too hot outside?	Y/N	Jabareen, Yosef. "Planning the resilient city: Concepts and strategies for coping with climate change and environmental risk." Cities 31 (2013). 220-229.
Behavior	Q4. Have you been to a park so far this year?	Y/N	Chiesura, Anna. "The role of urban parks for the sustainable city." Landscape and Urban Planning 68 (2004). 129-138.
Behavior	Q5. How many times per week do you visit a park?	Mult. Choice-Single	Chiesura, Anna. "The role of urban parks for the sustainable city." Landscape and Urban Planning 68 (2004). 129-138.
Perception	Q6. Thinking of the park you visit most, is it easy for you to get to this park?	Y/N	Comber, Brunsdon, Green. "Using a GIS-based network analysis to determine urban greenspace accessiblity for different ethnic and religious groups." Landscape and Urban Planning 86 (2008). 103-114.
Behavior	Q7. How do you usually get to this park?	Mult. Choice-Single	Comber, Brunsdon, Green. "Using a GIS-based network analysis to determine urban greenspace accessiblity for different ethnic and religious groups." Landscape and Urban Planning 86 (2008). 103-114.
Perception	Q8. How many miles away from you would you say it is?	Mult. Choice-Single	Zhang, Lu, Holt. "Modeling spatial accessiblity to parks: a national study." International Journal of Health Geographics 10:31 (2011).

Perception	Q9. Is there enough shade at this park?	Y/N	Bowler, Dianna E., et al. "Urban greening to cool towns and cities: A systematic review of the empirical evidence." Landscape and Urban Planning 97 (2010). 147-155.
General	Q10. Is this park a greenspace or an urban park?	Mult. Choice-Single	Karin Lundgren & Tord Kjellstrom. "Sustainability challenges from climate change and air conditioning use in urban areas." Sustainability 5 (2013). 3116-3128.
General	Q11. If there are water features at this park to cool off in what are they?	Mult. Choice-Mult.	Leung, Xi Y., et al. "Park users' quality evaluation: applying an analytical hierarchy process for managers." Managing Leisure 16. 142-160 (2011).
Behavior	Q12. What do you like to do at the park? Check all.	Mult. Choice-Mult.	Chiesura, Anna. "The role of urban parks for the sustainable city." Landscape and Urban Planning 68 (2004). 129-138.; Leung, Xi Y., et al. "Park users' quality evaluation: applying an analytical hierarchy process for managers." Managing Leisure 16. 142-160 (2011).
Perception	Q13. What do you like most about the park?	Ranking	Leung, Xi Y., et al. "Park users' quality evaluation: applying an analytical hierarchy process for managers." Managing Leisure 16. 142-160 (2011).
Perception	Q14. What do you dislike most about the park? Check all.	Mult. Choice-Mult.	Leung, Xi Y., et al. "Park users' quality evaluation: applying an analytical hierarchy process for managers." Managing Leisure 16. 142-160 (2011).
Stress	Q15. How much stress do you feel towards the overall experience of "going to the park"?	Likert 1-7	Chiesura, Anna. "The role of urban parks for the sustainable city." Landscape and Urban Planning 68 (2004). 129-138.; Karin Lundgren & Tord Kjellstrom. "Sustainability challenges from climate change and air conditioning use in urban areas." Sustainability 5 (2013). 3116-3128.
Satisfaction	Q16. How satisfied are you with the overall experience of going to the park?	Mult. Choice, Very DisSat to Very Sat.	Chiesura, Anna. "The role of urban parks for the sustainable city." Landscape and Urban Planning 68 (2004). 129-138.

Satisfaction	Q17. Overall, how satisfied are you with the parks around you?	Mult. Choice, Very DisSat to Very Sat.	Chiesura, Anna. "The role of urban parks for the sustainable city." Landscape and Urban Planning 68 (2004). 129-138.
Perception	Q18. How important to you are the following options in improving your local parks?	Ranking	Leung, Xi Y., et al. "Park users' quality evaluation: applying an analytical hierarchy process for managers." Managing Leisure 16. 142-160 (2011).
Perception	Q19. Overall, how satisfied are you with your life?	Mult. Choice, Very DisSat to Very Sat.	David Maddison & Katrin Rehdanz. "The impact of climate on life satisfaction." Ecological Economics 70 (2011). 2437-2445.
Stress	Q20. How much stress do you feel when it is too hot outside?	Likert 1-7	Chiesura, Anna. "The role of urban parks for the sustainable city." Landscape and Urban Planning 68 (2004). 129-138.
Stress	Q.21 How easy is it for you to cope with heat?	Likert 1-7	Karin Lundgren & Tord Kjellstrom. "Sustainability challenges from climate change and air conditioning use in urban areas." Sustainability 5 (2013). 3116-3128.
Perception Satisfaction	Q.46 Overall, how satisfied are you with your neighborhood?	Likert 1-7	

B. IRB Certificate of Approval

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REFERENCES

Bowler, D. E., Buyung-Ali, L., Knight, T. M., & Pullin, A. S. (2010). Urban greening to cool towns and cities: A systematic review of the empirical evidence. *Landscape and Urban Planning, 97*(3), 147-155. Doi:10.1016/j.landurbplan.2010.05.006

Brereton, F., Clinch, J. P., & Ferreira, S. (2008). Happiness, geography and the environment. *Ecological Economics, 65*(2), 386-396. doi:10.1016/j.ecolecon.2007.07.008

Chiesura, A. (2004). The role of urban parks for the sustainable city. *Landscape and Urban Planning, 68*, 129-138. doi:10.1016/j.landurbplan.2003.08.003

Collins, M., Knutti, R., Arblaster, J., Dufresne, J.-L., Fichefet, T., Freidlingstein, P., Gao, X.,…Wehner, M. (2013). Long-term Climate Change: Projections, Comitments and Irreversibility. In: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment report of the Intergovernmental Panel on Climate Change*. Cambridge University Press.

Comber, A., Brunsdon, C., & Green, E. (2008). Using a GIS-based network analysis to determine urban greenspace accessibility for different ethnic and religious groups. *Landscape and Urban Planning, 86*(1), 103-114. doi:10.1016/j.landurbplan.2008.01.002

Cortes, A., Herbert, C. E., Wilson, E., & Clay, E. (2007). Factors affecting Hispanic homeownership: A review of the literature. *Cityscape, 9*(2). U.S. Department of Housing and Urban Development, Office of Policy Development and Research.

Dallimer, M., Irvine, K. N., Skinner, A. M. J., Davies, Z. G., Rouquette, J. R., Maltby, L. L., Warren, P.H., Armsworth, P.R., and Gaston, K. J. (2012). Biodiversity and the feel-good factor: Understanding associations between self-reported human well-being and species richness. *Bioscience, 62*(1), 47-55. doi:10.1525/bio.2012.62.1.9

Florida, R., Mellander, C., & Rentfrow, P. J. (2013). The happiness of cities. *Regional Studies, 47*(4), 613-627. doi:10.1080/00343404.2011.589830

Gomez, F., Jabaloyes, J., Montero, L., De Vicente, V., & Valcuende, M. (2011). Green areas, the most significant indicator of the sustainability of sities: Research on their utility for urban planning. *Journal Of Urban Planning And Development, 137*(3), 311-328. doi: 10.1061/(ASCE)UP.1943-5444

Guardiola, J., González-Gómez, F., García-Rubio, M. A., & Lendechy-Grajales, Á. (2013). Does higher income equal higher levels of happiness in every society? The case of the Mayan people. *International Journal of Social Welfare, 22*(1), 35-44. doi:10.1111/j.1468-2397.2011.00857.x

Hansen, A., Bi, L., Saniotis, A., & Nitschke, M. (2013). Vulnerability to extreme heat and climate change: Is ethnicity a factor? *Global Health Action, 6*, 21364. doi:10.3402/gha.v6i0.21364

Jabareen, Y. (2013). Planning the resilient city: Concepts and strategies for coping with climate change and environmental risk. *Cities, 31*, 220-229. doi:10.1016/j.cities.2012.05.004

Kirtman, B., Power, S.B., Adedoyin, J.A., Boer, G.J., Bojariu, R.,…Wang, H.J. (2013). Near-term Climate Change: Projections and Predictability. In: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press.

Lal, P., Lim-Applegate, H., & Scoccimarro, M., (2001). The adaptive decision-making process as a tool for integrated natural resource management: focus attitudes and approach. *Conservation Ecology, 5*(2):11.

Leung, X. Y., Wang, F., Wu, B., & Busser, J. A. (2011). Park users' quality evaluation: Applying an analytical hierarchy process for managers. *Managing Leisure, 16*(2), 142-160. doi:10.1080/13606719.2011.559092

Louv, R. (2011). Reconnecting to nature in the age of technology. *Futurist, 45*(3), 41-45.

Lundgren, K., & Kjellstrom, T. (2013). Sustainability challenges from climate change and air conditioning use in urban areas. *Sustainability, 5*, 3116-3128. doi:10.3390/su5073116

Maddison, D., & Rehdanz, K. (2011). The impact of climate on life satisfaction. *Ecological Economics, 70*(12), 2437-2445. doi:10.1016/j.ecolecon.2011.07.027

Mitrousi, S., Travlos, A., Koukia, E., & Zyga, S. (2013). Theoretical approaches to

    coping. *International Journal of Caring Sciences, 6*(2), 131-137.

O'Brien, G., O'Keefe, P., Meena, H., Rose, J., & Leanne. (2008). Climate adaptation from

    a poverty perspective. *Climate Policy, 8*(2), 194-201. doi:10.3763/cpol.2007.0430

Oppenheimer, M., Campos, M., Warren, R., Birkmann, J., Luber, G., O'Neill, B.,

    Takahashi, K. (2014). Emergent Risks and Key Vulnerabilities. In: *Climate Change*

    2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects.

    Contribution of Working Group II to the Fifth Assessment Report of the

    Intergovernmental Panel on Climate Change. Cambridge University Press, 1039-

    1099.

Pierce, J. C., Budd, W. W., & Lovrich, N. P. (2011). Resilience and sustainability in US

    urban areas. *Environmental Politics, 20*(4), 566-584.

    doi:10.1080/09644016.2011.589580

Rehdanz, K., & Maddison, D. (2005). Climate and happiness. *Ecological Economics,*

    52(1), 111-125. doi:10.1016/j.ecolecon.2004.06.015

Resser, J. P., & Swim, J. K. (2011). Adapting to and coping with the threat and impacts

    of climate change. *American Psychologist, 66*(4), 277-289. doi:10.1037/a0023412

Seaman, P. J., Jones, R., & Ellaway, A. (2010). It's not just about the park, it's about

integration too: Why people choose to use or not use urban greenspaces.

International Journal of Behavioral Nutrition and Physical Activity, 7, 78.

doi:10.1186/1479-5868-7-78

Searns, R. (1995). The evolution of greenways as an adaptive urban landscape form.

Landscape and Urban Planning, 33(1-3), 65-80. doi:10.1016/0169-2046(94)02014-7

Shashua-Bar, L., Pearlmutter, D., & Erell, E. (2009). The cooling efficiency of urban

landscape strategies in a hot dry climate. *Landscape and Urban Planning, 92*(3–4),

179-186. doi:10.1016/j.landurbplan.2009.04.005

Smith, J. B., Schneider, S. H., Oppenheimer, M., Yohe, G. W., Hare, W., Mastrandrea,

M. D., . . . van Ypersele, J. (2009). Assessing dangerous climate change through an

update of the intergovernmental panel on climate change (IPCC) 'reasons for

concern'. *Proceedings of the National Academy of Sciences of the United States of

America, 106*(11), 4133-4137. doi:10.2307/40441775

Smith, T., Nelischer, M., & Perkins, N. (1997). Quality of an urban community: A

framework for understanding the relationship between quality and physical form.

Landscape and Urban Planning, 39(2-3), 229-241. doi:10.1016/S0169-

2046(97)00055-8

U.S. Census Bureau (2013). State and County Quick-Facts: 2013 Estimates.

Census.gov. Accessed on 10/30/14.

Zambrana, R. E., & Dorrington, C. (1998). Economic and social vulnerability of latino

    children and families by subgroup: Implications for child welfare. *Child Welfare,*

    77(1), 5-27. doi:0009-4021/98/010005-23

Zhang, X., Lu, H., & Holt, J. B. (2011). Modeling spatial accessibility to parks: A

    national study. *International Journal of Health Geographics, 10*(1), 31-44.

    doi:10.1186/1476-072X-10-31