Relationship Between Hostile Environmental Design and Environmental Justice:
A Case Study of CPTED at Arroyo Viejo Recreation Center in Oakland, CA

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ABSTRACT

In urban areas with poor access to high quality green spaces, the Crime Prevention Through Environmental Design (CPTED) framework creates a barrier for public parks and spaces to provide maximum psychological and environmental benefits. Though literature reviews have dissected how CPTED can act discriminately, my project intends to understand how the policy can result in a case of environmental (in)justice in Oakland, California, where there is varied green space access and quality. I used Arroyo Viejo Recreation Center as my site study, analyzing what landscape changes were implemented to adapt to CPTED recommendations, the demographics of its park users, and a community survey to understand the sentiment of Arroyo Viejo Park users towards existing park facilities and safety. I found that there was a reduction of accessibility and environmental features; however, there was an effort to upkeep outdated structures to increase the imageability of the park. The residents of Arroyo Viejo belonged to primarily groups of color, lower income, and lower educated groups than the overall City of Oakland, indicating that the reduction of park features could violate environmental justice. The community survey indicated that park users desired increased safety and shaded trees, but highly desired community initiatives for park management. The impact of hostile environmental design on communities of color should be further researched to understand how these spaces can become exclusionary and uphold discriminatory policing.

KEYWORDS

soft policing, hostile architecture, urban green space, defensible spaces, crime prevention through environmental design

INTRODUCTION

As policing and its excessive use of force has become increasingly criticized in the past couple of years, soft policing and community-based policing methods have become widely accepted as an alternative. Crime Prevention Through Environmental Design (CPTED) are a set of urban and architectural standards intended to promote community-based policing and reduce crime. It strives to design for "defensible spaces", ones that exclude potential criminals through community building and territorial control of space (Donnelly 2010). These environmental design elements aim for natural surveillance and open spaces to illuminate and reduce criminal activity (Cozens and Love 2015). Natural surveillance can occur as a reduction of view-obscuring vegetation and infrastructure for the installation of hard surveillance, such as CCTV (Cozens and Love 2015). It also builds on the idea of "eyes on the street" in which inhabitants and users of the street act as monitors for suspicious behavior, thus policing and reducing crime through increased traffic and visibility (Cozens and Love 2015). Focusing on residential control of neighborhood public spaces and increasing the visibility of an area has created a new terminology in environmental design, known as hostile architecture (Carr 2020). Hostile architecture refers to built structures that serve to drive people away from spaces that they are deemed unwanted, typically referring to homeless peoples or people suspected to be more susceptible to criminal activity (Carr 2020). Hostile architecture explores the ways CPTED foundationally works to exclude unwanted communities from civic areas through defensive elements (Carr 2020). Understanding the nature of CPTED to weaponize environmental design against non-community members can reveal ways both non-community members and community members can become environmentally disadvantaged due to CPTED implementation.

The Oakland Police Department currently employs CPTED policing into residential, commercial, and civic projects as a means of increasing video surveillance and reducing crime. Civic space recommendations, which are targeted for plazas, parks, recreation centers, churches, schools, and parking lots, provides a checklist to improve lighting, line of sight, visibility issues, clearly defined spaces, and accessibility (Oakland Police Department 2018). Raising the visibility of spaces maximizes opportunity for natural surveillance and the self-policing of public spaces. Environmental implementations, such as landscaping to avoid blind spots and the prioritization of trees that "retain a thin trunk as they grow and mature" and "retain an open canopy to allow light

in from above", allow for increased surveillance of the space (Oakland Police Department 2018). The boundaries between private and public space are defined with walls, fences, planters, or pavement, and benches are meant to be designed for sitting use only. Accessibility is minimized through hostile vegetation that deters sitting and walkways/landscaping that points public entrances away from private areas (Oakland Police Department 2018). Studies have stated the presence of green spaces with lush canopies and high biodiversity can lower crime rates in urban settings through the provision of psychological benefits (Shepley et al. 2019). Shade provision and well-integrated vegetation in urban parks can also provide environmental benefits, such as surface temperature reduction and air filtration (Heidt 2008). As CPTED works against the provision of these benefits, civic spaces in Oakland that employ CPTED become an area of interest for the potential disproportionate distribution of environmental services provided by green spaces.

The geography and quality of green space in Oakland is disproportionate to its populations, representing environmentally unjust green spaces. A 2007 study of Oakland's green space access found that the East Bay Regional Parks system provided a sufficient number of parks; however, the accessibility of these parks varied through location and transportation to the sites. The Trust for Public Land found that low-income populations in Oakland have 19% less than the city median's park space per person, whereas the high-income population contains 272% more than the city median's park space per person. As the location of accessible green spaces in Oakland are scattered, the Police Department's goal to implement CPTED can further the environmental justice issue. In 2015, Arroyo Viejo Recreation Center requested a site survey conducted by the Oakland Police Department to determine which CPTED integrations should be implemented into the space. The park contains a recreation center, playgrounds, fields, picnic areas, and the Arroyo Viejo Creek for its surrounding communities. The contents of the site survey will be used to understand how hostile environmental design acts to reduce the environmental benefits of the park.

In this study, I seek to understand how environmental design can facilitate environmental injustice through a geographically selective provision of environmental services. How do the environmental and architectural elements of civic spaces change before and after CPTED implementation, and how is this reflected in the number of environmental benefits these spaces receive? Do these changes occur in communities that are historically environmentally disadvantaged? Furthermore, how do community members prioritize surveillance over environmental features and accessibility in their park? In civic spaces, I hypothesize CPTED will

standardize trees with thinner canopies and trunks, less biodiverse vegetation, and reduced sitting areas. In order to analyze environmental justice, I plan to identify the demographics of the area, looking at race, income, and education level. I believe this will point to the reduction of environmental benefits of this greenspace in a disadvantaged community, that is made up primarily lower income, people of color. From the community survey, I believe I will find that community members will prefer the accessibility of their green space, greater biodiversity, and shade providing trees over the provision of surveillance.

Key Themes and Theory

CPTED is based in Defensible Space Theory, a series of practices and frameworks that propose the design of public spaces can dictate the behavior and relationship between insiders and outsiders of the space. Natural surveillance is a concept introduced by Jane Jacobs, who believes public safety can be achieved through keeping our 'eyes on the street' (Cozens and Love 2015). Eyes on the street refers to increased surveillance and opportunities for surveillance within public spaces, making sure that the outsiders of the space are visible to the insiders (Cozens and Love 2015). Oscar Newman expands on this concept in Defensible Space, where he defines aspects of urban design that can prevent crime. Newman states public spaces should be designed for territoriality and exercised through surveillance, image, and milieu of the environment (Donnelly 2010). Designing for territoriality is meant to both control the behavior of outsiders and add a sense of responsibility for insiders of the space (Newman 1973). Increasing the role of hard and natural surveillance in the space contributes to the residents' sense of territoriality, making them more likely to exclude potential criminals that are visibly unfit (Newman 1973). Increasing the image and milieu of the environment intends to emphasize the differences between the residents and potential offenders of the space, enforcing the idea that those who are deemed physically unattractive to the space should feel excluded (Newman 1973).

Under defensible space theory, the production of public space becomes less representative of its community members and more representational of subjective guidelines and standards (Jones and Popke 2010). By the early 2000s, CPTED had become an internationally accepted approach to policing, being integrated into law enforcement efforts and design principles of urban safety planning (Cozens and Love 2015). CPTED becomes politicized as certain social behavior and appearance

become 'legitimate' versus 'illegitimate' in public spaces, lending itself to sort people into "preconceived notions about race, gender, socio-economic status, and other ascriptive characteristics" (Parnaby 2006). Increased surveillance generates an imbalance of power between who is watching versus being watched, further distancing insiders from outsiders of the space (Parnaby 2006). Neighborhood beautification, often concealed as urban renewal projects, becomes an opportunity to displace unwanted peoples and homogenize the culture of the environment (Smith and Walters 2017). The scope of defensible space theory and CPTED becomes harmful as definitions of who is an insider versus outsider and what deems a public space attractive are unclear. Because of the nature of defensible space theory to reinforce the boundaries of insider versus outsider relationships, CPTED leads itself to become exclusionary and harmful to specific communities.

Defensible spaces lead to the exclusion of community members through the use of hostile architecture, a term used to describe environmental design elements that drive people out of spaces. Hostile architecture, also referred to as defensive and anti-homeless architecture, builds upon Newman's theory of defensible space by creating environments that are meant to both increase surveillance and drive outsiders out of spaces (Smith and Walters 2017). CPTED acts as an example of hostile architecture, encouraged and disguised by local governments and planners to protect citizens and reduce crime. In Oakland, the police department recommends guidelines to residential, commercial, and civic projects under CPTED. For civic projects, the guidelines are categorically divided into "lighting, line of sight, and other visibility issues", "clearly defined spaces", and "access" (OPD 2018). The language of the checklist indicates the intent of Oakland's CPTED strategies, using terminology that explicitly states the purpose of each design element. "Hostile vegetation is planted to deter sitting" and "landscaping...do not create blind spots or hiding spots" informs the public that the environmental design serves to reduce accessibility and to drive people out of the space (OPD 2018). Understanding how CPTED's framework is inherently harmful and exclusionary opens the discussion of how CPTED can be viewed through an environmental justice lens.

Methodology

In this study, Oakland Police Department's CPTED standards will be analyzed to evaluate if they violate environmental justice. Environmental justice (EJ) is the framework that believes the distribution of environmental benefits and services should be equal (Mohai et al. 2009). I will use a

case study of a civic space that implements CPTED to understand how CPTED could reduce environmental benefits and analyze if its geography and accessibility indicates environmental injustice. Civic spaces will be the focus of this study due to the nature of defensible space theory to regulate the people and environment of public spaces. The race and income demographics of these spaces will be compared against Oakland as whole to understand if CPTED's effects on the environment are more common within certain neighborhoods and communities (Mohai et al. 2009).

METHODS

Case Study Site Description

Arroyo Viejo Recreation Center has been chosen as the site study due to its efforts to implement Crime Prevention Through Environmental Design (CPTED) and its role as a significant green space for its surrounding community, primarily made up of Hispanic and Black residents who live below the median income. In December 2015, the center requested a Security Survey Report conducted by the Oakland Police Department suggesting environmental and target-hardening modifications to maximize the effectiveness of crime prevention. Improved lighting was most recommended throughout the park, additionally suggesting the removal of trees, bushes, and decorative plants to maximize the visibility of the lighting. Tree canopies were recommended to "be trimmed up 10ft in order to open visibility and make the area feel safer". Surveillance cameras were recommended to be installed wherever well-lit conditions were possible. Mural projects and decorative art were recommended to reduce the frequency of graffiti. Specially designed benches were recommended to inhibit hiding and lying down for sleep. Gate lines were recommended to decrease the accessibility of the Arroyo Viejo Creek from park users, adding that "every effort should be made to make the creek area hard to access but still keep the natural look". Efforts were recommended to reduce the garbage and trash of the recreation area and the replacement of damaged play structures in the park. The report concludes with a statement that these suggestions need also be accompanied by ongoing education and a maintenance program, acknowledging that these crime preventative methods may not necessarily stop crime.

Determining CPTED implementation in Arroyo Viejo Park

Using Oakland's CPTED qualifications and a site study conducted by Oakland PD in 2015, I determined how CPTED was built into the landscape and architecture of Arroyo Viejo Recreation Center. From visiting and speaking with the director of the park, I analyzed what recommended changes were implemented into the park. Specifically, I paid attention to environmental changes, such as the planting of "hostile vegetation" and trees with a "thin trunk" and "open canopy" that "do not create blind spots or hiding spots". Environmental changes that upheld CPTED's principles of natural surveillance, accessibility, territoriality, and image will be identified in a temporal comparison from 2015 (prior to implementation) and present. The purpose of this analysis was to understand how the environmental services of the park were decreased through reduced accessibility and green infrastructure.

Understanding the demographics of Arroyo Viejo Park - is there environmental (in)justice?

To determine if a violation of environmental justice is occurring, local demographics of the park were analyzed to discover if the reduction of environmental services occurs in communities of color, low-income households, and lower education attainment households. Arroyo Viejo Park users were represented through 3 zip codes, 94603, 94605, and 94621, which are within a 1-mile radius of the park. Using the 2020 US Census data, these criteria were compared against the city of Oakland, and I calculated the Z-score to determine if there was a statistically significant difference between the demographics of the neighborhood and the city of Oakland. The Z-test was recommended by the U.S. Census Bureau when working with the American Community Survey (ACS) decennial census data, which provided estimated proportions, population size, and margin of error. Using ACS data estimates and margin of error data, I found the statistical significance between estimates from the City of Oakland versus each zip code through the Z-score:

$$Z = \frac{A - B}{\sqrt{MOE/1.645(A)^2 + MOE/1.645(B)^2}}$$

A = City of Oakland

B = Arroyo Viejo Zip Codes: 94603, 9605, & 94621

According to a 90 percent confidence level, there will be a significant difference between A and B if $Z < -1.645$ or $Z > 1.645$.

Community sentiment towards park services and safety

To understand how community members perceive Arroyo Viejo Park, I distributed a community survey through NextDoor, Facebook, and QR codes around the park and neighborhood. The questionnaire served to understand sentiment towards the park's safety and the potential implementation of CPTED (Appendix A Figure A1). Questions took the form of multiple choice, demographic, and Likert scale formats. The survey aimed to gain more insight into how the park management should go about future planning for its green space design.

RESULTS

How Arroyo Viejo implemented CPTED into its park

Due to a limited budget for the park, most Crime Prevention Through Environmental Design (CPTED) alterations to the park were minor and difficult to maintain after 7 years. Several bushes were removed or trimmed up as instructed by the police department technician, who regarded them as hiding spots. There were instances of decreased accessibility through the gating off public play structures and the use of planters to detract from certain walking paths (Table 1). There were also efforts to increase the imageability of the park, replacing sensor lights, fixing broken playground equipment, replacing damaged parking structures, and repainting faded signs. The director of the park expressed interest in installing security cameras and more sensor activated lights in the near future, as well as requesting another site survey to be conducted by Oakland PD this year.

Table 1. Implemented CPTED Changes at Arroyo Viejo Between 2015 and 2022 Data from 2015 was collected by the Oakland Police Department and summarized in the figure below.

Implemented CPTED Changes Between 2015 and 2022		
2015	**2022**	**Intention**
Accessibility		
12 planters to be relocated as 'detterents'	Relocated	Deter users from certain walking paths
Repaved roundabout to reduce traffic speed	No change	Reduce traffic speed
Bollard installation	Spiked bollards installed around park	Prevent bikes and motorcycles from speeding into park
Restroom demolition if community survey suggests	No change	Removal of hiding or sleeping spot
Fence installation	Fencing installed around: playground, center, large dumpster	Reduce potential illicit activity spots
Replacement of benches for thin metal benches	Some benches removed though not replaced	Removal of hiding or sleeping spot
Gateline to surround Arroyo Viejo Creek	No change	Removal of hiding or sleeping spot
Natural Surveillance		
Lights installed	Some lights installed around center building	Increase visibility
Replacement of orange lights with LED or white lights	LED lights replaced	Increase visibility
Trees and/or bushes removed	Some large bushes removed, though not many	Increase visibility
Trees trimmed up to 10 ft	No change	Increase visibility
Bushes trimmed up	Bushes surrounding the center building trimmed up	Increase visibility
Surveillance cameras	No change	Increase visibility
Imagibilty		
Unreadable entrance sign	Repainted	Increase imagibility
Unreadable 'Park Rules' sign	No change	Increase imagibility
Graffiti removal	Park Director said hard to maintain	Increase imagibility
Trash and debris removal	Removed	Increase imagibility
Removal of trees and bushes to highlight decorative art	Removed	Increase imagibility
Damaged play structure	Fixed	Increase imagibility
Territoriality		
NA	NA	Increase community ties and create difference between insiders/outsiders

Demographics of Arroyo Viejo

The Z-scores between the City of Oakland and 94603, 94605, and 94621 indicated statistical significance between the racial makeup of Arroyo Viejo, educational attainment, and median income level. There was no statistical difference between American Indian, and Native Hawaiian populations in Arroyo Viejo versus the whole City of Oakland; however, there was a

statistical significance between densities of White or Caucasian, Black or African American, Asian, Hispanic or Latino, and White (non-Hispanic or non-Latino) populations. Arroyo Viejo represents a greater proportion of Hispanic or Latino ethnic groups and Black or African American populations and a lower proportion of Oakland's White populations (Figure 1 and 4a).

There was statistical difference between the City of Oakland and the number of residents in the 94603-zip code who attained some college or associate degree. However, there remains a statistical significance between the rest of the City of Oakland versus Arroyo Viejo (Figure 2 and 4b).

There was no statistical significance between the median household income of Oakland and the 94605-zip code; however, there was a difference between Oakland and the 94603 and 94621-zip codes (Figure 3 and 4c).
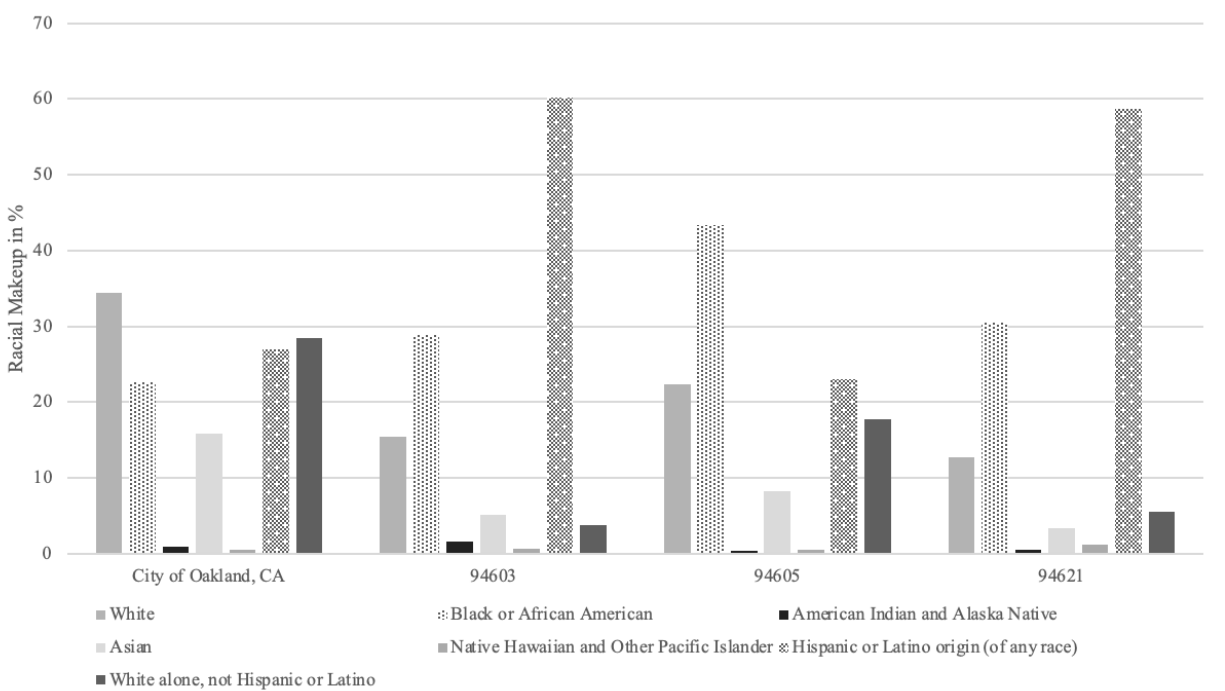
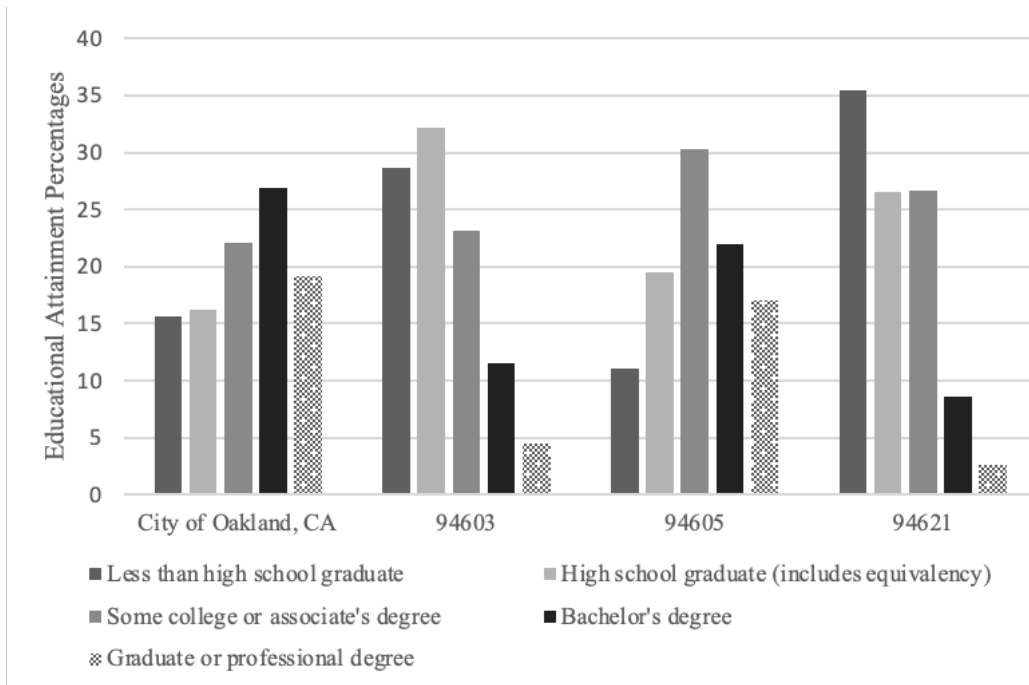**Figure 1. Racial and ethnic demographics of Oakland, CA versus Arroyo Viejo**

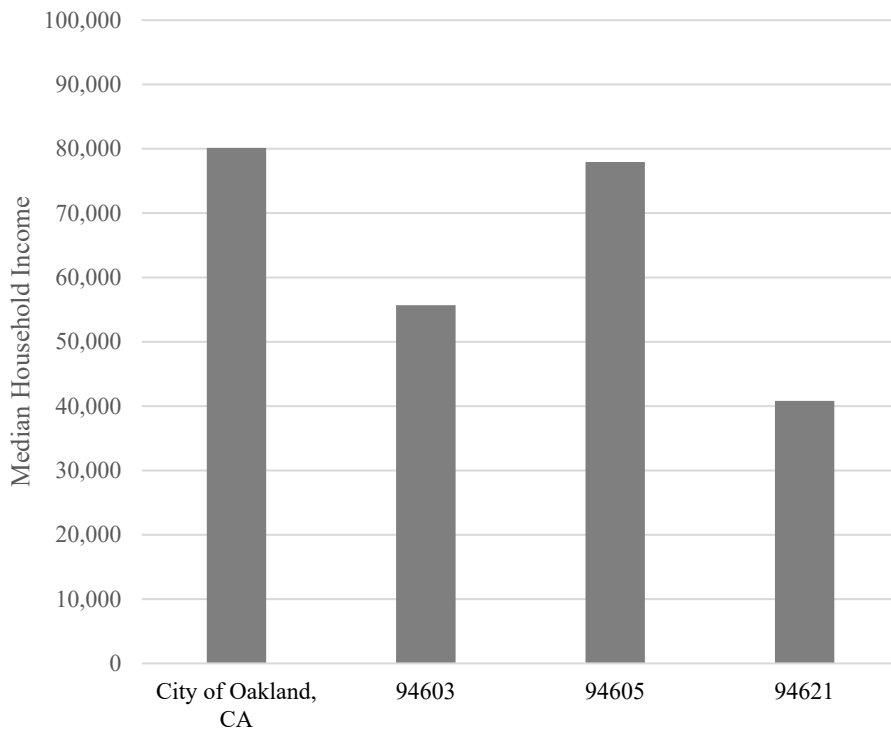**Figure 2 Education Attainment Levels in City of Oakland versus Arroyo Viejo**

Figure 3. Median Household Income ($) in Oakland, CA versus Arroyo Viejo
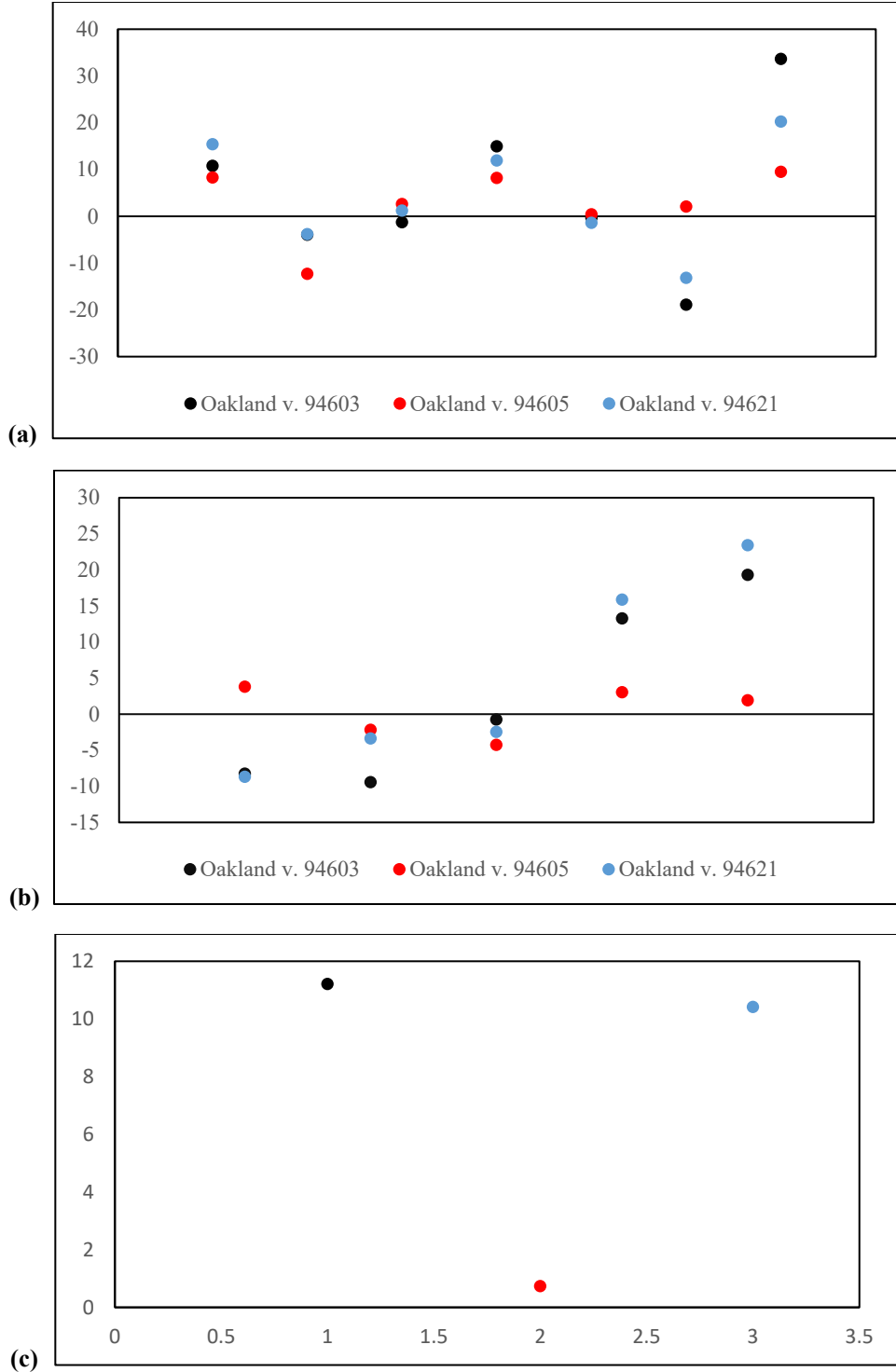
(a)

(b)

(c)

Figure 4. Z-Score distribution. The top plot (a) represents the Z-score distribution for the demographics of each zip code compared against the demographic of Oakland. The middle plot (b) represents the Z-score distribution for education levels between each zip code and Oakland. The bottom plot (c) represents the Z-score distribution of median income levels between each zip code and Oakland.

Community survey response

I filtered responses to be taken from zip codes within a 5-mile radius from the location of Arroyo Viejo. The survey respondents identified as either Latino or Hispanic, Black or African American, or White or Caucasian. 80% of respondents described feeling unsafe in their neighborhood. Residents had mixed feelings about hard surveillance, expressing primarily positive and very positive feelings and some very negative responses. Survey question 8 details how community gardens with food are the most desired facility by community members, with shady trees, flowers, improved play structures, and improved security all with equal desirability (Table II). Survey question 10 indicates a lack of safety and attractiveness of Arroyo Viejo, and a strong desire for greater community involvement in greenspace management (Table 2).

Table 2. Community Survey Responses

Arroyo Viejo Recreation Center Survey Results						
Theme	*Question*					
Respondent demographic	**What is your 5 digit zip code?**	*94605, 94621, 94603, 94619, 94601*				
	What race do you identify with?	*Latino or Hispanic, 60%*	*Black or African American, 30%*	*White or Caucasian, 10%*		
Safety	**How safe do you feel in your neighborhood?**	*Not safe, 80%*	*Safe, 20%*	*Very Safe, 0%*		
	What are your feelings towards hard surveillance (police, CCTV, security camera)?	*Positive, 40%*	*Very Positive, 30%*	*Very negative, 20%*	*Neutral, 10%*	
Desired facilities	**What types of facilities do you enjoy or want more of in your local park?**					
		Dislike strongly	Dislike slightly	Neither like nor dislike	Like slightly	Like strongly
	Trees with shade		*10%*	*10%*	*10%*	*70%*
	Community garden with food		-	-	*20%*	*80%*
	Flowers		-	*10%*	*20%*	*70%*
	Improved play structures		-	*11.11%*	*11.11%*	*77.78%*
	Improved security		-	-	*22.22%*	*77.78%*
	Improved exercise structures		-	*22.22%*	*22.22%*	*55.56%*
	How much do you agree with the following statements?					
	My local Greenspace is a safe place for physical activity – such as walking, cycling, sports, play	*33.33%*	-	*66.67%*	-	-
	My local Greenspace is an attractive place	*25%*	*37.50%*	*25%*	*12.50%*	-
	My local Greenspace is a good place for children to play	*12.50%*	*25%*	*62.50%*	-	-
	I would like to have more of a say in how my local greenspace is managed	-	-	*33.33%*	*22.22%*	*44.44%*
	My local greenspace makes the area a great place to live	*11.11%*	-	*33.33%*	*33.33%*	*22.22%*

DISCUSSION

Crime Prevention Through Environmental Design, CPTED, is a framework of crime preventative strategies that public and private spaces can enforce and design into their environment. These strategies, which intend to make spaces defensible, have made certain spaces inaccessible and prone to exclusivity. In thinking about the quality and accessibility of green spaces, my project looks at how CPTED can reduce the environmental services and psychological benefits. It also seeks to understand if the communities in which CPTED is implemented in represent environmentally disadvantaged populations, becoming an environmental justice issue. Lastly, a community survey was conducted in the Arroyo Viejo neighborhood to gain the perspective of residents on CPTED's prioritization of surveillance and inaccessibility over the environmental provisioning of green spaces.

The site study, which served to analyze how Arroyo Viejo Park integrated CPTED police recommendations, found that changes to the park decreased accessibility and increased natural surveillance and imageability. With reference to the community survey, I found that changes that reduced the presence of shade providing trees and the accessibility of play structures lowered the quality of the park for Arroyo Viejo residents. However, the community desire to improve the safety of the park could make CPTED's implementation of surveillance cameras and brighter lighting an asset. The increased imageability of the park represents another positive environmental and psychological impact, as damaged structures were repaired and there was an effort to reduce littering and trash around the park.

The demographic analysis of the Arroyo Viejo neighborhood to the City of Oakland established that the residents of Arroyo Viejo represented a greater proportion of residents of color, had disadvantaged opportunity for higher educational attainment, and were in median income brackets. The statistical difference between these two demographics indicated that if CPTED reduced the environmental benefits and quality of the greenspace, it is a violation of environmental justice.

Overall, the community sentiment towards improving the crime prevention of the park was positive. There was a high indication that community centered park management and projects, such as a community garden that supplied food, could be beneficial for future planning in the park. My results supported my hypothesis in that the CPTED implementation did reduce the equity and

accessibility of the park; however, the community survey found that increased surveillance and policing were not as frowned upon amongst community members as I had expected. Though attitudes towards hard policing were polarized, there were overarching feelings of unsafety in the park that needed to be addressed.

CPTED's Relation to Poor Green Space Health

In this case study, the changes implemented into the park indicated the declining environmental benefits of green infrastructure at Arroyo Viejo Recreation Center. Through the Oakland Police Department site survey of the park, environmental recommendations are carried out through the trimming and removal of trees and bushes throughout the park. These negative environmental impacts suggest that CPTED is a facilitator in the reduction of environmental services that public green spaces provide local communities.

Prior studies on green infrastructure and crime reduction signified a positive correlation between the presence of landscapes containing thick shade providing canopies and biodiverse vegetation with a decrease in crime rates. The heat reducing effects of the green infrastructure provided psychological benefits that reduce aggression and in turn reduce crime (Shepley et al 2019). High quality green spaces with dense vegetation have also contributed to community building efforts and the concept of "eyes on the street" through increased traffic to the space (Shepley et al 2019). Results of the case study revealed that the efforts taken to reduce tree canopies and vegetation can also create a public space that is more susceptible to crime. Understanding how specific landscape architecture alters crime and community behavior varies by site and requires extensive research on the community's relation to the green space.

CPTED as a Means of Policing: Surveillance in Communities of Color

Arroyo Viejo Recreation Center exists in a neighborhood made up primarily of Black and Latino residents and residents who fall below the median income of Oakland. This case study suggests that the reduction of environmental benefits due to CPTED in the surrounding neighborhood of Arroyo Viejo is a violation of environmental justice. As underprivileged communities and communities of color are typically most affected by inaccessible green space,

understanding how to maximize public environmental resources whilst ensuring the safety of the community can be a significant area of research.

Though the park did not have the budget to install security cameras, the police recommendation to replace tree canopy widths for CCTV cameras adds to recent studies which link surveillance to race. As awareness to the rise of hard policing and excessive use of force gained attention, surveillance plays a role in upholding ideas of a racial state and subjugating visitors of the park to a white gaze (Byfield 2018). The practice of surveillance disindividualizes system of power, concealing the technologies of policing while making certain bodies become apparently visible (Cook and Laing 2011). Recent studies have also investigated the racist use of facial recognition in police surveillance technologies, finding that the use of CCTVs and digital surveillance have been influential in discriminatory stop and frisk policing (Williams 2020).

Limitations

This study was limited through the lack of data the Oakland Police Department collects on the locations of spaces that implement CPTED. Through insufficient geospatial data on these CPTED-integrated spaces, the pattern of hostile architecture in Oakland could not be analyzed. The case study served to analyze an example of how the transition of Arroyo Viejo to a defensible green space was an act of environmental injustice.

Limitations additionally happened through the lack of precise information on changes that occurred between the 2015 landscape of the park and its present state. The park director had expressed the difficulty in implementing and continuing the maintenance of the CPTED recommendations, attributing the issue to a lack of budget. This constrained the study results, as the changes to the environment were not as stark as I had expected them to be. Though the Oakland Police Department provides CPTED guidelines, there is a disparity between how well these practices are maintained and implemented between this case study site and other parks in Oakland.

Future Discussions

To expand upon this case study, city or state police departments should collect data on sites that decide to implement CPTED. This data would allow for a geospatial analysis of these sites

and a greater understanding of the neighborhoods and demographics that CPTED is integrated in. It could also provide a greater understanding of how exclusivity based CPTED principles, such as territoriality or target hardening, can exhibit itself through discrimination and environmental injustice. In a case study of the CPTED's effectiveness in Sweden, research indicated that the four principles of CPTED often contradicted each other, with target hardening often overpowering aesthetic and image milieu of the environment (Iqbal and Ceccato 2015). This paper also raises questions about CPTED's purpose, proposing additional research on which populations have the right to feel safe under CPTED and the sustainability of the principles (Iqbal and Ceccato 2015).

Additional community-based studies could be conducted to understand citizen sentiments towards the prioritization of surveillance over environmental benefits in green spaces. This could be a continuation of studies that research community attitudes towards hard policing enacted through local police departments versus community-based policing methods (Ren et al 2005). As an alternative to hard policing, community-based/soft policing should also be investigated to understand how these forms of policing can also be harmful to people of color (Cossyleon 2019). "Eyes on the street" and defensible spaces should be re-envisioned in environmental design to promote accessibility and inclusivity whilst not sacrificing the safety of the community.

Broader Implications

Hostile architecture has become an increasingly popular topic in the fields of urban planning and environmental design. CPTED is a government supported method of hostile architecture, built on principles of exclusion and subjective beautification. In enforcing CPTED in neighborhoods with increased homeless populations or communities with poor access to public spaces, the guidelines become harmful in their inherent nature to drive people out of civic spaces and to reduce the amount of public resources available (Chellew 2019). The increased role of surveillance also questions who public spaces are designed for and signifies the emergence of how dominant structures define acceptable behavior in public space (Mitchell 2015). Racialized surveillance should be considered when turning to community-based policing methods, understanding how the history of policing in communities of color have led to distrust and hierarchical structures of power (Fussell 2020). High quality parks are green spaces designed for

the community, exhibiting ideas of inclusivity and climate mitigation while also maintaining the safety of park visitors.

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APPENDIX A : COMMUNITY SURVEY

Arroyo Viejo Recreation Center Community Survey

What is your 5 digit zip code?

[_____]

How close is Arroyo Viejo Recreation Center from your home?

○ Less than a 5 min walk
○ Within a 5-10 min walk
○ Within a 11-30 min walk
○ More than a 30 min walk
○ Don't know

What race do you identify with?

○ White or Caucasian
○ Black or African American
○ Asian
○ Latino or Hispanic
○ Native American or Indigenous
○ Hawaiian or Pacific Islander
○ Other

What is your primary use of the Arroyo Viejo Recreation Center?

	Not Very Often	Sometimes	Often	Very Often
Exercise	○	○	○	○
Relaxation	○	○	○	○
Dog Walking	○	○	○	○
Playground	○	○	○	○

How often do you use Arroyo Viejo Recreation Center?

○ Once a week or more
○ 3-4 times per month
○ 1-2 times per month
○ Once every couple months
○ Never

How safe do you feel in your neighborhood?

○ Not safe
○ Safe
○ Very Safe

What are your feelings towards hard surveillance (police, CCTV, security camera)?

○ Very negative
○ Negative
○ Neutral
○ Positive
○ Very positive

What types of facilities do you enjoy or want more of in your local park?

	Dislike strongly	Dislike slightly	Neither dislike nor like	LIke slightly	Like strongly
Trees with shade	○	○	○	○	○
Community garden with food	○	○	○	○	○
Flowers	○	○	○	○	○
Improved play structures	○	○	○	○	○
Improved security	○	○	○	○	○
Improved exercise structures	○	○	○	○	○

How satisfied are you with Arroyo Viejo Recreation Center?

○ Extremely dissatisfied
○ Somewhat dissatisfied
○ Neither satisfied nor dissatisfied
○ Somewhat satisfied
○ Extremely satisfied

How much do you agree or disagree with the following statements relating to Arroyo Viejo Recreation Center?

	Disagree strongly	Disagree slightly	Neither agree nor disagree	Agree slightly	Agree strongly
My local Greenspace is a safe place for physical activity – such as walking, cycling, sports, play	○	○	○	○	○
My local Greenspace is an attractive place	○	○	○	○	○
My local Greenspace is a good place for children to play	○	○	○	○	○
I would like to have more of a say in how my local greenspace is managed	○	○	○	○	○
My local greenspace makes the area a great place to live	○	○	○	○	○

Figure AI. Arroyo Viejo Community Survey sent out to Oakland residents through Qualtrics.