

**A Modern Settlement House Movement:
The Impact of Neighborhood Centers on Climate Resilience**

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Abstract

As we look to the future, climate related crises and change will require resilient communities to adapt to a new normal. The settlement house tradition provides a time-tested model for adaptation in which communities can leverage their own assets, providing a bottom-up approach to address challenges and build resilience. Many modern neighborhood centers (NCs) are modeled after the traditional settlement house framework. This study hypothesized that current models of settlement houses increase community resilience following adverse climate events, thus providing a viable contribution to future climate action plans. Specifically, this study used geographical information system (GIS) data mapping to determine the effects of neighborhood centers (NCs) on community resilience in Harris County, Texas following Hurricane Harvey. Mental health, demographic, and climate risk factors were measured for census tracts with NCs and compared with census tracts without NCs. Results showed that communities with NCs scored better on mental health markers after Hurricane Harvey. Although these results were not statistically significant, the effects are notable. Similarly, differences in demographic and climate risk data did not reach statistical significance at $p < .05$. However, rates of unemployment showed notable trends indicating that NCs may have an influence on unemployment levels. Considering these inconclusive findings, further research in this field is highly encouraged. Moving forward, modern NCs provide a potential model for building community resilience in the face of a growing climate emergency.

Keywords: resilience, community, climate change, settlement house, neighborhood centers

A Modern Settlement House Movement:

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How do communities improve resilience in the face of climate change? Climate change is a growing crisis, and communities need to continuously adapt to an ever-changing new normal. By improving adaptation, communities can increase resilience to unknown future challenges. One fascinating historical model for social adaptation is the settlement house. The settlement house movement was part of the Progressive Era that sought to educate and empower vulnerable populations in the United States in the early 1900s. Settlement houses have provided a viable model for building resilience for more than a century. Many modern neighborhood centers (NCs) currently embody this approach. These NCs are community driven and embrace meaningful participation through mutual aid. Furthermore, their targeted efforts in local adaptation provide flexible support to a variety of challenges and transitions. The literature review below documents the efficacy of this model in increasing resilience in broad terms (Yan & Sin, 2011). What is unknown is if this effect translates to climate related crises. Do NCs based on the settlement house model influence the resilience of community residents during the aftermath of a severe climate disaster? This study explores the impact of NCs on community resilience following Hurricane Harvey in Harris County, Texas.

Literature Review

Resilience Theory

Originally, resilience is a term that comes from the field of physics. In physics, resilience refers to an object's ability to bounce back from pressure. However, resilience has become a buzzword with increased use but diluted meaning. Davoidi and colleagues (2012) notes this evolution:

It appears that resilience is replacing sustainability in everyday discourse in much the same way as the environment has been subsumed in the hegemonic imperatives of climate change. Yet, it is not quite clear what resilience means, beyond the simple assumption that it is good to be resilient. (as cited in Baldwin & King, 2018, p. 41)

We must wade through these distilled waters to reclaim a concrete meaning for community resilience. Fortunately, Magis (2010) offers a more distinct definition, positing that resilience refers to “the existence, development, and engagement of community resources by community members to thrive in an environment characterized by change, uncertainty, unpredictability, and surprise” (p. 402). Indeed, resilience is the human ability to leverage resources to recover and even thrive after crises.

Resilience Factors

There are multiple ways that resilience can be facilitated. Viewed on a continuum, resilience is a construct of successful adaptation (Ahern et al., 2006). As such, resilience can be altered through adjusting risk factors that lead to vulnerability, as well as through increasing protective resources within the community (Ahern et al., 2006). These resilience factors can be social or physical. For example, social adaptive capacity, individual agency, and social capital are all social factors that increase resilience. On the other hand, resilience can also be increased by adjusting physical factors, such as enhancing built environments and remedying physical vulnerabilities. In either case, community resilience is the result of the presence or absence of physical and social resources and the ability of the community to leverage these resources.

Resources

Social and physical resources are critical factors for building community resilience. Baldwin & King (2018) hold that “a built environment that supports pro-community behaviours

is conducive to community resilience to environmental adversities” (p. 41). Not only does a formal gathering place offers a central location for leveraging other physical assets, but it also creates a space for building social capital. Social capital includes cognitive aspects—such as behavioral norms, attitudes, and trust—and it also includes the structural elements of neighborhood networks and associations (Baldwin & King, 2018). Therefore, community resilience most likely occurs when a community can collectively use social and physical resources within the context of a place.

Adaptive Capacity

Communities can build adaptive capacity to better leverage resources. Adaptive capacity is a condition that refers specifically to “the capability of a particular system to effectively cope with shocks” (Martin-Breen & Anderies, 2011, as cited in Baldwin & King, 2018, p. xx). It has been found that building adaptive capacity works best within certain physical bounds, encompassing both the social and physical aspects of a system. Berkes and Ross (2013) note that increasing community adaptation works best in non-dispersed, place-based communities that leverage their own community-based assets. Other factors that influence adaptive capacity include social cohesion, socio-demographic characteristics, and social vulnerabilities like living alone or minority status (Baldwin & King, 2018). Ultimately, adaptation is the process that results from leveraging adaptive capacity—leading to community resilience.

Agency

Another factor that increases adaptive capacity is agency. Agency is a process by which an individual pursues personal goals, and it is a defining factor in increasing resilience and effecting social change (Davidson, 2013). Magis (2010) describes active agency as an important dimension of community resilience. Increasing agency can be accomplished through

incorporating concepts of mutual aid and meaningful participation. These tools develop a bottom-up process within the community, allowing for more sustainable gains for future generations (Isidiho & Sabran, 2016). Furthermore, by enacting individual choice and action through agency, an individual can regain some control in an uncertain environment. Thompson and Spacapan (1991) note a number of positive outcomes associated with a sense of control, including increased well-being, physical health, and successful coping with stress. Ultimately, enacting agency allows an individual to claim personal control and meaningful participation within the community, which is critical for increasing adaptive capacity.

Resilience and Vulnerable Communities

Building resilience is especially important in vulnerable communities. Social vulnerability can be defined as “the characteristics of a person or community that affect their capacity to anticipate, confront, repair, and recover from the effects of a disaster” (Flanagan et al., 2018, p.34). Vulnerable communities lack sufficient resources to cope with current and future challenges, measuring high on risk factors and low on protective factors. Research shows that natural disasters disproportionately affect vulnerable communities (Ahern et al., 2006). Particularly, poor communities are more vulnerable at every stage of an adverse climate event, and they are less likely to make a full recovery (Ahern et al., 2006). Accordingly, this study focuses specifically on measuring resilience within poor communities over the course of an adverse climate event.

Climate Resilience

It is imperative that adaptation to environmental threats be included in definitions of community resilience. Davidson (2012) cautions that these threats are not taken seriously enough. Furthermore, with the increasing unpredictability of the climate crises, the ability of a

community to predict and plan effectively decreases (Davidson, 2012). In addition to this, resource decline will negatively affect the amount of assets a community has to adapt to change. Perhaps more importantly, a resource decline would require community systems that promote cooperation in the face of resource scarcity (Davidson, 2012). Davidson (2012) emphasizes that, “dealing with resource scarcity and the ethical implications this imposes needs to be front and centre in any treatment of community resilience” (p.22). Ignoring the climate crisis in planning for community resilience would be a catastrophic oversight.

Models for Community Resilience

Settlement Houses

A key historical model of building community resilience is the settlement house. The first settlement house was founded in 1884 in London by a local clergyman, inspired to act by the endemic destitution in the surrounding area. This clergyman built a team to live and work among the community with a purpose to “learn as much as to teach, to receive as much as to give” (Neighborhood Centers Inc., 2006, p.8). The NCs in the current study all grew out of a settlement house in Houston, Texas that was originally established in the early 1900s. Similar to other settlement houses of that era, their purpose was to offer “educational, industrial, social and friendly aid to all those within our reach” (Neighborhood Centers Inc., p. 8). This model is built upon the principle of mutual aid, using bi-directional learning and participation to increase adaptive capacity and agency. Furthermore, settlement houses engage in “small experiments” to provide a flexible response to unique challenges. Irvine and Kaplan (2014) lay out a methodology for the use of small experiments as a citizen-led approach to research that includes identifying specific goals, implementing programs, gathering feedback, and leveraging community participation. Kaplan (1996) recommends small experiments as “a powerful means

for sharpening our intuitions, overcoming indecision, and testing ideas without undue baggage” (p. 170). Although the term may be relatively new, small experiments have been continuously utilized by settlement houses to produce a flexible model of social adaptation.

Research has shown the settlement house model offers important benefits to the community. Yan’s (2004) extensive research demonstrates that settlement houses can provide a model for community building for the field of social work. Yan (2004) writes that settlement houses show positive effects in “building solidarity and generating capital in the local community,” offering “a sound and effective community-based third sector to rebuild communities in the global era” (p.52). Specifically, settlement houses can increase adaptive capacities through social learning and capitalizing on community strengths and relationships (Berkes & Ross, 2013). The settlement house model engages local resources, builds adaptive capacity, and increases agency. These features work together to provide a solid framework for building community resilience.

Neighborhood Centers

As the settlement house tradition moved into the modern era, many of the original settlement houses transitioned into NCs. For the most part, this transition occurred in name only, as the social and physical framework of the entities remained similar to previous models. Yan and Sin (2011) trace the roots of community development within NCs back to the settlement house movement. Building off the settlement house model, a comprehensive approach to community building is integral to NCs; however, Yan and Sin (2011) specified service delivery and community organizing as specific measures that had a positive impact in their study. In conclusion, Yan and Sin (2011) emphasize the inherent communal strengths of NCs:

Judging from the history of settlement houses and the findings of this study, we argue that these eight San Francisco NCs [neighborhood centers], inherited from the settlement house tradition, provide and create institutional, programmatic, and natural situations for the residents to belong and contribute to the community. (p.121)

This assessment was reaffirmed in another study by Yan and colleagues (2017), reiterating that NCs modeled after settlement houses show progress in developing community assets. Taken together, these studies are critical in drawing a connection between the older model of settlement houses and modern NCs. Furthermore, these studies clearly suggest that modern NCs carry on the settlement house legacy of contributing to community resilience.

Resilience Hubs

Currently, cities are beginning to look to a novel model for building community resilience: the resilience hub. As defined by the Urban Sustainability Directors Network (USDN), a resilience hub includes features that leverage mutual aid, particularly those focused on community coordination and resource distribution (Baja, 2018). The purpose of resilience hubs is to develop spaces that support neighborhoods and aid in the distribution of resources and services during a debilitating climate-related event (Baja, 2018). Resilience hubs are a unique community hub developed in response to climate change that integrate NCs into their framework. These hubs contain emergency preparedness resources, educational material for disaster response and sustainable living, and social networking opportunities. Resilience hubs form partnerships with local neighborhood centers to promote increased well-being as part of their resilience plan. They also incorporate settlement house concepts, such as mutual aid, participation, and social support. Faber and colleagues (2021) assert that the resilience hub model is critical for providing resources and increasing adaptive capacities in transitioning to a

new normal. As a result, resilience hubs offer communities physical and social resources to build community resilience to climate crises.

Current Study Aims

This study seeks to connect the NC model to increased community resilience in climate crises. In the process, this study will provide empirical support for the inclusion of NCs within climate action plans. As of yet, there is limited research on the link between NCs and climate resilience. This study seeks to fill this gap in research and provide a theoretical basis for building community climate resilience.

Background

In August of 2017, Hurricane Harvey hit the coast of the Gulf of Mexico as a Category 4 hurricane. Figure 1 displays the Federal Emergency Management Agency (FEMA) Disaster Declaration issued on August 25th, 2017 that allowed for Harris County, Texas to be eligible for individual and public assistance. Harris County experienced catastrophic flooding affecting 4.7 million residents and causing 36 deaths in the county (Harris County Flood Control District, 2018). As a result of this devastation, Hurricane Harvey earned a tie for first place with Hurricane Katrina as the costliest hurricane on record (National Hurricane Center, 2018).

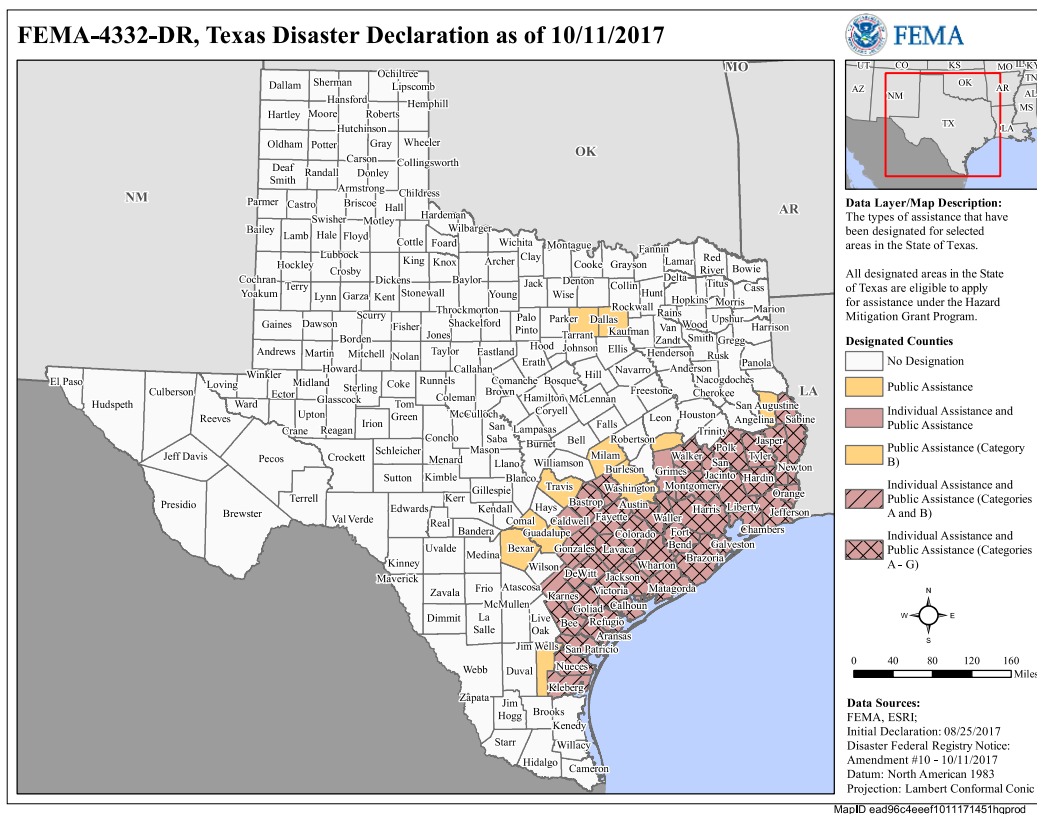
Predicted Outcomes

This study explores the role of NCs within Harris County on community resilience following one of the most extreme adverse climate events in recent history. Community outcomes on mental health and demographic indicators were measured in 2016, before Hurricane Harvey hit Texas. These outcomes were then assessed for 2017, the year that Hurricane Harvey made landfall. Mental health and demographic indicators were again measured in 2018, along with climate risk indicators. It was predicted that indicators measured before, during, and after

this event would result in outcomes that demonstrate the positive impact of NCs on community resilience to climate disasters. Specifically, it was hypothesized that census tracts with NCs would demonstrate better mental health outcomes than census tracts without NCs following Hurricane Harvey. It was further hypothesized that census tracts with NCs would demonstrate improved demographic outcomes following Hurricane Harvey than census tracts without NCs. Lastly, it was hypothesized that census tracts with NCs would demonstrate better climate risk outcomes than census tracts without NCs following Hurricane Harvey.

Figure 1

Texas FEMA Disaster Declaration after Hurricane Harvey by County



Note: Map of disaster declaration area following Hurricane Harvey for determination of public assistance. Reprinted from Federal Emergency Management Agency (2017). *FEMA-4332-DR, Texas Disaster Declaration as of 10/11/2017*. Map. https://gis.fema.gov/maps/dec_4332.pdf

Method

Data gleaned for this study was secondary data obtained from geographic information system (GIS) databases on the census tract level. As this study focused on secondary data, no IRB approval was required. Mental health data from the Behavioral Risk Factor Surveillance System (BRFSS) survey was gathered for 2016, 2017, and 2018 (Conduit Healthy Communities Institute, 2022). Demographic data from the American Community Survey (ACS) was gathered from Social Explorer for 2016, 2017, and 2018. Climate risk data was gathered from FEMA Risk Index for 2018 (FEMA, 2018). Neighborhoods with and without NCs were identified within Harris County, Texas, with a control group selected based on poverty markers. These data were analyzed to ascertain the effects of NCs before and after Hurricane Harvey hit in August of 2017. The variables measured focused on mental health, demographics, and climate risk indicators to explore the impact of NCs on community resilience.

Study Groups

First, five NCs within Harris County were identified. All these NCs self-identified as modern settlement houses, tracing their origin back to the original Houston settlement house established in 1907. To attain a control group, the demographic vulnerability of the NC population was measured according to poverty level. Poverty level is listed as a social vulnerability indicator by the District Social Vulnerability Index (DSVI) (Dintwa & Navaneetham 2019). To ensure similar social vulnerability between study group and control group, we chose census tracts with similar poverty markers for the control group. First, we identified the number of families living at or below 200% of the poverty ratio within all Harris County census tracts (Income Below Poverty Ratio, 2012-2016). Next, we identified the min and max poverty measurements of the study group (census tracts with NCs). We used this min and

max poverty range to identify tracts in Harris County with similar poverty measures. After excluding the five tracts with NCs, all census tracts within Harris County that fell within the min and max poverty range measurements were retained. These remaining census tracts, with no NCs but with similar poverty measures, were selected as the control group.

Participants

After accounting for census tracts that lacked sufficient data, the number of participating census tracts included the following:

2016

Study group n = 5

Control group n = 385

2017

Study group n = 5

Control group n = 387

2018

Study group n = 5

Control group n = 388

Hypothesis 1: Mental Health Indicators

This study hypothesized that census tracts with NCs would demonstrate better mental health outcomes than census tracts without NCs following Hurricane Harvey in 2017. Behavioral Risk Factor Surveillance System (BRFSS) data were used to compare mental health data. BRFSS is an annually conducted telephone survey on health behaviors, conditions, and preventative services (Centers for Disease Control and Prevention, 2022). The results of this survey are compiled to provide community mental health data on a census tract level. This study assessed

whether the percentage of the population experiencing poor mental health days (i.e. 14 or more such days per month) increased following Hurricane Harvey at a greater rate in census tracts without NCs compared with census tracts with NCs. These measures were taken for the years 2016, 2017, and 2018 and analyzed for statistical significance using the Mann-Whitney U Test in the statistical program, R. The Mann-Whitney U Test (also known as the Wilcoxon Test) is a non-parametric, rank-sum test that can be used in smaller sample sizes that lack normal distributions.

Hypothesis 2: Demographic Indicators

This study hypothesized that census tracts with NCs would demonstrate better outcomes on the specific variables outlined below than census tracts without NCs following Hurricane Harvey. The American Community Survey (ACS) was used to compare demographic variables. The ACS survey is conducted yearly by the federal census bureau to help determine the distribution of federal and state funding (United States Census Bureau, n.d.). These data are gathered and analyzed on a census tract level to assess various demographic features. Education, unemployment, length of residency, income and poverty level outcomes were all measured to assess the impact of Hurricane Harvey on the local community on a census tract level. Continuity in education, employment, residency, and income levels were hypothesized to demonstrate community resilience. Variables measured included school enrollment for the population 3 years and over, unemployment rate for civilian population in labor force 16 years and over, median household income (in inflation adjusted dollars), and year householder moved into unit (renter occupied housing units), and poverty status of family type by presence of children under 18 years. These measurements were taken for the years 2016, 2017, and 2018. NC study group census tracts were then compared to the control group using the Mann-Whitney U Test in the statistical program, R.

Hypothesis 3: Climate Risk Indicators

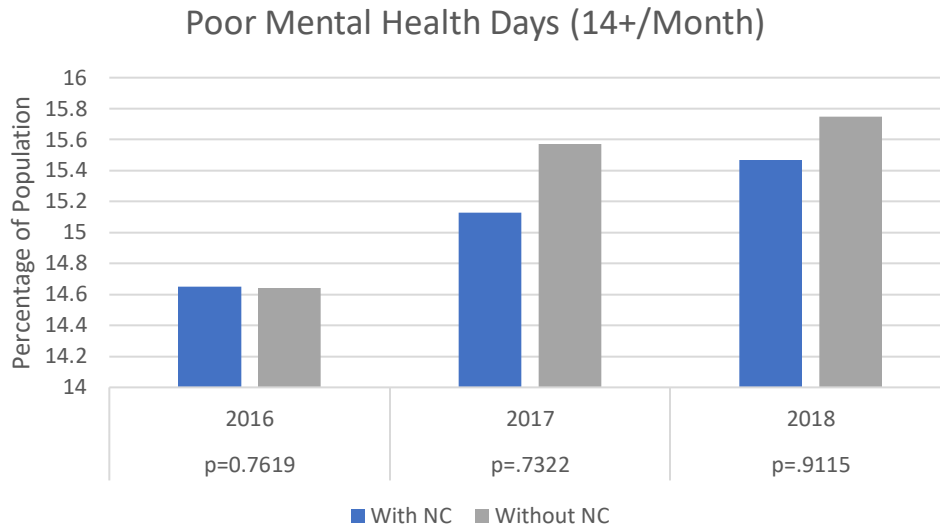
This study hypothesized that census tracts with NCs would score better on climate risk index measures than census tracts without NCs after Hurricane Harvey. The Risk Index is a new geographic information system (GIS) tool developed by FEMA for assessing climate related community risks. This online data mapping system provides detailed metrics on natural hazard risks, social vulnerability, and community resilience on a census tract level. As this is a new tool, data was only available for the year 2018. FEMA variables measured in this study included risk index, social vulnerability, community resilience, and hurricane risk. These were taken in 2018 for census tracts with NCs (study group) and census tracts without NCs (control group) in Harris County. These variables were then analyzed using the Mann-Whitney U Test in the statistical program, R.

Results

The following variables were analyzed for significance at $p < .05$ using the Mann-Whitney U-Test (or Wilcox Test) in the statistical program, R.

H1: Mental Health Outcomes

In this study, it was hypothesized that the population within census tracts with neighborhood centers (NCs) would experience a lower percentage of poor mental health days (14 or more such days per month) than census tracts without NCs. It was predicted that this trend would be evident both before and after Hurricane Harvey.

Figure 2*Rate of Poor Mental Health Days per Month by NC Status*

As shown in Figure 2, rates of the population experiencing poor mental health days (14 or more such days per month) were nearly identical in 2016, prior to Hurricane Harvey. After Hurricane Harvey made landfall in 2017, however, census tracts with NCs showed lower rates of poor mental health days than those census tracts without NCs for the years 2017 and 2018. Although the trend in the data supports the hypothesis in this study, the difference did not achieve statistical significance at $p < 0.05$.

H2: Demographic Outcomes

This study hypothesized that census tracts with NCs would measure better on demographic markers of resilience following Hurricane Harvey than those census tracts without NCs. As resilience is identified as the ability to successfully adapt to change (Ahern et al., 2006), we chose to measure demographic markers that would be most vulnerable to change. These

variables are shown in Figure 3 and include school enrollment, employment status, length of residency, household income, and poverty status. Specifically, this study hypothesized that census tracts with NCs would show greater school enrollment, less unemployment, greater median household income, longer residency, and less income below poverty level after Hurricane Harvey than tracts without NCs.

Figure 3

Demographic Variables by NC Status

American Community Survey Demographic Outcomes	2016		2017		2018	
	With NC	Without NC	With NC	Without NC	With NC	Without NC
School Enrollment Age 3+: Not Enrolled in School	70.20%	69.60%	70.90%	69.90%	69.70%	69.90%
Unemployment Rate	7.2%	9.3%	5.40%	8%	6%	8%
Median Household Income	\$37,141	\$40,310	\$39,460	\$42,159	\$39,663	\$43,810
Population with Length of Residence Less Than Two Years	11.50%	6.80%	18.30%	21.20%	11.90%	10.10%
Income Below Poverty Level	25.60%	21.40%	24.60%	20.40%	24.10%	19.80%

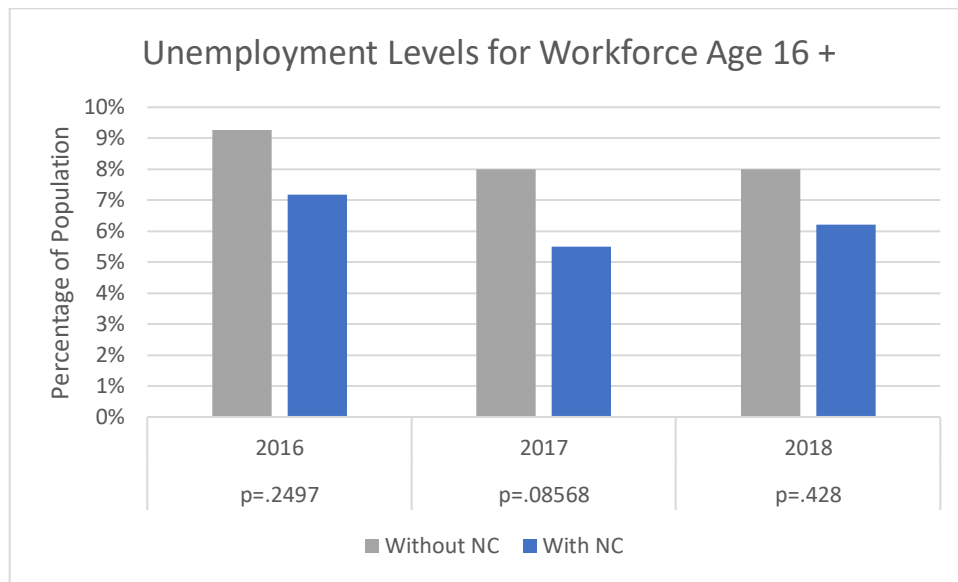
Note: The variable, “population with length of residence less than two years,” was measured using American Community Survey variable, “year householder moved into unit” (2012-2018).

There were some notable trends in demographic outcomes, although none of the variables measured achieved statistical significance at $p < .05$. Overall, unemployment rates suggest NCs have a positive impact on unemployment rates regardless of climate events. As shown in Figure 4, the unemployment rates of census tracts with NCs were lower than tracts without NCs for

each year measured, both before and after Hurricane Harvey. Notably, unemployment rates in census tracts with NCs were only 5.5% in the population of labor force age 16 years and older in 2017. Conversely, the mean value of unemployment rates in the census tracts without NCs equaled 8% in the population of labor force age 16 years and older in 2017. This trend suggests that the presence of NCs may have an influence on unemployment levels and is worth exploring in future work. On the other hand, the control group scored better on median household income and income below poverty level for each year measured.

Figure 4

Unemployment Rates by NC status



Note: Level of statistical significance was set at at $p < .05$.

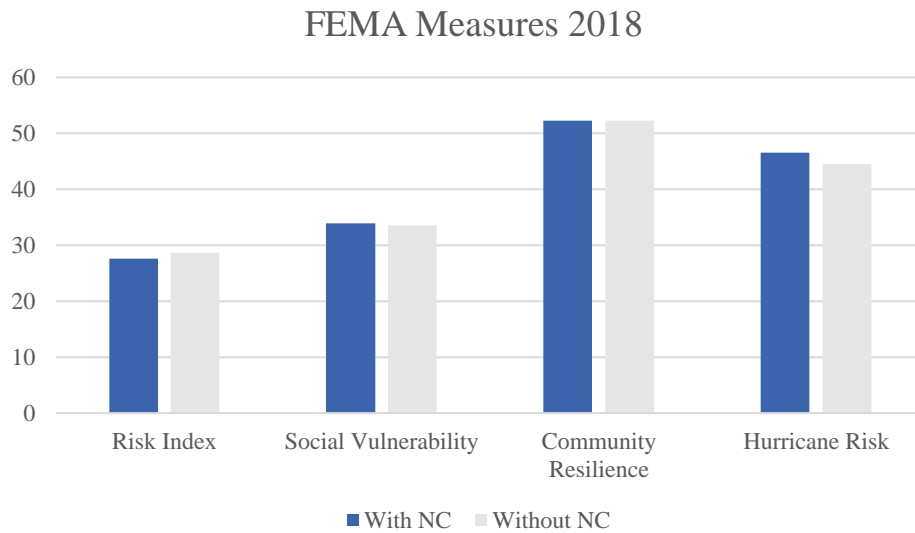
H3: Climate Risk Indicators

This study further hypothesized that census tracts with NCs would measure lower on risk index and social vulnerability measures than those without NCs. On the other hand, it was hypothesized that measures on community resilience would be higher for census tracts with NCs than those without. This study hypothesized that hurricane risk would measure similarly for all

tracts, as hurricane risk is calculated based on building and population exposure to hurricanes (FEMA, 2018). The results of our analysis, displayed in Figure 5, showed that tracts with NCs scored slightly lower on the overall risk index indicator than tracts without NCs, despite having slightly elevated social vulnerability and hurricane risk levels. However, this difference did not reach a level of statistical significance.

Figure 5

FEMA Variables by NC Status



Note: Community resilience measured the same across all Harris County census tracts, regardless of NC status.

Discussion

The results of this study encourage further exploration of these research questions. Despite a lack of strong statistical significance, this study makes several recommendations that are noted in itemized conclusions, shown below. There is reason to expect that NCs may in fact influence community mental health. Furthermore, the results of this study suggest that NCs also

influence unemployment levels. It would be worth pursuing more targeted studies to explore the nature of these relationships.

Key Study Findings

- The presence of NCs has a positive influence on community mental health.
- Communities with NCs show improved unemployment rates.
- The settlement house/NC model provides a useful framework for enhancing climate emergency responses.
- Additional factors were identified that need to be explored to determine their contribution to enhancing community resilience.
- Non-GIS, targeted analysis should be included in future studies.

Overall, this study focused on mental health, demographic, and climate risk variables to measure community resilience. However, other factors contribute to resilience that were not measured in this study. Notably, Magis (2010) points out other elements of community resilience, such as collective action. The NCs in this study engaged in proactive social responses to Hurricane Harvey that are not reflected in the data collected. For example, these NCs created Neighborhood Restoration Centers in nearby census tracts that were judged to be most vulnerable (BakerRipley Community Developers, n.d.). These NCs also instituted Disaster Recovery Services that provided individualized financial aid, resources, and home repair after Hurricane Harvey (BakerRipley). Additionally, the NCs developed a Humanitarian Action Plan to prepare for future crises and address their impact on vulnerable immigrant communities within the Houston region (Humanitarian Action Plan, 2019). These were flexible responses that addressed unique situations, filling the gap when government aid was delayed or non-existent.

Notably, these services were available to all Houston residents, not just the census tracts that were the focus of this study. These social actions stand as an example of the community enacting agency, a key feature of resilience. Future studies would benefit from including measures of social action within their analysis of community resilience.

In light of the nuance surrounding this topic, different research methods may prove more suitable for exploring the impact of NCs on community resilience. While GIS data is not necessarily new, there is still a lot of room for growth in mapping socially relevant data. This study demonstrates the difficulties faced in completing a targeted analysis using GIS data. A census tract level may be too broad of a unit of analysis to get an accurate measure on the effects of neighborhood centers, yet that is the smallest level of analysis available with these tools. Furthermore, while census level data was available for each measure, it was often lacking in sufficiency. It was noted in the BRFSS study that demographic averages were sometimes included when BRFSS data was insufficient (Conduent Healthy Communities Institute, 2022). Furthermore, public data access on a census tract level is generally limited for mental health indicators. Additionally, ACS data for each year is a compilation of the previous five years (Centers for Disease Control and Prevention, n.d.). On another note, the FEMA Risk Index is a new tool and has only been available for one year. The FEMA Risk Index also lacks specificity; for example, all of Harris County census tracts received identical scores for Community Resilience. However, it has great potential for aiding community resilience building efforts and potential climate crises responses. Overall, it is recommended that a more targeted survey and qualitative studies be carried out to ensure measurement validity.

There are additional factors that could contribute to a lack of support for our hypotheses. Perhaps more residents in neighborhoods without NCs were more likely to relocate after

Hurricane Harvey and never return to their original neighborhood. Another factor could be that government aid could have been prioritized for communities that did not have access to a NC. This influx of aid to neighboring areas also may have balanced the measurement outcomes within communities with or without NCs after the hurricane hit.

Ultimately, the settlement house model remains a central focus of research for increasing community resilience to adverse climate events. Despite the fact that this study does not provide statistically significant evidence against our original hypothesis, the settlement house model nonetheless is a time-tested approach in other realms of adaptation. This model has significant strengths: small experiments can be included within this framework to flexibly address a variety of challenges, and enhancing mutual aid efforts engages meaningful participation. The settlement house model also includes key features for building resilience. Settlement houses leverage resources, build adaptive capacity, and increase agency in the face of uncertainty and change.

Recommendations and Future Directions

We encourage further research on the impact of NCs on community resilience following climate crises. As a prospective study, it is worth noting that this is a new and rapidly evolving field. The dire consequences of the climate emergency will have lasting ramifications on our communities, and any work towards building climate resilience should be a priority. This study provides a theoretical framework for including the settlement house model into climate action plans to build community resilience. However, it is critical that research in this field moves beyond theory, given the urgent nature of the climate emergency. Including settlement houses within climate action plans now could provide an opportunity for more targeted research on the impact of NCs on climate resilience, while also providing previously proven benefits of this model.

Furthermore, we recommend that future studies explore other factors that influence resilience using alternative research methods. Careful assessment of social action, in addition to psychological well-being and community resources, is essential to accurately ascertain the level of community resilience. Many of these adaptations have not been adequately captured through statistical data. Future studies on measuring this impact could use qualitative methods with NC staff and members. Another option is the use of targeted surveys to understand the true relationship and significance of community mental health and NC status.

Finally, communities can explore using small experiments to uncouple social support and adaptation from physical locations. The NCs in this study succeeded in providing social support outside of the original NC locations using pop-up centers. These Neighborhood Restoration Centers provided flexible, targeted aid beyond traditional locations. The Neighborhood Restoration Centers allowed for network-based services to operate where the community needed aid most, beyond the physical limitations of brick-and-mortar facilities. This allowed for targeted responses to the most vulnerable areas during climate crises and could provide another model for inclusion in climate action plans.

Conclusion

Social adaptation and community resilience are critical features of climate action plans. Not only are climate crises an opportunity for restoration, but communities can leverage these events as opportunities for transformation. These periods of transition can be utilized to implement new and lasting changes towards a more sustainable future. The settlement house model is a potential social adaptation mechanism that can be incorporated into climate action plans. This model leverages local assets, meaningful participation, and small experiments to produce flexible and sustainable responses to challenges. As we further explore this critical field

of community resilience, climate resilience must remain central. Together, we can build resilient and sustainable communities as we transition to a new normal.

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