THE GREAT EQUALIZER? AN ANALYSIS OF THE RELATIONSHIP BETWEEN RACE, SEVERE WEATHER DISASTERS, AND CLIMATE CHANGE POLICY SUPPORT

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Climate disasters are on the rise, with devastating effects on communities around the globe. Scientists have provided evidence that severe weather events due to climate change will continue to increase in frequency and severity. Extreme weather events are often referred to as the great equalizers, disregarding the socioeconomic status and race of those affected during widespread destruction. However, the literature suggests that people of color are disproportionately exposed to and affected by climate change and extreme weather events. In this study, I examine how exposure to extreme weather events will influence climate change policy support amongst different races. I argue that people of color will support climate change policy more than white people. I run regression models using data from Collaborative Multiracial Post-Election Survey and National Centers for Environmental Information. I do not find support for my hypothesis, but I do find that among the Black population, climate change policy support increases as respondents get older.

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CHAPTER 1

INTRODUCTION

Climate disasters are on the rise, with devastating effects on communities around the globe. Scientists have provided evidence that severe weather events due to climate change will continue to increase in frequency and severity. Additionally, the United States has a long history of unequal treatment of minority populations that still has ramifications today. Extreme weather events are often referred to as the great equalizers, disregarding the socioeconomic status and race of those affected during widespread destruction. However, the literature suggests that people of color are disproportionately exposed to and affected by climate change and extreme weather events (Fothergill and Peek 2004; Donner and Rodriguez 2008; Shonkoff 2011). This is partially due to a significant makeup of people of color in urban areas and along coastal regions. There are many other contributing factors that influence people's ability to recover after a severe weather event that influences the risk perception of climate change. Experiencing negative climate-change-related events can increase risk perceptions and influence climate change opinion (Wong-Parodi and Garfin 2021). For my research, I look at how race and exposure to extreme weather events influences climate change opinion. Previous studies identify direct experience as a major influence on risk perception, learning and action (Ballew et al. 2019; Wong-Parodi and Garfin 2021; Van der Linden 2014). Will people of color feel strongly about climate change policy to combat climate change because they are disproportionately impacted by severe weather events? The literature suggests that because people of color have multiple disadvantages after a severe weather disaster compared to white people that this may be true. For decades, researchers have studied climate change opinion among different demographic factors. Scholars and politicians have believed that political ideology was a main factor influencing climate change

beliefs but a growing literature in climate change disparities may prove otherwise (Latkin 2021). My work attempts to fill an important gap in the existing literature on the link between extreme weather, race, and climate change perceptions. The minority population, which experiences significant socio-economic disadvantages, is one of the fastest growing populations in the United States (Thomas et al. 2018; Ojerio et al. 2011). Extreme weather events will continue to escalate and knowing what factors influence climate change opinion and action is an important topic that must be discussed in order to combat climate change.

CHAPTER 2

LITERATURE REVIEW

Climate Change

Climate change refers to the long-term shift in temperatures and weather patterns. While a changing global climate is not a new phenomenon and can have natural causes, the earth's climate is changing rapidly compared to the pace of natural variations in climate that have occurred throughout Earth's history. Since the 1800s, human activities have been the main driver of climate change. 97% of climate scientist agree that the burning of fossil fuels like coal, oil and gas have been the primary factors contributing to anthropogenic climate change (United Nations 2023, Smith et al. 2022). Global average temperature has increased by about 1.8°F from 1901 to 2016, and observational evidence does not support any credible natural explanations for this amount of warming; instead, the evidence consistently points to human activities (U.S. Global Change Research Program 2018). Long-term changes in climate can directly or indirectly affect many aspects of society in potentially disruptive ways. For example, warmer average temperatures could threaten the extinction of some species, affect the production of crops, spread diseases, increase poverty and displacement along with many other negative effects (United States Environmental Protection Agency 2023). More extreme variations in weather are also a threat to society that people are experiencing today. While increased precipitation can replenish water supplies and support agriculture, intense storms can damage property, cause loss of life and population displacement, and temporarily disrupt essential services such as transportation, telecommunications, energy, and water supplies (United States Environmental Protection Agency 2023). The United States government has implemented policy to combat climate change. The U.S. Department of Defense is elevating climate change as a national security priority,

integrating climate considerations into policies, strategies, and partner engagements (U.S. Department of Defense 2023). However, climate change needs to be addressed by substantial human action at a global scale. If countries do not prioritize mitigating climate change, the United Nations estimates that global temperatures will increase an average of seven degrees Fahrenheit by 2100 (Elliott 2020). In my research I will focus on one of the main negative effects of climate change which are severe weather events. Due to climate change, some extreme events have already become more frequent, intense, widespread, or of longer duration, and many are expected to continue to increase or worsen, presenting substantial challenges for people all over the world (U.S. Global Change Research Program. 2018).

Extreme Weather Events

Climate change continues to expose more of the global population to more frequent severe and extreme weather events. "Extreme weather events" is a catch-all-term for a variety of very different weather phenomena, some of which are easier to attribute to climate change than others. Extreme events are occurrences of unusually severe weather or climate conditions that can cause devastating impacts on communities and agricultural and natural ecosystems. Weather-related extreme events are often short-lived and include heat waves, freezes, heavy downpours, tornadoes, tropical cyclones, and floods (U.S. Department of Agriculture 2023). Climate-related extreme events either persist longer than weather events or emerge from the accumulation of weather or climate events that persist over a longer period (U.S. Department of Agriculture 2023). Examples include drought resulting from long periods of below-normal precipitation or wildfire outbreaks when a prolonged dry, warm period follows an abnormally wet and productive growing season (U.S. Department of Agriculture 2023). Severe weather events like hurricanes, typhoons, tsunamis, droughts, and wildfires have increased by an estimated 46%

between 2000 and 2017 (Versey 2021). CarbonBrief (2023) found that over the past 20 years, the extreme weather literature is heavily dominated by studies of extreme heat, rainfall or flooding, and drought. Americans are noticing climate changes all around them. The increase of global temperatures will raise the level of the world's seas by more than 3 feet, causing flooding in two-thirds of the world's major cities. Sea-level rise is widely recognized as one of the most likely and socially disruptive consequences of future climate change (Hauer 2016). Nearly 40% of the U.S. population lives on the coast (National Ocean Service 2023). Increasing population, particularly in coastal regions, has resulted in coastal development, which results in the elimination or destruction of buffer zones, like trees and dunes (Donner and Rodriguez 2008). Federal Emergency Management Agency (FEMA) estimates that 40 million people are now at risk for catastrophic inland flooding. Inland cities near large rivers also experience more flooding, especially in the Midwest and Northeast. Insurance rates are rising in some vulnerable locations, and insurance is no longer available in others (U.S. Global Change Research Program).

Hurricanes affect millions of people who live along the Atlantic and Gulf of Mexico coasts each year (Donner and Rodriguez 2008). Parts of the Southwest United States and the Pacific Coast can also experience severe weather associated with hurricanes, which include tornadoes, floods, and heavy winds. While hurricanes are a natural part of the climate system, the intensity and frequency has begun to increase.

A warmer atmosphere holds more moisture. This moisture eventually falls as precipitation, either as rain or snow. Blizzards are more likely to occur and be more severe in places where temperatures are still cold. Winter storms are also more likely to occur (National Geographic 2022). A winter storm is generally considered less severe than a blizzard due to the

lack of high winds and visibility, but they are still dangerous, especially when driving or walking on slick surfaces (National Geographic 2022).

The U.S. Environmental Protection Agency defines a heat wave as a period of 4 days with an average temperature greater than a location-specific threshold that is expected to happen every 10 years (United States Environmental Protection Agency 2023b). In the United States, the Centers for Disease Control (2017) estimates that more than 600 people are killed by extreme heat each year. Though this may not seem a large number, heat accounted for almost as many deaths as flooding and hurricanes combined and was the single largest cause of weather-related fatalities between 1986 and 2017 (Centers for Disease Control 2017). The impact of heat waves is often greater in cities, where dense urbanization often replaces vegetation and natural soil with hardscape, referred to as an “Urban Heat Island”. Prolonged extreme heat waves are closely related to air pollution which can lead to respiratory issues. Prolonged exposure to excessive heat can also increase the risk of wildfires (United States Environmental Protection Agency 2023b).

Although wildfires are not an actual weather phenomenon, wildfires are directly related to weather. Climate change affects wildfires by creating hot dry conditions that fuel fires. Hotter and drier weather and earlier snowmelt mean that wildfires in the West start earlier in the spring, last later into the fall, and burn more acreage (U.S. Global Change Research Program 2014).

Drought is a serious environmental threat across the United States. A drought is a period of drier-than-normal conditions that results in water-related problems (USGS 2023). When little or no rain falls, soils can dry out and plants can die. When rainfall is less than normal for several weeks, months, or years, the flow of streams and rivers declines, water levels in lakes and reservoirs fall, and the depth to water in wells increases. If dry weather persists and water-supply problems develop, the dry period can become a drought (USGS 2023). Climate change

exacerbates droughts by making them more frequent, longer, and more severe.

The climate change literature uses extreme weather events and extreme weather disasters interchangeably at times. A discipline's definition of extreme weather events may vary by characteristics (McPhillips et al. 2018). What would be considered a disaster can be based on a threshold that depends on the event type, system thresholds, geographical, social context, researcher goals, and other factors. Broadly, we understand that weather disasters are events that generate impacts on our social, ecological, and/or technical systems (McPhillips et al. 2018). Hallegatte (2014) argues that a severe weather disaster is not a natural event, it is the combination of a natural hazard and the exposure and vulnerability of a human system. The behavioralist paradigm suggests that natural disasters are a failure of planning response and rationality. Disasters can occur due to a lack of planning and foresight from actors in the public and private sphere. There are deep seated structures in society that explain who and what is vulnerable to extreme weather events. Human decisions create vulnerability to severe weather events that create disasters to humans (Black et al. 2013). Risk associated with extreme weather events is often presented as the product of three factors: "(1) the hazard, which is the natural event; (2) the exposure, which is the population and assets potentially affected by hazards; and (3) the sensitivity, i.e. the human and economic losses if population and assets are affected by a hazard. If no one or nothing is affected by the event, there is no disaster" (Hallegatte 2014, 5). While the number of deaths has not been increasing, there have been observed increases in monetary damages and the total number of people affected (McPhillips et al. 2018). The increase in monetary damage and people affected is due to a combination of increased exposure, vulnerability, and the fact that climate change is increasing the frequency of some types of extremes that lead to billion-dollar disasters (Smith 2023). This increase in disasters can be

partly explained by the expansion of cities and suburban areas into hazard-prone zones, and the subsequent increased exposure of people and infrastructure (Chang and Franczyk 2008). Recent polling in Fall 2021 found that approximately half (46%) of Americans reported first-hand experiences with extreme weather within the past 12 months and that two-thirds (67%) believed that extreme weather events were happening more often than in the past (Zanocco et al. 2022).

Climate Change Vulnerabilities

Social Vulnerability

Extreme weather events impact people in many different ways. Extreme weather events have often been overlooked as a site of social stratification because they were viewed as indiscriminate “acts of God” that affected communities randomly (Fothergill and Peek 2004). In fact, due to this notion of randomness, disasters were believed to be “status levelers” or events that democratized the social structure (Fothergill and Peek 2004). While a disaster does indeed threaten everything in its path, and for a brief period there is a loss of “culturally derived discriminations and social distinctions”, disasters do not affect all members of society equally (Fothergill and Peek 2004; Donner and Rodriguez 2008). Climate change threatens to exacerbate existing social and economic inequalities that result in higher exposure and sensitivity to extreme weather and climate-related events and other changes (U.S. Global Change Research Program. 2018). Marginalized groups have greater sensitivity and less resilience to disasters (Shepherd and KC 2015). The climate change literature commonly uses the term "climate gap", which refers to the disproportionate and unequal implications that climate change and climate change mitigation hold for people of color and the poor (Shonkoff 2011). People of color are those identifying as Black, Hispanic/Latino, Asian, Native American, Pacific Islander, or multiracial. There is a variation in experience within these categories and the omission of important groups

experiencing discrimination like Middle Easterners who are often categorized as White (Berberian et al. 2022).

Although everyone is vulnerable to the possible health impacts associated with extreme weather, some populations may be more vulnerable than others. Some social groups experience greater loss of resources and greater impacts to livelihoods and cultural identity than others. This differential vulnerability to comparable levels of physical change is primarily a function of social rather than just physical factors (Thomas et al. 2018). Social vulnerability to climate change is determined by a community's ability to anticipate, cope with, resist, and recover from the impact of major weather events (Shonkoff 2011). Social vulnerability is the product of social stratification and inequalities, it is not only a function of the demographics of the population but also complex constructs such as health care, social capital, and access to lifelines including emergency response (Finch et al. 2010). Social vulnerability frames disasters and their impacts within broader social contexts and processes (Finch et al 2010). The literature suggests that socially vulnerable populations are more likely to suffer negative impacts, including property loss, physical harm, and psychological distress (Donner and Rodriguez 2008). It is also harder for them to mitigate disaster risks. Climate change is an issue of human rights, public health, and socioeconomic equity because of its diverse consequences and its disproportionate impact on vulnerable and socially marginalized populations. The concept of "social vulnerability" suggests that there are social factors that affect the ability of individuals and communities to plan for, respond to, and recover from extreme weather events. Climate change does not occur in isolation. Rather, it is superimposed on other stresses, which combine to create new challenges. The underlying factors that contribute to social vulnerability to extreme weather events are similar to those that produce other social inequities like lack of access to resources, information,

political power, and limited social capital (Ojerio et al. 2011). In America, these issues are usually associated with a person's age, gender, low economic status, and race (Fothergill and Peek 2004, 90).

Race and Disaster

The literature discusses many extreme weather events that have exposed the United States' systemic vulnerabilities and constraints in launching large-scale, coordinated, equitable, and effective responses to external shocks, resulting in severe disruptions and prolonged crises. Existing challenges, chronic underfunding, subsequent short-sightedness, and ineffective government coordination exacerbated by partisan politics and lack of consistent federal leadership have hobbled state and local governments' ability to effectively respond (Shi and Moser 2021). Racial, ethnic, and economic forms of segregation have played a crucial role in establishing the life constraints and environmental exposures of minorities and individuals of lower socioeconomic status in America. (Linscott et al. 2021). Climate change functions as a dual chronic stressor for vulnerable communities. The first threat is the actual climate induced event. The second concern is the recovery phase, because in some areas there are fewer local and state-level protections or response systems that help with adaptation and prevent displacement (Versey 2021).

It is important to note the different stages of severe weather events. Each stage is critical to how people can effectively handle the event. The different stages of the disaster include: risk perception; preparedness behavior; warning communication and response; physical impacts; psychological impacts; emergency response; recovery; and reconstruction. (Fothergill and Peek 2004). Dissecting each stage's impact on individuals can explain how there are disproportionate impacts on different groups of people. Risk perception is how people view the risks and threats

of disasters (Fothergill and Peek 2004). Preparedness is the stage of a disaster involving all pre-event preparation activities and mitigation efforts in advance of a specific warning (Fothergill and Peek 2004). For example, preparedness behavior includes stocking emergency supplies, mapping evacuation paths, response training, practice drills and disaster educational efforts. The warning communication and response stage entails receiving warnings, such as emergency broadcasts and sirens, or other risk communication of an immediate danger, and taking some type of action in response to this warning, such as evacuation (Fothergill and Peek 2004). The physical impact stage is concerned with the actual and immediate effects of the disaster striking a community (Fothergill and Peek 2004). Physical impacts include mortality, morbidity and injury rates, as well as economic losses (Fothergill and Peek 2004). Psychological impacts involve the emotional stress, trauma and other psychological impacts of a disaster event (Fothergill and Peek 2004). The emergency response stage of a disaster is the post-impact period. It is the immediate aftermath of a disaster, the first hours, days, sometimes up to one week, depending on the event and surrounding circumstances (Fothergill and Peek 2004). The recovery stage is considered the one-year period following a disaster. It is usually characterized as a time of returning to 'normality' and of rebuilding, allocating resources, finding housing and repairing lifelines in a community (Fothergill and Peek 2004). The reconstruction phase follows recovery, thus extending from approximately the first year after the event to several years later. Reconstruction surrounds a community's long-term restoration, including rebuilding, replacing infrastructure, obtaining loans and assistance, and locating permanent housing (Fothergill and Peek 2004). Every part of a disaster, including vulnerabilities, preparedness, response, and rebuilding is to some extent a social calculus. It follows that the question of who fully recovers is also embedded in human decisions that prioritize some lives over others (Mendez et al. 2020). Research has

shown that these stages can look different for people based on social inequities (Fothergill and Peek 2004).

Before severe weather events take place, it is important to discuss what factors have led to certain populations being more vulnerable to severe weather events. Race is a human-invented, shorthand term used to categorize people into various social groups based on characteristics like skin color, physical features, and genetic history (Nogueira 2022). Race is a social construction that gives or denies benefits and privileges (Nogueira 2022). From the inception of American society, racism has been deeply ingrained in its fabric. Black people were forcibly brought to America as slaves and were denied rights for most of American history. The fight for Black civil rights was arduous. The U.S. government forcefully took Native Americans land. They have claimed back some of their land but many live in poor conditions and are still fighting to protect their land. Discrimination against Hispanics began with the English war with Spain. Once America was founded, they soon began taking land from Mexico and the discrimination against them increased. A growing resentment against Hispanics due to their growing minority and non-English dialect has been prevalent in today's society. American white nativists in the late 19th century spread xenophobic propaganda about Chinese people that led to the creation of the Chinese exclusion act. Japanese and Filipinos were also discriminated against in immigration policies and society due to wars at the time. Most of the discrimination began because white nativist believed minorities were an underclass and a threat to white superiority. Racism in America isn't as blatantly obvious as it once was. Racism is not always conscious, explicit, or readily visible but it is often systemic and structural. Systemic and structural racism are forms of racism that are pervasively and deeply embedded in systems, laws, written or unwritten policies, and practices that produce unfair treatment and oppression of people of color.

Racism is embedded in the economic system as well as in the cultural and societal norms (Nogueira 2022). "The scars and stains of racism are still deeply embedded in the American society" (Bowden 2018).

Discovering and discussing the reasons for people's vulnerability to disasters is essential to understanding why extreme weather events become extreme weather disasters. The literature discusses home ownership, residential segregation, lending practices and other housing policies factors as reasons for people of color being vulnerable to extreme weather events (Nogueira 2022; Li and Yuan 2022; Swope et al. 2022). The racist housing practices and their ramifications are still apparent today and are considered structural and systemic racism (Mendez 2020; Nogueira 2022). The literature has found a connection to racist housing policies and areas most vulnerable to severe weather disasters (Craig et al. 2021; Grindal et al. 2023). Some geographical areas have increased exposure to climate hazards. Through policy decisions such as redlining, structural racism plays a central role in perpetuating the adverse health effects of climate change on populations targeted for marginalization. (Nogueira 2022, 526). Following the Great Depression in the 1930s, the federal government created the Home Owners' Loan Corporation (HOLC) as part of the New Deal. The purpose of the HOLC was to rescue home owners defaulting on their mortgages across the United States. To support this task, the HOLC created security maps, standardized appraisal tools for over 200 cities. Security maps assigned investment risk to entire neighborhoods based on a variety of factors, including prior home values, presence of industry, and racial demographics. Each neighborhood was shaded one of four colors, red was categorized as hazardous (Nardone et al. 2021). Redlining is racial discrimination. Residents of color were more likely to be locked into undesirable areas with deteriorating structures and higher residential density (Li and Yuan 2022). Redlining deepened

neighborhood racial residential segregation, and people of color were disproportionately shut out from favorable loan terms and new housing developments, contributing to long-term disinvestment in their neighborhoods (Swope et al. 2022). Even though redlining is now outlawed, it is associated with present day levels of racial segregation, poverty, and income inequality. Historically redlined neighborhoods have been found to be disproportionately exposed to urban heat and flooding. Mostly Black and Hispanic populations make up these areas. As a result, some of the communities most vulnerable to the impacts of climate change are predominantly Black and/or Hispanic populations (Craig et al. 2021).

Black Americans are currently 40% more likely to live in areas predicted to experience deadly increases in extreme temperature (Grindal et al. 2023). Research on the urban heat island indicates that heat exposure in cities places lower income Black and Hispanic residents at higher risk for death and strokes (Shepherd and KC 2015). Residents of flood-prone areas face elevated risks because of sea levels and frequent tropical storms. 20% of coastal counties from Virginia to Texas are composed of Black people (Shephard and KC 2015). Hurricane Katrina in 2005 solidified the relevance between environmental justice concerns and climate change by exposing preexisting injustice in New Orleans. It showed how communities of color were disproportionately unprepared and vulnerable to the storm due to racial segregation, poverty and poor housing (Mendez 2020, 13). Hurricane Katrina also demonstrated how these communities received less government support for recovery and were subject to continued form of discrimination in recovery efforts. Due to historical forces resettlement and discriminatory policies, Native Americans disproportionately live in areas most vulnerable to climate change impacts such as extreme temperature, droughts and fires (Mendez 2020). Because it is difficult for many people to own homes and acquire loans, people have resorted to purchasing mobile

homes. Because mobile homes are financed as personal property rather than real estate, they are attainable through a different set of loan products that may be more accessible than conventional mortgage products (Rumbach 2020). Latinos and American Indians make up a significant share of manufactured home park residents (Rumbach 2020). These areas typically have higher flood exposure and restricted post disaster recovery options. These findings advance the literature on disaster risk by showing how the geographical locations and housing types are treated differently by government policies and regulations in ways that can increase hazard exposure and complicate long-term recovery after disasters (Rumbach 2020).

Extreme weather events can pose a significant risk to human health and well-being. In America, structural racism exacerbates these risks for some populations more than others. Extreme weather events can disrupt the physical and social infrastructure people and communities rely on to stay safe and healthy which can worsen current health inequities in some communities. A health inequity is a particular type of health difference that adversely affects groups of people who have systematically experienced significant obstacles to health based on characteristics historically linked to discrimination or exclusion (Nogueira 2022, 527). Minorities are believed to bear a disproportionate health burden of extreme weather events as a result of lack of access to institutions necessary for health. wellness, and predisposing medical conditions (Shepherd and KC 2015). This increases susceptibility to the physical dangers extreme weather events present. This is reflected by differentials in death and injury rates. Red Cross fatality counts have historically shown that disaster-connected deaths are higher among minorities. In 2020, Black, Hispanic, and Asian Americans had a higher prevalence of diabetes than their white counterparts. Having diabetes can impact how the body responds to conditions associated with climate change. For example, a Puerto Rico–based study found that people with diabetes were

more likely to have cardiovascular complications and other heat-related illnesses during heatwaves (Smith et al. 2022). Furthermore, researchers found that expecting mothers in Northern California who were Black, Hispanic, or had pre-existing diabetes and hypertension were at higher risk of preterm birth than women without those characteristics when exposed to increasing temperatures (Smith et al. 2022). When Hurricane Audrey ravaged Louisiana in 1957, the death rate for whites was 38 per thousand population, compared with 322 per thousand for blacks. This figure may be interpreted to indicate that minority group members tend to disproportionately experience negative consequences from extreme weather disasters (Perry and Greene 1982).

Severe Weather/Climate Disaster Stages

Risk Perception

Risk perception represents intuitive judgements about the probability of a given risk and concern about the consequences of that risk if it were to happen (Allan et al. 2020). The extent to which individuals perceive risks associated with severe weather events may be influenced by sociodemographic factors. The perceived risk can determine what if any preventative actions they choose to take. Risk perception can be driven by past experiences, media, close relatives and friends, personal beliefs, and other factors (Wachinger et al. 2012). As a result of an increasingly complex world, individuals are not able to inform themselves about all threats that they face. Therefore, they are forced to trust in authorities and experts. People select media outlets that they believe to be trustworthy, including experts whose opinion can be considered as accurate. This can result in a reduction of the uncertainty, but, due to the fundamental affective dimension of trust, individuals may feel more at risk if their trust in experts is lacking or damaged (Wachinger et al. 2012). Therefore, trust has an important effect on an individual's risk

perception. Those who have directly experienced flooding are more likely to accept that it poses a serious risk. Perceived personal threat from environmental dangers can lead to action to protect others, as well as oneself. Experience may also motivate people to seek further information to understand and inform their future responses (Fortner et al. 2000). Research consistently shows that white men often view hazards as less risky than their minority counterparts (Allan et al. 2020). Mendez (2020) found that white people in California "are twice as likely as Latinos to say they are knowledgeable about disasters even though Latinos (48%) are by far the most likely group to be very worried (27% Asians, 21% Blacks, and 15% whites (120).” These differences are likely driven by multiple reasons like access to resources, trust in authority, and worldviews.

Preparedness Behavior

Having previous disaster experience, a greater perception of risk and consequences, and being geographically closer to the extreme weather increase the likelihood for individuals to be prepared for severe weather events (Armstrong et al. 2020). Preparedness behavior is taking measures to mitigate or avoid the risk. Household level practices include personal actions, like preparing evacuation kits and seeking safety information, as well as home hardening and risk-reduction actions, like shuttering windows and purchasing insurance (Fothergill and Peek 2004). While Black people do not tend to live in the areas with the highest fire potential, they are overrepresented in communities somewhat prone to wildfire but would likely not respond or adapt well if a wildfire were to occur (Mendez 2020). Baker (2011) found that White people in Florida coastal regions have higher preparedness scores than Black people and Hispanics. In a study of Florida single-family homeowners, it was found that Hispanic and Black homeowners had lower levels of hurricane-shutter usage than respondents from other racial backgrounds (Maldonado et al. 2016). Minorities may be less likely than non-Hispanic whites to plan for

emergencies or to feel prepared for emergencies (Maldonado et al. 2016). Renter status, most common among foreign-born Hispanics, was a key obstacle to structural mitigation to homes to protect against flood and hurricane threats. Renter status is also an obstacle for maintaining flood insurance (Maldonado et al. 2016). Preparing for a disaster can be costly and some people rely on neighbors, family, and close friends for assistance. Before Hurricane Andrew hit, Black and Hispanic families were more likely than White families to have been helped by relatives in preparing for the disaster (Fothergill et al. 1999).

Warning Communication and Response

Warning communications are vital to the survival of many people vulnerable to severe weather events. Warnings are given in multiple ways and there's a range of actions people can take to protect themselves and their family. Warning communications can be given through family, friends, emergency response workers, tv, radio, and other forms of media. Minorities that do not speak or understand English proficiently may have trouble receiving vital warnings. In 2014, for example, as a massive wildfire emerged in eastern Washington, language barriers prevented Hispanic farm-workers from receiving evacuation notification from authorities, and the only Spanish radio station in this region never received the emergency information (Davies et al. 2018). Mexican-Americans use social networks to relay warning information more than Blacks or Whites and Mexican-American urban residents have higher levels of warning information exchange (Fothergill et al. 1999). Before Hurricane Andrew, Black people, and Mexicans-Americans preferred neighborhood meetings as a communication channel regarding hazard more than White people (Fothergill et al. 1999).

People respond to extreme events in multiple ways. People may evacuate or some people may stay behind. Some people may believe the event is not a serious threat. Some people may

perceive the threat as real but believe that their homes are safe, or stay behind to protect their homes (Ojerio et al. 2011). Some may have inadequate social or economic resources. Others may have more nonrational reasons (Riad et al. 1999). Riad et al. (1999) found that Black victims of Hurricane Andrew and Hurricane Hugo were the least likely group to evacuate. Black respondent that did not evacuate cited a variety of reasons. Most commonly, they did not perceive the hurricane as a serious threat or they believed that their housing was safe. A small fraction attributed their decision to stay to low resources or the need to protect their home from others (Riad et al. 1999). A majority of victims after Hurricane Katrina living in shelters stated the main reason they did not evacuate was because they lacked transportation and underestimated the storm (Brodie et al. 2006). Some people are physically unable to leave or have to care for someone who is physically unable to leave (Brodie et al. 2006). Evacuation and response behavior is complex and collectivistic rather than individualistic. Social norms are an important factor influencing how the vulnerable population responds. Correctly translating and effectively disseminating preparedness and evacuation information and materials is a prerequisite for equitably mitigating severe weather event vulnerability.

Physical Impacts

The immediate effects on human health during and after extreme weather events include exposure to elements, injury, and even death. These events can also increase exposure to other environmental conditions like production of hazardous chemicals, pathogens, bacteria contamination, poor air quality, and heat exhaustion (National Institute of Environmental Health Sciences 2022). People of color experience different consequences of disasters than white people. The recent literature overwhelmingly confirms earlier studies suggesting rising temperatures will lead to higher mortality and illness among adults of color than White adults

(Berberian et al. 2022). Risk of dying associated with higher temperatures and extreme heat events was elevated among Black, Hispanic, and Native American individuals compared to Whites in studies across the United States (Berberian et al. 2022). Regarding heat wave mortality, in a study of nine California counties from 1999–2003, for each 10°F increase in ambient temperature, there is a 2.6% increase in cardiovascular mortality with ischemic heart disease being the most dominant of these outcomes. In this analysis, mortality risks were highest for African Americans at 4.9% (Basu and Ostro 2008). Studies looking at the United States strongly suggest people of color are at higher risk for wildfire-related cardiovascular and respiratory illnesses than White people (Berberian et al. 2022). Two national studies spanning from 1999 to 2018 found that Native Americans had the highest mortality rate associated with extreme cold compared to White people (Berberian et al. 2022). A disproportionate number of Black people died in Hurricane Audrey; the death rate there was 38 per thousand population for whites and 322 per thousand for blacks. (Fothergill et al. 1999). Previous studies demonstrate that African Americans are more likely to experience physical hardships and trauma during and after a disaster due to low socioeconomic position and limited financial savings needed to relocate or mitigate damages due to extreme weather events (Linscott et al. 2021). The evidence overwhelmingly suggests severe weather events due to climate change is likely to exacerbate existing racialized health inequities in many contexts.

Psychological Impacts

Living through a disaster and resettlement due to severe weather event can take a toll on victims. Feelings of anxiety, constant worrying, trouble sleeping, and other depression-like symptoms are common responses to disasters before, during, and after the event (Hori and Schafer 2009). Many people are able to “bounce back” from disasters with help from family and

the community, but others may need additional support to cope and move forward on the path of recovery (Hori and Schafer 2009). A large body of literature in ‘‘disaster mental health’’ has concluded that psychological effects of disasters are multifaceted and can persist for years (Hori and Schafer 2009, 67). Black and Hispanic individuals reported higher rates of mental illness compared to Whites after Hurricane Sandy in New York and New Jersey (Berberian 2022). Blacks and Hispanics have also been shown to experience greater adverse mental health-related outcomes (e.g., anxiety, psychosis, and substance use disorders), associated with temperature as compared to White people (Berberian et al. 2022). Black survivors of Hurricane Katrina had higher odds of screening positive for depression and increased likelihood of having post-traumatic stress disorder (PTSD) compared to White people (Aune 2020). Similarly, research in the Houston metropolitan area after Hurricane Harvey found that non-Hispanic Black people disproportionately experienced PTSD compared to non-Hispanic Whites (Berberian 2022). Black and Hispanic individuals also reported higher rates of mental illness compared to Whites after Hurricane Sandy in New York and New Jersey (Berberian 2022).

Emergency Response

Each emergency response to extreme weather events has specific characteristics that are dependent on local circumstances. Local and national responders can work together to efficiently use resources to help people. Some of these could include search and rescue, supplying food and water, temporary shelter, medical supplies and assistance. For some minorities, language is often an issue. Several studies showed that emergency agencies have either too few or no bilingual personnel for bilingual populations (Fothergill et al. 1999, Ojerio et al. 2011). After Hurricane Andrew, much of the early relief information was provided only in English, preventing Spanish speaking Hispanics from receiving food, medical supplies, and assistance information (Fothergill

et al. 1999). Brodie et al. (2006) found that 76% of Hurricane Katrina evacuees agreed that the government's response “was too slow”. Nearly 7 in 10 said that they believed the government would have responded more quickly if the affected areas had been populated by a higher percentage of wealthy, White residents, as opposed to the higher population of poor, Black residents. 61% reported that their experiences during Hurricane Katrina and the aftermath made them feel as though the government did not care about people like them (Brodie et al. 2006). A majority of evacuees at the Houston shelters disapproved of the job political leaders at all 3 levels of government did in handling the situation caused by Hurricane Katrina. 70% disapproved of the job President Bush did. Previous studies show that the distribution of FEMA individual assistance decreases with the increased presence of the Black and Asian populations (Drakes et al. 2021).

Recovery

The recovery stage, typically the one-year period following a disaster, historically has implied putting a disaster-stricken community back together (Fothergill and Peek 2004). This section addresses some of the racial differences as life returns to somewhat normal during this time of allocating resources and rebuilding. Nogueira et al. (2022) found that Black disaster survivors have a lower probability of receiving FEMA assistance, and FEMA provides greater post disaster financial assistance to white disaster survivors, even when the amount of damage is the same. A Hurricane Andrew recovery study found that resources favored White affluent communities, whereas the poorer Black communities in Florida City lacked the necessary administrative capacities for securing aid (Domingue and Emrich 2019). A recent study on disaster aid and justice in the United States found that members of the Hispanic community were less likely to receive full compensation through federal funding streams following severe

flooding in Iowa. In addition, individual forms of aid distributed post disaster generally privilege property owners and neglect people in urban areas, renters, or people occupying public housing (Domingue and Emrich 2019). People of color may have more difficulty accessing assistance because lack of familiarity with bureaucratic processes, and a lack of trust in outside agencies (Ojerio et al. 2011, 29). Recent evidence suggests that racial and ethnic minorities tend to hold lower trust in public institutions when compared to non-Hispanic whites due to underemployment, unemployment, poverty, and discrimination (Ojerio et al. 2011; Harlan et al. 2019). Some groups of people may not be willing to seek help beyond friends and family when confronted with disasters. Leaders at FEMA are wrestling with the complicated question of why these disparities exist and what to do about them. The problem seems to stem from complex systemic factors, like a real estate market that often places higher values on properties in communities with many white residents, or the difficulty of navigating the federal bureaucracy, which tends to favor people and communities that have more resources from the beginning (Donner and Rodriguez 2008). This is unfortunate because these institutions are supposed to assist people in times of disaster. Usually, the areas with fewer resources and more limited capabilities for securing aid are also in the most need of federal funding. There is a need for government institutions to gain the confidence of people of color in the wake of severe weather events so they can obtain adequate assistance (Harlan et al. 2019).

Reconstruction

The impact of severe weather events can be long-lasting. Some vulnerable populations experience a longer time rebuilding their lives after a severe weather event. People of color have a difficult time recovering due to lack of insurance, distrust in health care institutions, and low socioeconomic status (Versey 2021). Minority groups are far more likely to be uninsured or

underinsured relative to their white counterparts due to affordability (Donner and Rodriguez 2008). Even for people of color that have adequate insurance there can be differences in insurance settlements claims. After Hurricane Andrew, Black people and non-Cuban Hispanics were more likely than White people to receive insufficient settlement amounts, although there were no differences between Hispanics and White people insurance coverage with major companies. Black and Hispanics were more likely to be left out of the formal aid network and to recover economically more slowly (Fothergill et al. 1999). Black residents are at greater risk for permanent residential displacement following a flood-related disaster (Shepherd and KC 2015). Past research suggests that individuals and families who are forced from their pre-disaster places of residence are more likely to lose jobs and income (Hori and Schafer 2009, 65). Some victims of Hurricane Katrina were unable to resettle their former homes, largely driven by socioeconomic factors that delineated along racial lines. Among those returning to the city after Katrina, only 22.3% of black residents were able to return to their original homes compared to 46% of nonblack residents. There are evidence-based reports of gentrification following Katrina. Specific measures of gentrification in the literature include combinations of change in income, property values, education levels, and social and employment class, but refer generally to the upward social change of a neighborhood from lower to higher socioeconomic status (Aune et al. 2020). It is common for wealthier people or companies to purchase property after a disaster to rebuild and renovate which ultimately raises property value and leaves neighborhoods too expensive for some people to resettle there after a disaster. For white Americans, living in a county hit by a large disaster can be a financial boon (Howell and Elliott 2019). Displacement can cause anxiety, post-traumatic stress disorder, and depression (Aune 2020). After some disasters, white residents flee for safer areas leaving a majority minority population which

increases the geographical disparity between races (Grindal et al. 2023). Communities of color are more likely to experience a decline in their standard of living than white communities in the long term (Fothergill et al. 1999).

From the literature it is evident that there is a racial disparity in severe weather event experience. People of color bear the costs of climate change disproportionately, including greater economic consequences, local environmental and health risks, and climate-related displacements (Benegal et al. 2022, Smith et al. 2022, Berberian et al. 2022, Zanocco et al. 2022). Minority groups' experience is significantly more adverse than White people (Flores et al.2020). The racial disparity in extreme weather events experience and its relationship to climate change opinion has been understudied.

Climate Change Opinion

Research supports that people of color are more vulnerable and disproportionately at risk for extreme weather events. Scholars have found that there are different climate change opinions amongst different races. The literature supports the idea that experiencing extreme weather events influences climate change opinion (Demski 2017). Extreme weather events can serve as focusing events, raising awareness and ultimately collective action in some cases. After experiencing extreme weather events, risk associated with climate change rises. Some Americans increasingly recognize the risks climate change poses to their everyday lives and livelihoods and are beginning to respond.

Risks

Social vulnerability contributes significantly to higher perceived risks from extreme weather events. Risk perceptions refer to assessments of the extent to which global warming is causing harm now and/or will cause harm in the future to different people and species (Ballew et

al. 2019). Broad consensus exists that people incorporate multiple sources of information, experiences, and subjective intuition into formulating mental models of perceived risk (Harlan et al. 2019). Research also shows that people of color in the U.S. perceive heightened vulnerability to climate change due, in part, to awareness of their disadvantaged position in society (Ballew et al. 2021). A poll by the Pew Foundation in 2020 found that 60% of respondents viewed climate change as a major threat to the well-being of the US, the highest rating since the poll began in 2009 (Latkin 2021).

While climate change risk perceptions have increased substantially in recent years, the percentage of Americans who view global warming as a personal and local threat remains low. People generally have limited risk perceptions, in part because they lack personal experience with climate change and tend to view the negative impacts as distant in time and only affecting people and places far away. Some people have a limited understanding of nature's cause-and-effect processes (Ballew et al. 2019). Furthermore, although most Americans think the climate is changing, some tend to misunderstand or discount climate science (Ballew et al. 2019). Through research we see that people that experience severe weather events are likely to believe they are at risk to climate change, especially people of color. Ballew et al. (2021) found that across the political spectrum, people of color were more likely to report that climate change poses a danger to themselves. Information gained from personal and vicarious experiences can make abstract risks of climate change more concrete and affect individuals' risk perceptions (Konisky et al. 2016). Those who suffer from a greater number of negative outcomes resulting from severe weather events tend to express greater hazard risk perceptions (Wong-Parodi and Garfin 2021). Currently, the effects of personal experience on climate change opinions in the United States are relatively small, but as extreme weather increases in frequency and severity, the effects of

personal experience may grow as well (Ballew et al. 2019). Personal experience of extreme events, such as hurricanes or flooding, connected to climate change can elevate risk perceptions, policy support, and pro-environmental behavior (Ballew et al. 2019). The more recent the past event, the more risk perception is heightened (Harlan et al. 2019). Personal experiences also have the strongest impact on climate change beliefs among the least engaged segments of the American population. (Ballew et al. 2019).

Data from a study found that individuals with more confidence in their access to adaptive resources perceive lower risks from floods than individuals with less confidence (Harlan et al. 2019). People with higher social status (white men, especially of middle or upper class) have greater access to resources such as wealth and income, which insulate them from the negative effects of societal and environmental risks, and thus they evaluate those risks more benignly (Grindal et al. 2023). As noted earlier, white people experience the adverse consequences of climate change less frequently than people of color. As such, they may view climate change as less of a risk and thus exhibit greater skepticism of claims that climate change is happening and dangerous. Individuals' perceptions of the likelihood and severity of flood risk are higher for minorities (Harlan et al. 2019). Survey data from the past decade shows that Black and Hispanic Americans perceive greater risks from climate change than do white Americans (Benegal et al. 2022). Hispanics' greater risk perceptions may be explained by their stronger pro-climate injunctive social norms and egalitarian worldviews, stronger identification with the Democratic party, more frequent communication with family outside the U.S., greater harm from environmental hazards, stronger descriptive norms, and a weaker individualist worldview (Goldberg et al. 2020).

Racial Differences on Climate Change Opinion

Researchers have found that there are different climate change opinions among races. In the U.S., people of color tend to hold stronger pro-climate views than White people (Ballew et al. 2021). For instance, recent studies document that communities of color express greater climate change concern and risk perceptions compared to White people who tend to express higher levels of skepticism (Ballew et al. 2021; Grindal et al. 2023). Surveys of public attitudes suggest that the Hispanic population is much more concerned than other groups about climate change. Nationally, Hispanics are more sure that climate change is happening, more likely to blame it on human activity, and more concerned that it will hurt the country than White respondents (Wilder et al. 2016; Goldberg et al. 2020). A recent survey of climate attitudes in Arizona found that 85% of Hispanics wanted the government to limit emissions, compared to 70% of whites (Wilder et al. 2016). Hispanics were much more likely to think that climate change was causing an increase in drought and heat waves as well (Wilder et al. 2016). Research has found that climate denialism and opposition to climate policy will more likely be found in the White population (Benegal and Holman 2021). According to the Pew Research Center, white people are the least likely to recognize that human activity is the primary driver of climate change (Grindal et al. 2023). Whites are more likely to be doubtful or dismissive of climate change (27%) than are Hispanics/Latinos (11%) or African Americans (12%) (Ballew et al. 2020). Racialized rhetoric and aspects of white identity have become increasingly tied to aspects of climate action and policy during the Obama and Trump presidencies (Benegal and Holman 2021). During the Obama presidency, conservative think tanks, industry leaders, and Republican elites engaged in aggressive climate change denialism and linked Obama to climate policy and opposition to resource extractive industries, for example, “Obama's War on Coal” (Benegal and Holman

2021). During the Trump presidency, elite rhetoric about restoring coal and jobs to rural, white mining communities further reinforced these relationships (Benegal and Holman 2021). Other commonly used narratives in opposition to climate change policy emphasized the unfairness of international climate agreements, the betrayal of hard-working Americans in coal and mining, and the uneven distribution of costs and benefits across communities in the United States, which is connected to racial resentment (Benegal and Holman 2021).

Attributing Extreme Weather Events to Climate Change

Climate change is a risk 'buried' in familiar natural processes such as temperature change and weather fluctuations. It had a low-risk salience because it was not being directly experienced. Since humans are accustomed to considerable weather and temperature variation on a daily and seasonal basis, they underestimate the effects of a predicted rise in global temperatures of a few degrees over a period of time. Nevertheless, an increasing amount of research has shown that people to some extent can accurately detect changes in their local climate and relate this perceptual experience to climate change. Moreover, the rising rate of extreme weather events is now increasingly being associated with climate change. In fact, several studies have indicated that personal experience with extreme weather events is a significant predictor of climate change risk perceptions (Van der Linden 2014).

Attributing extreme weather events to climate change can be a cognitive process whereby the experience of negative climate-change-related events may increase climate change concerns and motivate people to act (Wong-Parodi and Garfin 2021). Bergquist et al. (2019) conducted surveys with Florida residents before and after Hurricane Irma in 2017. They asked participants how strongly they felt negative emotions when they thought about climate change and found that participants reported stronger negative emotions toward climate change after the hurricane, in

addition to willingness to pay higher taxes for the sake of the environment. They reported that higher negative emotions were associated with increased willingness to sacrifice to reach climate change solutions (Bergquist et al. 2019). Scientific confidence in the ability to attribute the effects of anthropogenic climate change is highest for extreme heat and cold events and lowest for tornadoes and wildfires (Zanocco 2018; Marlon et al. 2021). Demski et al. (2017) also found evidence that weather experiences can have effects on climate attitudes through increasing the salience of the issue of climate change.

Often in the immediate aftermath of extreme events, there is media and public interest in what caused them (Stott et al. 2015). But we have seen instances where climate change is not discussed often enough in minority media. Craig et al. 2021 found Hispanic journalists were most likely and Black journalists were least likely to see climate change as a locally relevant issue in their region. They also found that Black journalists were less interested in reporting on local climate impacts and solutions, and that could ultimately influence the quantity and quality of climate change reporting reaching Black audiences (Craig et al. 2021).

Some media outlets are hesitant to discuss climate change after extreme weather events because it is a highly politicized issue. Even mentioning the topic of climate change amid a disaster recovery could be perceived as using a community's loss to further a political agenda. Boudet et al. (2020) argued that even though discussing climate change after a disaster may seem insensitive to some, events should be interpreted as signals of climate change that can affect people, places, and things they care about. Frequent news reports of national and global floods, for example, may trigger individuals' memories of past events and raise risk perceptions for everyone, independently of individual experiences (Harlan et al. 2019).Though attributing climate change to extreme weather events is an ongoing scientific debate, some scholars and

activists have argued that these very events might provide the best opportunity to raise public awareness and prompt collective action on climate change (Zanocco et al. 2018).

There's evidence that there is a positive relationship between experiencing extreme weather activity and expressions of concern about climate change. However, the effect only materializes for recent extreme weather activity; activity that occurred over longer periods of time does not affect public opinion (Konisky et al. 2016). Some researchers have conducted studies to examine the association between experienced extreme weather and concern about climate change and have found no significant association, but a time variable may be influencing the outcome (Shao and Hao 2020). Incorporating climate change into discussions about extreme weather before events occur and alongside actionable advice on how to prepare is likely to be beneficial for the future resilience of at-risk people of color (Zanocco et al. 2019). Ample evidence from psychology and cognitive sciences confirms that risk perceptions, beliefs, and concerns are particularly influenced by recent or highly salient events that are cognitively more readily available than abstract statistical evidence (Hoffman et al. 2022). Directly experiencing impacts of weather events may lessen the sense of distance to climate impacts, making the issue of climate change feel closer to home. No one factor is enough to generate collective action; instead the frequency can create mobilization (Boudet et al. 2020)

Extreme Weather Events, Voting Behavior and Engagement

Climate change scholars have found that experience not only affects climate change beliefs but also voting behavior and engagement. In some cases, it has influenced climate change policy. There is a gap between climate change attitudes and concern and behaviors (Latkin 2021). Higher levels of self-reported personal harm after an extreme weather event were associated with more support for climate change mitigation policy (Zanocco et al. 2019). Latkin

(2021) in a national study found that compared with White people, non-Hispanic Blacks were “a little more” willing to take political actions (Latkin 2021, 8).

Hispanics have been found to be more engaged with climate change, both in conviction that the consequences will be harmful and in willingness to support public action and pro climate policies, than non-Latino Americans (Craig et al. 2021; Goldberg et al. 2020). Hispanics are also more likely to think that the government should act to reduce climate change (Wilder et al. 2016).

The increased willingness of people of color to engage in climate change action may be related to the specific impact climate change has in their communities. After the 1927 Mississippi floods, Barry (1997) argues that the mistreatment of Black people during the flood affected the Black shift from the Republican to the Democratic party. Another example of discrimination influencing political action is when five tribes belonging to the Isle de Jean Charles Band of Biloxi-Chitimacha-Choctaw appealed to the United Nations that the United States was violating their human rights by failing to mitigate climate change impacts resulting in their displacement (Grindal et al. 2023). Due to historical forced resettlement and discriminatory policies, Native Americans disproportionately live in areas most vulnerable to climate change impacts such as extreme temperature and drought. Climate change has already begun to decimate their homelands (Grindal et al. 2023).

Compared to Whites, Hispanics/Latinos and Black people also report greater willingness to join a campaign to convince elected officials to take action to reduce global warming. More than one in three Hispanics/Latinos (37%) and Black people (36%) say they would “definitely” or “probably” join a campaign compared to one in five White people (22%) (Ballew et al. 2020). Ballew et al. (2020) also asked Americans how important 29 policy issues would be in

determining their vote in the 2020 Presidential Election. Among registered voters, a majority of Hispanics/Latinos say global warming would be "very important" to their vote (57%; ranked 6th), which is comparable to the importance of immigration reform (57%; ranked 7th). While about half of Black people said global warming would be "very important" to their vote (53%), it ranks 16th in their list of issue priorities. About one in three Whites (35%) said global warming will be "very important" to their vote (ranked 17th) (Ballew et al. 2020).

A study conducted in Europe found that climate change experiences increase public support for climate action but only under favorable economic conditions (Hoffman et al. 2022). Existing evidence shows that people who have experienced extreme climatic or weather events are more likely to believe in the existence of climate change and express concern about climate change and show willingness to engage in mitigation actions and favor climate policies (Hoffman et al. 2022). They also found that exposure to climate extremes, in particular heat and dry spells, activates environmental concerns and promotes Green voting in Europe. The prior research thus suggests that experiencing more severe weather may appreciably increase support for climate change policies if you are disproportionately vulnerable to it (Demski 2017).

Other Factors that May Influence Climate Change Opinion

There can be multiple demographic characteristics that influence social vulnerability. Scholars have found that vulnerability may be increased due to factors such as a person's age, party identification, ideology, gender, education, and income. A broad body of scholarship has established that younger Americans, Democrats, liberals, women, people with higher educational attainment, and higher income are more supportive of climate action and policies (Benegal et al. 2022). Race can interact with these factors and influence climate change opinion.

Sex

In America, the vulnerability of women as compared to men is most closely associated with income differentials and the challenges faced by households headed by a single female (Wilder et al. 2016). White men are significantly less likely to support climate change policies than white women (Benegal et al. 2022). However, this pattern does not apply to other groups: Black men are more likely to express support for policies than Black women and there are not gender differences between Asian or Hispanic men and women in their support for climate policies (Benegal et al. 2022).

Age

Due to physical limitations, the elderly are disadvantaged in preparing and responding to a disaster. They are also more likely to suffer health consequences than younger people (Ojerio et al. 2011). Older Black individuals are more likely to support climate policy than younger Black people (Benegal 2022). Benegal (2022) suggests this may be due to younger Black people prioritizing other policy issues relating to racialized economic inequities, policing and criminal justice (Benegal et al. 2022). They also found that among white respondents, there is a linear negative relationship as older respondents are less supportive of climate policies.

Education

Other studies explaining trends in climate opinion also emphasize the role of education in shaping climate views. Regions with younger and better educated populations exhibit higher levels of climate change concern (Peisker 2023). Increased educational attainment can boost scientific curiosity, trust in scientists, and increased awareness of the scientific consensus on climate change. At higher levels of educational attainment, Democrats report greater concern and awareness of climate change, but Republicans' attitudes about climate change varies little across

levels of education (Benegal and Holman 2021). But the role of education in moderating the relationship between racism and views about climate change is far more nuanced and unintuitive. When racist prejudices persist among the more educated, racist individuals oppose climate action at higher rates. Among racist individuals, those holding bachelor's or postgraduate degrees are more likely to oppose climate mitigation policies than individuals who have lower educational attainment (Benegal and Holman 2021). Conservative white men with more education (some college or more) are significantly less likely than those with less education (high school or less) to support some climate change policies (Ballew et al. 2022). Education is more negatively associated with expressed beliefs and risk perceptions for conservative white males than for conservatives in general (Ballew et al. 2022).

Ideology and Party ID

Political ideology has been consistently identified as one of the primary factors that shapes public opinions about climate change in the United States; conservative political affiliation strongly predicts disbelief in the existence of anthropogenic climate change (Craig et al. 2021). Within minority communities, political ideology is a significantly weaker predictor of climate attitudes than it is for White Americans (Craig et al. 2021). Racial and ethnic minorities' views on climate change and its mitigation may be less ideologically driven compared to those of Whites. (Schuldt and Pearson 2016). Among liberals, in contrast, White people tend to report higher levels of acceptance and risk perception than Black people, and greater pro-climate beliefs and policy support relative to both racial groups. Racial differences in personal risk perceptions, however, appear more robust across the political spectrum, with people of color indicating greater personal risk perceptions relative to White people. Within political subgroups, racial differences are more pronounced among the political Right than the political Left, with

conservative Whites less concerned about global warming, and less supportive of climate policies, than conservative Black people and Hispanics/Latinos (Ballew et al. 2021). Across the political spectrum, people of color were more likely than Whites to report that global warming poses a danger to themselves. This supports previous research that being a member of a historically underserved or disadvantaged group contributes to increased perceptions of vulnerability to environmental problems (Ballew et al. 2021). These results offer comprehensive evidence that climate change is less polarized among people of color in the U. S and the climate views of people of color "may be less ideologically-driven" (Ballew et al. 2021; Ballew et al 2020). White people in the U.S. are substantially more likely to identify with the political Right, relative to Black people and Latinos, raising important questions about the extent racial differences in climate public opinion simply reflect well-documented differences in political orientation across racial groups. (Ballew et al. 2021). When experience with an extreme weather event is perceived as resulting in personal harm, non-ideological interpretations may become more prominent, particularly for conservatives. (Zanocco et al. 2019) People may rely less on abstract notions, like political ideology and more on concrete experiences (like personal harm) in interpreting them (Zanocco et al. 2019). From the literature we see that vulnerabilities due to race may be a main factor that influences climate change opinion.

Income

The connection between income and extreme weather event vulnerability has been thoroughly discussed in the climate change literature. Poor people around the world suffer the greatest disaster losses and have the most limited access to public and private recovery assets, both in developing societies as well as wealthy industrialized nations like the United States (Fothergill and Peek 2004). Much of the literature discusses poor individuals' vulnerability to

extreme weather events but there is a gap in the literature that discuss how this affects their voting behavior and engagement on climate change. However, Benegal did conduct a study and found Black respondents' support for climate policies increases with higher levels of income while there is a negative effect with White people (Benegal et al. 2022).

There is an abundance of research that discusses extreme weather events, climate change risk perception, and socially vulnerable groups. This literature provides enough evidence to conclude that people of color are more vulnerable to climate change for complex reasons. There is evidence that climate change opinion varies among race but there is little research discussing how race influences climate change opinion. Two different communities can experience the same type of event and have different opinions about climate change (Zanocco et al. 2018). Researchers have suggested those differences may be due to people of color being more vulnerable to climate change than white people. People of color experience more challenges through every stage of extreme weather events and this could influence their climate change opinion and support for climate change policy. Racial identification has become increasingly correlated with concern about climate change since the Obama presidency (Benegal 2018). Higher levels of racial prejudice and resentment are correlated with lower levels of agreement that climate change is occurring. There are current projection that the U.S. is on track to become a majority-minority nation by 2050 (Schuldt and Pearson 2016). It is important to understand how race and ethnicity shape climate change beliefs and engagement.

CHAPTER 3

THEORY/HYPOTHESIS

Climate change leads to frequent extreme weather events, which have a disproportionate impact on people of color. Race may play a critical role in shaping how the public responds to and engages with climate change. I focus on people of color that have experienced extreme weather events because the literature supports that they are more likely to be concerned about climate change due to their disproportionate vulnerability to extreme weather events. Extreme weather events are leading to increased recognition and concern over climate change (Brulle et al. 2012). Focusing on personal experiences can increase variability in public opinion between individuals in different locations with different experiences. Researchers suggest that people who have recently suffered adverse weather are more likely than those who have not to rely on their gut feelings when they explicitly vote for politicians (Rudman et al. 2013). When people link climate change to threats to their personal health and safety it can prompt climate change support. Previous studies show that experiencing the effects of climate change in the form of extreme events can be one of the strongest predictors compared to other influencing factors in risk perception of climate change (Myers 2013). Based on the existing literature, I therefore hypothesize:

Exposure to extreme weather events, will influence people of color to support climate change policy more than white people.

CHAPTER 4

METHODOLOGY

I test my hypothesis using survey data from the 2016 Collaborative Multiracial Post-Election Survey (CMPS) and Cost of Billion-Dollar Weather and Climate Events data from the National Centers for Environmental Information (NCEI) (2023). The unit of analysis is the individual survey respondent, and my data cover the time period from 2012-2016.

The CMPS is a national survey of voters and non-voters on political and social issues conducted post-election. CMPS surveyed 10,145 people in five languages: English, Spanish, Chinese, Korean, and Vietnamese. The 2016 CMPS included large and generalizable samples of Blacks (n=3,102), Latinos (n=3,003), Asian and Pacific Islanders (n=3,006), and Whites (n=1,034), which allowed for an individual racial group analysis or comparative analysis across groups.

NCEI monitors the cost impacts of hurricanes, droughts and heat waves, inland floods, severe local storms, wildfires, freeze events, winter storms, and cold waves. To ensure costs can be compared over time, the Adjusted Consumer Price Index (CPI) is used. They calculate the cost assessment from the public and private sector. (e.g. FEMA, Insurance Service Office, US Dept of Ag., State Agencies, NFIP, and others). The cost includes damages to residential, commercial, and government buildings. Their total also includes agricultural assets and public infrastructure. I use data from NCEI to indicate which states are experiencing the most financial impact of extreme weather events. Typically, the higher costs associated with extreme weather events indicate how detrimental the event is. The cost of extreme weather can indicate its severity in terms of economic impact and level of disruption to the affected area. I use data from 2012-2016 because the survey data from CMPS was collected in 2016. Research shows that

more recent extreme weather events or more likely to influence climate change attitudes so the scope is closer to when the respondents were asked about their climate change opinions. Distant climate events tend to influence concerns and voting less strongly possibly due to the experiences becoming less salient (Hoffman et al. 2022).

Dependent Variable

My dependent variable is climate change policy support. To measure climate change policy support, I used question c42 from the CMPS survey which states "Please indicate how much you agree or disagree with: The Federal Government should pass laws to combat the effects of climate change". The answer options included a 5-point Likert scale ranging from "Strongly disagree" to "Strongly agree". I coded responses for each answer option where (1=lowest level, 5=highest level) of climate change policy support to create a 5-point index.

Independent Variables

The independent variables are race (coded categorically for White, Hispanic/Latino, Black, and White) and exposure to extreme weather disasters. Exposure to extreme weather disasters is being operationalized with the cost of extreme weather disaster collected from NCEI. At the state level, there is a lack of data that provides information on whether people live in proximity to extreme weather events. Exposure to extreme weather events can be identified by analyzing the frequency and intensity of the events themselves, as well as the resulting damages and losses. Economic cost is one way to gain insight into the extent and severity of these damages and losses. States with high economic costs may have experienced one or few catastrophic events, or may be exposed to frequent, smaller events that have collectively led to high costs. Conversely, states with low costs associated with extreme weather events are likely to have less exposure to such events. Thus, cost can serve as an indicator of the level of exposure to

extreme weather events for populations. I created variables for individual years from 2012-2016 and a variable that averages the cost of disaster for each state from 2012-2016. The average cost variable can provide long-term trends, account for fluctuations, and reduce the impact of outliers or rare events.

Controls

I also include controls for education (1=Grades 1-8, 6= Post graduate education), income (collapse variable where 1=less than $20,000, 12=$200,000 or more), and age (continuous variable). Each of these have the potential to shape climate change policy support. [1]

[1] I ran models with sex and ideology variables but the hypothesis test on the coefficients were insignificant. Therefore, I took those variables out of the final models.

CHAPTER 5

RESULTS

Statistical analyses were performed using SPSS Statistics and Stata. In order to test the relationship between the dependent and independent variables, I implemented a linear regression model with robust standard errors. Descriptive statistics for all my variables of interest are provided in Table 1. Figure 1 provides the distribution of self-identified race among respondents in the CMPS Survey, with a majority of the respondents identifying as persons of color. A majority of the respondents when asked if they thought "the federal government should pass laws to combat the effects of climate change" said they agreed or strongly agreed (see Figure 2). The distribution of climate change policy support for each race is provided in Table 2. I performed regression analyses to assess the impact of demographic characteristics on support for climate change policies across different racial groups. I produced comprehensive tables (see Tables 3-8) to present the results of running several models in Stata, presenting both the coefficient and standard error information.

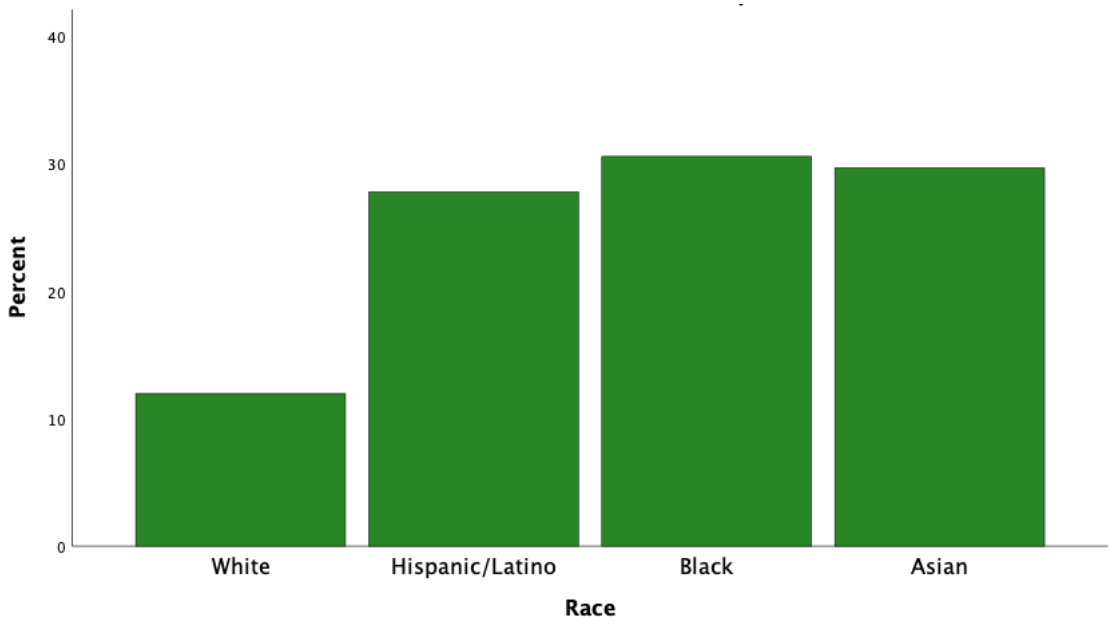

Figure 1: Distribution of race in CMPS survey.

Table 1: Descriptive statistics of sample respondents.

Measures	N(%)/Min/Max	Mean
Race		
White	1207 (12%)	
Hispanic/Latino	2802 (27.8%)	
Black	3082 (30.6%)	
Asian	2992 (29.7%)	
Education		4.27
Grades 1-8	92 (.9%)	
Some High School	482 (4.8%)	
High School Graduate or GED	2092 (20.7%)	
Some college, 2-year degree	3055 (30.3%)	
4-year college graduate	2629 (26.1%)	
Post graduate education	1733 (17.2%)	
Income		5.62
Less than $30,000	2788 (27.7%)	
$30,000 to $59,999	2604 (25.7%)	
$60,000 to $89,999	1598 (15.9%)	
$90,000 to $199,999	1877 (18.6%)	
$200,000 or more	325 (3.2%)	
Age	Min - 18 Max - 98	40.66
Climate Change Policy Support		3.82
Strongly Disagree	368 (3.6%)	
Disagree	506 (5%)	
Neither Agree nor Disagree	2800 (27.8%)	
Agree	3310 (32.8%)	
Strongly Agree	3099 (30.7%)	
Average Cost of Disaster from 2012-2016		3.70
less than 5M	240 (2.4%)	
5M-100M	645 (6.5%)	
100M-250M	2554 (25.3%)	
250M-500M	2620 (26%	
500M-1.0B	2436 (24.1%)	
1.0B-2.0B	530 (5.2%)	
2.0B-5.0B	1008 (10%)	
5.0B-50B	0 (0%)	
Sex		
Male	3492 (34.6)	
Female	6574 (65.2%)	

Note: N = 10083

Table 2: Race and climate change policy support cross tabulation.

		Climate Change Policy					
		1	2	3	4	5	Total
White	Count	88	90	356	324	349	1207
	% within race	7.3%	7.5%	29.5%	26.8%	28.9%	100.0%
	% within total climate change policy support	23.9%	17.8%	12.7%	9.8%	11.3%	12.0%
Hispanic/Latino	Count	108	123	724	869	978	2802
	% within race	3.90%	4.4%	25.8%	31.0%	34.9%	100.0%
	% within total climate change policy support	29.3%	24.3%	25.9%	26.3%	31.6%	27.8%
Black	Count	97	162	969	1002	852	3082
	% within race	3.1%	5.3%	31.4%	32.5%	27.6%	100.0%
	% within total climate change policy support	26.4%	32.0%	34.6%	30.3%	27.5%	30.6%
Asian	Count	75	131	751	1115	920	2992
	% within race	2.5%	4.4%	25.1%	37.3%	30.7%	100.0%
	% within total climate change policy support	20.4%	25.9%	26.8%	33.7%	29.7%	29.7%
Total	Count	368	506	2800	3310	3099	10083
	% within race	3.6%	5.0%	27.8%	32.8%	30.7%	100.0%
	% within total climate change policy support	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

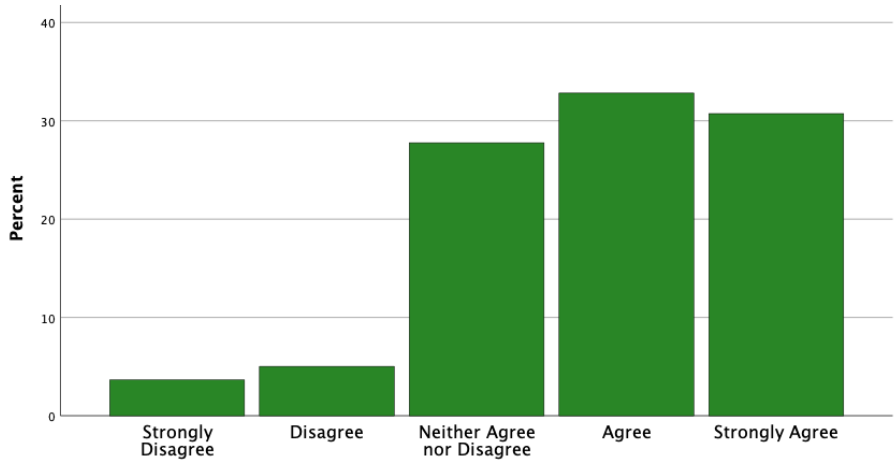

Figure 2: Responses to whether federal government should pass laws to combat effects of climate change.

Table 3: Regression – Average 2012-2016 attitudes toward climate changes by race and exposure to extreme weather events.

	Support for Climate Change -Whites	Support for Climate Change -Blacks	Support for Climate Change-Hispanic/Latinos	Support for Climate Change -Asians
Avg Cost of Events from 2012-2016	-0.0171288	-0.0147755	-0.0120721	-0.0137441
	(-0.0247637)	(-0.014744)	(-0.0120113)	(-0.0126773)
Age	-0.006569***	0.0040937***	-.0057321***	-.0074976***
	(-0.0021964)	(-0.0012936)	(-0.0016239)	(-0.0013263)
Education	.1414398***	.0910909***	.1020294***	.0714135***
	(-0.0350176)	(-0.0197304)	(-0.0208608)	(-0.0205509)
Income	-0.0042393	.0262582***	-0.0026931	0.0088812
	(-0.0124314)	(-0.0068803)	(-0.0073736)	(-0.0061271)
Constant	3.416401***	3.173572***	3.770548***	3.86429***
	(-0.1778538)	(-0.1003343)	(-0.1039299)	(-0.1029655)
N	1103	2828	2574	2628
R^2	0.0203	0.0305	0.0145	0.0161

Notes: ***p<0.01, **P<0.05, *p<0.10

Table 4: Regresssion – 2012 attitudes toward climate change by race and exposure to extreme weather events.

	Support for Climate Change -Whites	Support for Climate Change -Blacks	Support for Climate Change-Hispanic/Latinos	Support for Climate Change -Asians
Cost of Events 2012	-.0252254*	0.0070994	-0.0043022	-0.0107642
	(-0.0146023)	(-0.007941)	(-0.0079718)	(-0.0071144)
Age	-.0064454***	0.0041088	-.0056905***	-.0076293***
	(-0.0021867)	(-0.0012951)	(-0.0016255)	(0.0013252)
Education	.139049***	.0903791	.1031447***	.0727345***
	(.0350049)	(.0197125)	(.0208034)	(.0205767)
Income	-.0036483	.0261439	-.0025468	.0089297
	(.0123757)	(.0068717)	(.0073767)	(.0061267)
Constant	3.475525***	3.091459	3.734354***	3.859535***
	(.1660442)	(.094287)	(.0954715)	(.0958049)
N	1103	2828	2574	2628
R^2	0.02224	0.0304	0.0142	0.0165

Notes: ***p<0.01, **P<0.05, *p<0.10

Table 5: Regression – 2013 attitudes toward climate change by race and exposure to extreme weather events.

	Support for Climate Change -Whites	Support for Climate Change -Blacks	Support for Climate Change-Hispanic/Latinos	Support for Climate Change -Asians
Cost of Events 2013	-.0329177**	-.0190913**	-.0237531***	-.0225654**
	(.0160084)	(.0084292)	(.0089157)	(.0102495)
Age	-.0068518***	.004127***	-.0057284***	-.0075184***
	(.0021892)	(.0012932)	(.0016226)	(.001323)
Education	.1412384***	.0924647***	.0995655***	.0717646***
	(.0349324)	(.0197335)	(.0208861)	(.0205345)
Income	-.0051341	.0255212***	-.0033033	.0081274
	(.0124066)	(.0068876)	(.0073729)	(.0061286)
Constant	3.455035***	3.159674***	3.792784***	3.864433***
	(.1597546)	(.0865858)	(.0941914)	(.0944542)
N	1103	2828	2574	2628
R^2	0.0238	0.0318	0.0167	0.0176

Notes: ***p<0.01, **P<0.05, *p<0.10

Table 6: Regression – 2014 attitudes toward climate change by race and exposure to extreme weather events

	Support for Climate Change -Whites	Support for Climate Change -Blacks	Support for Climate Change-Hispanic/Latinos	Support for Climate Change -Asians
Cost of Events 2014	.0172268	.0070589	-.0062974	-.0053476
	(.0201269)	(.0122907)	(.0125043)	(.0106294)
Age	-.0063622***	.004083***	-.0056998***	-.0074241***
	(.0021912)	(.0012933)	(.0016249)	(.0013218)
Education	.1402945***	.0903623***	.1027207***	.0705412***
	(.0348994)	(.0197501)	(.0208293)	(.0205373)
Income	-.0039266	.0261441***	-.0027395	.0089585
	(.0124222)	(.0068777)	(.0073663)	(.0061252)
Constant	3.293032***	3.102224***	3.743043***	3.834559***
	(.1684123)	(.0940178)	(.1037399)	(.1000257)
N	1103	2828	2574	2628
R^2	0.0206	0.0302	0.0142	0.0157

Notes: ***p<0.01, **P<0.05, *p<0.10

Table 7: Regression – 2015 attitudes toward climate change by race and exposure to extreme weather events.

	Support for Climate Change -Whites	Support for Climate Change -Blacks	Support for Climate Change-Hispanic/Latinos	Support for Climate Change -Asians
Cost of Events 2015	0.0295912	-.0003265	.0020904	.0041281
	(.018315)	(.0106668)	(.0091378)	(.0082095)
Age	-.0062312***	.0040896***	-.0056689***	-.0073917***
	(.0021922)	(.0012934)	(.0016244)	(.0013228)
Education	.1373635***	.0908583***	.103583***	.0700606***
	(.0350498)	(.0197439)	(.0208485)	(.0205395)
Income	-.0044335	.0261389***	-.0026473	.0088768
	(.0123714)	(.0068943)	(.0073753)	(.0061219)
Constant	3.259841***	3.124666***	3.702783***	3.798671***
	(.1627875)	(.0939342)	(.1009465)	(.0989018)
N	1103	2828	2574	2628
R^2	0.0223	0.0301	0.0142	0.0157

Notes: ***p<0.01, **P<0.05, *p<0.10

Table 8: Regression – 2016 attitudes toward climate change by race and exposure to extreme weather events.

	Support for Climate Change -Whites	Support for Climate Change -Blacks	Support for Climate Change- Hispanic/Latinos	Support for Climate Change -Asians
Cost of Events 2016	-.0084438	-.0138641*	-.0018953	-.0014774
	(.0144446)	(.0078309)	(.0078826)	(.0074505)
Age	-.0065175***	.0041025***	-.0056974***	-.007407***
	(.002194)	(.0012946)	(.001625)	(.0013209)
Education	.1416529***	.0889732***	.1030943***	.0702884***
	(.035017)	(.0197429)	(.0208164)	(.0205397)
Income	-.0043894	.0267072***	-.0026439	.0089485
	(.0124639)	(.0068748)	(.0073725)	(.0061259)
Constant	3.383258***	3.182426***	3.72426***	3.821275***
	(.1628345)	(.0920752)	(.0974782)	(.0961567)
N	1103	2828	2574	2628
R^2	0.0202	0.0312	0.0142	0.0157

Notes: ***p<0.01, **P<0.05, *p<0.10

CHAPTER 6

FINDINGS

What effect does exposure to extreme weather events and race have on climate change policy support? The percentage of races that supported climate change policy varied. As shown in Table 2. People of color strongly supported climate change policy more than white people, with Hispanic/Latino supporting it the most. However, more Hispanic/Latino people disagreed with climate change policy more than any other group. A greater percentage of people within minority groups supported climate change policy than white people. A greater percentage of the white population disagreed or remained neutral compared to other races.

Turning next to the linear regressions, I specified the climate change policy variable (dependent), the average cost of events from 2012-2016 variable (independent), individual race (independent), age, income, and education control variables, shown in Table 3. There was a not significant effect for any of the races between exposure, race, and climate change policy support. I then tested the same variables but swapped out the average cost of disaster from 2012-2016 variable for individual years (See Table 4-8). For year 2012, there is a statistically significant negative relationship for Whites (β = -.02, t = -1.73, p<0.10) (See Table 4). For year 2013, we see a statistically significant relationship for all races, however there is a negative correlation between the dependent and independent variables (See Table 4). As the cost for severe weather events increased the support for climate change policy decreased for White (β = -.03, t = -2.06, p<0.05), Hispanic/Latino (β = -.02, t = -2.66, p<0.01), Black (β = -.02, t = -2.26, p<0.05), and Asians (β = -.02, t = -2.20, p<0.05). No significant relationships for each race for 2014 and 2015 disaster cost variables. For 2016, there is a significant negative relationship for Black people (β = -.01, t = -1.77, p<0.10) (See Table 8). Few of the models showed statistically significant

relationships when testing the independent and dependent variables.

Given exposure to extreme weather events, as Black people get older there is a statistically positive relationship between race and support climate change policy for 2013, 2014, 2015, 2016, and the average from 2012-2016 cost of extreme events. There is a negative statistical relationship amongst Whites, Hispanic/Latino and Asians for 2012, 2013, 2014, 2015, 2016, and the average from 2012-2016 cost of extreme events (See Table 3-8). There is a negative statistical relationship between White, age and climate change policy support for 2012 (β = -.006, t = -2.95, p<0.01) 2013 (β = -.006, t = -3.13, p<0.01) 2014 (β = -.006, t = -2.90, p<0.01) 2015 (β = -.006, t = -2.84, p<0.01), 2016 (β = -.006, t = -2.97, p<0.01), and average from 2012-2016 (β = -.006, t = -2.99, p<0.01). There was a negative statistical relationship between Hispanic/Latino, age, and climate policy for 2012 (β = -.005, t = -3.50, p<0.01), 2013 (β = -.005, t = -3.53, p<0.01), 2014 (β = -.005, t = -3.51, p<0.01), 2015 (β = -.005, t = -3.49, p<0.01), 2016 (β = -.005, t = -3.51, p<0.01) and average from 2012-2016 (β = -.006, t = -3.53 p<0.01). There is also a negative statistical relationship between Asian, age, and climate policy for 2012 (β = -.007, t = -5.76, p<0.01), 2013 (β = -.007, t = -5.68, p<0.001), 2014 (β = -.007, t = -5.62, p<0.001), 2015 (β = -.007, t = -5.59, p<0.001), 2016 (β = -.007, t = -5.61, p<0.001) and average from 2012-2016 (β = -.007, t = -5.65, p<0.01).

The relationship between being White and support for climate change policy was estimated to be negative in 4 of 6 models. Two negative estimated effect was statistically significant for 2012 and 2013. The relationship between being Hispanic/Latino and support for climate change policy was estimated to be negative in 5 of 6 models. One negative estimated effect was statistically significant for 2013. The relationship between being Black and support for climate change policy was estimated to be negative in 4 of 6 models. Two negative estimated

effect was statistically significant for 2013 and 2016. The relationship between being Asian and support for climate change policy was estimated to be negative in 5 of 6 models. One negative estimated effect was statistically significant for 2013.

Overall, the results do not support my hypothesis and theoretical expectations. The findings of this study suggest that there is not a significant relationship between race, exposure to extreme weather events and climate change policy support, particularly among people of color. While there were some notable differences between races, there was not a significant difference between people of color and white people. Additionally, the results of the regression analysis indicate that age has a significant influence on climate change policy support among Black people. While there were some unexpected findings that did not support my hypothesis, these results underscore the importance of understanding this complex issue.

CHAPTER 7

DISCUSSION

There is evidence that suggests exposure to extreme weather events can increase support for climate change policy (Zanocco et al. 2019). However, the evidence provided in this study does not support that people of color are significantly more supportive of climate change policy than white people when exposed to extreme weather events. The data does suggest that policy support varies according to race which leads me to conclude that the relationship between race severe weather events, and climate change is more complex than I am able to show with the existing data.

Climate change policy support may vary among groups depending on other factors like age, ideology, education, and income. I incorporated exposure to extreme weather events into my theory and hypothesis because the literature indicates that exposure increases risk which may lead to more support for climate change policy. I theorized that people of color would feel strongly about climate change support because they are disproportionately affected by the negative effects of it. However, prior studies have found that because people of color are discriminated against in other areas of society, there may be other immediate concerns before climate change even after experiencing extreme weather. I found that given exposure to extreme weather events, as Black people get older there is a statistically positive relationship between race and support for climate change policy. This supports Benegal et al. (2022) findings where age was positively correlated with support for climate policy, with people 65 and older supporting climate policy at the highest rate. One explanation for this could be that young Black people could hold lower levels of concern for climate-related issues due to their prioritization of other policy issues. Some of these issues could be racialized economic inequities, policing and

criminal justice, housing insecurity, and racial discrimination. Benegal et al. (2022) also found that there is a negative linear relationship among their white respondents, older white people were less supportive of climate policies which is consistent with my findings. People of color may be concerned with obtaining the resources they need to survive and may not be connecting their issues to climate change policy after severe weather events. There has been a significant increase in information available to the public about climate change in recent years (Reynolds et al. 2010). However, one explanation for exposure to extreme events not significantly influencing climate change policy support could be the lack of exposure to and understanding of scientific information about climate change (Bauer et al. 2007). Especially if media and the government are not discussing the connection between extreme events and climate change. There are more Black people that neither agree nor disagree about climate change than any other race. This could also be due to a lack of understanding. People of color may be more concerned with other policies involving crime, housing insecurity, racial discrimination, and other issues. These issues may take precedence over climate change policy. Historically, people of color have been underrepresented in politics and decision-making positions related to climate change policy (Chu and Cannon 2021). This issue may make people of color feel far removed from climate change policy and feel uncomfortable taking a stance on the issue.

CHAPTER 8

LIMITATIONS AND FUTURE RESEARCH

This research provides information for an important gap in the climate change and race literature. However, there were limitations in this study. All extreme weather events were pulled from NCEI. Scientists and the general population are not certain that particular weather events like tornadoes are due to climate change. NCEI included tornadoes in their severe storm category and that may skew data results. In extreme weather events literature, tornadoes are typically included but for most people the occurrence of a tornado is not linked to climate change. Other extreme weather events that are scientifically proven to be a direct effect of climate change may not be understood by some of the American population. NCEI's cost of disaster data reflects the economic damage and the level of disruption but it does not reflect loss of life, injuries, and displaced people. It also does not reflect population density within states. A state may be more populated creating higher economic cost compared to a state with lower population where the infrastructure may be more spread out even though the effects to people's lives are severely impacted. NCEI captures tangible cost but does not account for intangible costs like emotional trauma. NCEI is also conducted via the internet which could exclude people without internet access.

I wish to make a few recommendations about the direction of future research. Future research might further investigate a broader range of races. The CMPS survey only included White, Black, Hispanic, and Asians. The literature suggests that racial groups such as Native Americans are also disproportionately impacted by climate change. The literature discussing Native Americans and climate change is limited and should be researched further. Asians were included in my study, but they are a racial group that is understudied in the climate change

literature. There's less evidence of climate-related disparities among Asians; however, most studies combine multiple ethnicities (e.g., Filipino, Vietnamese, East Indian, Chinese, Korean, etc.) into one category, likely obscuring important differences and possible disparities across groups that have experienced marginalization differently in America (Berberian et al. 2022). To better understand the diversity of voices and responses to climate change problems it is important for research to move beyond the White/Person of Color dichotomy and investigate various racial groups. Climate change opinions and vulnerabilities vary among different minority races so distinguishing the races in future research would be beneficial. Understanding the unique vulnerabilities among the undocumented immigrant population and residents of US territories besides Puerto Rico and their climate change opinions would be useful. Future research should continue to collect similar information across data-poor areas to acquire a more complete and detailed understanding of how the population perceives the pressing threat of climate change. Surveys before and after important disasters are also useful to better understand the dynamic nature of disasters and climate change opinion. I think it would be interesting to focus on one state and regularly conduct surveys involving climate change attitudes. As severe weather events get worse, tracking the attitudes over time could provide beneficial information about the effects of extreme weather events and race on climate change policy support. Focusing on one state and regularly conducting surveys involving climate change attitudes could provide interesting data.

Many believe that the vulnerability of racial and ethnic communities to disasters is mainly due to economic status and resources, and argue we should be addressing class issues, not those of race and ethnicity. Racial communities are disproportionately poor in the US, the proportion of poor among minorities is growing. However, it is important that we do not dismiss issues of race. While in many ways they cannot be separated from issues of economic resources

and power, in other ways they explain marginalization in the disaster experience in a manner that socioeconomic factors cannot and how it may influence climate change opinion. In the last decade the disaster and climate change research community has begun to thoroughly document racial inequalities in disaster risk and vulnerability in hopes of improving the situation and taking measures to prepare for future events and this progress should continue.

CHAPTER 9

RECOMMENDATIONS

After researching the climate change vulnerabilities among minorities in America, I think it is important to mention a few recommendations for future policy and government action. National agencies such as FEMA and the Red Cross and other groups that respond to disaster on a large scale need to continue educate themselves on the diversity of various communities and plan accordingly. Local governments should also be required to integrate the diverse cultural and linguistic needs of their residents when updating their disaster and emergency plans. Local governments should collaborate with community-based organizations and residents in order to develop culturally appropriate emergency response and planning resources. People who are marginalized in the early stages are marginalized later. They need to be part of the planning from the beginning. Increasing the representation of people of color in the of environmental sector may also have implications for bridging political divisions and fostering greater consensus in climate change decision making. Government agencies should plan ahead and strategically allocate resources to communities with the greatest risks that will result in the greatest improvement in disaster resilience. Agencies and organizations understanding disparities can help inform better disaster and climate change adaptation planning to protect the most vulnerable populations. Authorities and community leaders, in areas most affected by extreme weather events should remind people that climate change has the potential to lead to higher frequencies of extreme events in their area in the near future. Migrating out of these areas could be an idea worth considering. However, it is important to understand the unique needs and barriers of minority groups to ensure that barriers to sustained involvement in climate change action is addressed. My recommendations do not imply that agencies are not working in this area; several

agencies have made a concerted effort to incorporate better policies for a diverse population, however it is apparent that it should be a top priority. A systematic change more than personal change is required to address the climate change challenge (Boucher et al. 2021). If the public were overwhelmingly concerned with climate change, the government would be more likely to act as it has in the past on issues like nuclear energy and toxics (Dietz et al. 2007). I hope the researchers steer a productive course towards ending the vulnerability of many minority communities in the U.S. to climate change.

CHAPTER 10

CONCLUSION

Climate change is a complex problem involving interactions among biological, physical, and social systems. Earth's climate will continue to change over this century and beyond. All people are exposed to weather extremes and climate impacts, but people of color have greater exposure and less resilience (Shepherd and KC 2015). Contrary to my initial hypothesis, the results of the study did not provide evidence of a statistically significant relationship between race, climate disaster cost, and climate change policy support. However, the results do show that there is a difference amongst races in climate change policy support, given extreme weather events. There should be a collaboration among scientists, policymakers, and diverse publics including populations most burdened by climate impacts. Addressing climate change requires both broad collective support for government policies and an understanding of the needs and policy preferences of communities and demographics most impacted by climate change. Understanding how various groups of people perceive and respond to climate, and why there are differences between groups, can help improve communication about climate change across diverse audiences, and more effectively support public engagement and action. As the effects of climate change worsen and more people experience the negative effects of it, researchers should provide valuable information about future climate change behavior and engagement in the United States. There are real world applications and practical benefits to understanding the factors that contribute to climate change policy support. It is thus essential to understand how support for such policies varies significantly across individuals and groups.

REFERENCE LIST

Allan, Jinan, J. Ripberger, W. Wehde, M. Krocak, C. Silva, H. Jenkins-Smith. 2020. "Geographic Distributions of Extreme Weather Risk Perceptions in the United States" *Risk Analysis* 40(12): 2498-2508.

Armstrong, Cory, J. Cain, J. Hou. 2020. "Ready for Disaster: Information Seeking, Media Influence, and Disaster Preparation for Severe Weather Outbreaks" *Atlantic Journal of Communication* 29(3):121-135.

Aune, Kyle, D. Gesch, and G. Smith. 2020. "A Spatial Analysis of Climate Gentrification in Orleans Parish, Louisiana post-Hurricane Katrina" *Environmental Research* 185: 109384.

Baker, Earl J. 2011. "Household Preparedness for the Aftermath of Hurricanes in Florida." *Applied Geography* 31(1):46-52.

Ballew, M., Maibach, E., Kotcher, J., Bergquist, P., Rosenthal, S., Marlon, J., and Leiserowitz, A. 2020. "Which racial/ethnic groups care most about climate change?" Yale University and George Mason University. New Haven, CT: Yale Program on Climate Change Communication. https://climatecommunication.yale.edu/publications/race-and-climate-change/.

Ballew, Matthew, A. Leiserowitz, C. Roser-Renouf, S. Rosenthal, J. Kotcher, J. Marlon, E. Lyon, M. Goldberg, E. Maibach. 2019. "Climate Change in the American Mind: Data, Tools, and Trends" Environment: *Science and Policy for Sustainable Development* 61(3): 4-18.

Ballew, Matthew, A. Pearson, J. Schuldt, J. Kotcher, E. Maibach, S. Rosenthal, A. Leiserowitz. 2021. "Is the Political Divide on Climate Change Narrower for People of Color? Evidence from a decade of U.S. Polling?" *Journal of Environmental Psychology* 77: 1-7.

Ballew, Matthew, A. Pearson, M. Goldberg, S. Rosenthal, A. Leiserowitz. 2020. "Does Socioeconomic Status Moderate the Political Divide on Climate Change? The Roles of Education, Income, and Individualism" *Global Environmental Change* 60: 2-12.

Ballew, Matthew, E. Maibach, J. Kotcher, P. Bergquist, S. Rosenthal, J. Marlon, A. Leiserowitz. 2020. "Which Racial/Ethnic Groups Care Most About Climate Change?" *Yale Program on Climate Change Communication* Accessed March 6, 2023. https://climatecommunication.yale.edu/publications/race-and-climate-change/

Barry, J.M. 1997. *Rising Tide: The Great Mississippi Flood of 1927 and How It Changed America*. New York: Simon & Schuster.

Basu, Rupa and B. Ostro. 2008. "A Multicounty Analysis Identifying the Populations Vulnerable to Mortality Associated with High Ambient Temperature in California" *American Journal of Epidemiology* 168(6):632–637.

Bauer, Martin, N. Allum, and S. Miller. 2007. “What Can We Learn from 25 Years of PUS Survey Research? Liberating and Expanding the Agenda” *Public Understanding of Science* 16: 79-95.

Benegal, Salil and M. Holman. 2021. "Racial Prejudice, Education, and Views, of Climate Change" *Social Science Quarterly* 102(4): 1907-1919.

Benegal, Salil D. 2018. “The spillover of race and racial attitudes into public opinion about climate change” *Environmental Politics* 27(4): 733-756.

Benegal, Salil, F. Azevedo, and M. Holman. 2022. "Race, Ethnicity, and Support for Climate Policy" *Environmental Research Letters* 17:1-19.

Berberian, Alique, D. Gonzalez, L. Cushing. 2022. "Racial Disparities in Climate Change-Related Health Effects in the United States" *Current Environmental Health Reports* 9: 451-464.

Bergquist Magnus, A. Nilsson, P.W. Schultz. 2019. "Experiencing a Severe Weather Event Increases Concern About Climate Change" *Front Psychol* 10:1-6.

Black Richard, N. Arnell, W. Adger, D. Thomas, & A. Geddes. 2013. "Migration, Immobility and Displacement Outcomes Following Extreme Events" *Environmental Science & Policy* 27: S32-S43.

Boucher, Jean Leon, Garfield T. Kwan, Gina R. Ottoboni, Mark S. McCaffrey. 2021. “From the suites to the streets: Examining the range of behaviors and attitudes of international climate activists” *Energy Research & Social Science* 72.

Boudet, Hilary, L. Giodono, C. Zanocco, H. Satein, H. Whitley. 2020. "Event Attribution and Partisanship Shape Local Discussion of Climate Change After Extreme Weather" *Nature Climate Change* 10(1): 1-16.

Bowden, John. 2018. "John Lewis: ‘Scars and stains of racism are still deeply embedded in American society’" Accessed April 1, 2023. https://thehill.com/homenews/house/415171-john-lewis-scars-and-stains-of-racism-are-still-deeply-embedded-in-american/.

Brodie, Mollyann, E. Weltzien, D. Altman, R. Blendon, & J. Benson. 2006. "Experiences of Hurricane Katrina Evacuees in Houston Shelters: Implications for Future Planning” *American Journal of Public Health* 96(8):1402–1408.

Brulle, Robert J., J. Carmichael, J. C. Jenkins. 2012. “Shifting Public Opinion on Climate Change: An Empirical Assessment of Factors Influencing Concern Over Climate Change in the U.S., 2002-2010” *Climatic Change* 114:169-188.

CarbonBrief. 2023. "Mapped: How Climate Change Affects Extreme Weather Around the World". Accessed March 26, 2023. https://www.carbonbrief.org/mapped-how-climate-change-affects-extreme-weather-around-the-world/.

Carroll, M.S., P. Cohn, D. Seesholtz, L. Higgins. 2005. "Fire as Galvanizing and Fragmenting Influence on Communities: The Case of the Rodeo Chediski Fire" *Society & Natural Resources* 18(4): 301-320.

Centers for Disease Control and Prevention. CDC. "About Extreme Heat". Accessed April 2, 2023. https://www.cdc.gov/disasters/extremeheat/heat_guide.html

Chang, Heejun and Franczyk, J. 2008. "Climate Change, Land-Use Change, and Floods: Toward an Integrated Assessment" *Geography Compass* 2(5): 1549-1579.

Chu, Eric K. and C. Cannon. 2021. "Equity, Inclusion, and Justice as Criteria for Decision-Making on Climate Adaptation in Cities" *Current Opinion in Environmental Sustainability* 51: 85-94.

Collaborative Multiracial Post-Election Survey. 2016. “CMPS Survey”. https://cmpsurvey.org

Craig, Richard, W. Yagatich, S. Patzer, K. Timm, E. Maibach. 2021."Race/Ethnicity and Climate Change Reporting: Perceptions and Interests of News Personnel's Interest to Cover Climate Change Based on Race" *Environmental Communication* 17(2): 135-145.

Curtis, Katherine J. and Annemarie Schneider. 2011. “Understanding The Demographic Implications of Climate Change: Estimates of Localized Population Predictions Under Future Scenarios of Sea-Level Rise” *Population and Environment* 33: 28-54.

Davies, Ian P., R. Haugo, J. Robertson, and P. Levin. 2018. "The Unequal Vulnerability of Communities of Color to Wildlife" *PloS One* 13(11): 1-15.

Demski, Christina, S. Capstick, N. Pidgeon, R. Sposato, A. Spence. 2017. "Experience of Extreme Weather Affects Climate Change Mitigation and Adaptation Responses" *Climatic Change* 140(2): 149-164.

Dietz, Thomas, Amy Dan and Rachael Shwom. 2007. “Support for Climate Change Policy: Social Psychological and Social Structural Influences” *Rural Sociology* 72(2): 185-214.

Domingue, Simone and C. Emrich. 2019. "Social Vulnerability and Procedural Equity: Exploring the Distribution of Disaster Aid Across Counties in the United States" *The American Review of Public Administration* 49(8): 897-913.

Donner, William and Havidan Rodriguez. 2008. “Population Composition, Migration and Inequality: The Influence of Demographic Changes on Disaster Risk and Vulnerability” *Social Forces* 87(2):1089-1114.

Drakes, Oronde, E. Tate, J. Rainey, S. Brody. 2021. "Social Vulnerability and Short-Term Disaster Assistance in the United States" *International Journal of Disaster Risk Reduction* 53: 1-10.

Eakin, Hallie and A. Luers. 2006. "Assessing the Vulnerability of Social-Environmental Systems" *Annual Review of Environment and Resources* 31: 365-394.

Elliott, James R., P. Brown, K. Loughran. 2020. "Racial Inequities in the Federal Buyout of Flood- Prone Homes: A Nationwide Assessment of Environmental Adaptation" *Socius* 6: 1-15.

Environment: New Jersey. n.d. “Extreme Weather Map: Fact Sheet”. Accessed May 2, 2022. Environmentnewjersey.org/page/nje/extreme-weather-map-fact-sheet.

Finch, Christina, C. T. Emrich, & S. L. Cutter. 2010. "Disaster Disparities and Differential Recovery in New Orleans" *Population and Environment* 31: 179–202.

Flores, Aaron, T. Collins, S. Grineski, J. Chakraborty. 2020. "Social Vulnerability to Hurricane Harvey: Unmet needs and Adverse Event Experiences in Greater Houston, Texas" *International Journal of Disaster Risk Reduction* 46: 1-9.

Fothergill, Alice and Lori Peek. 2004. "Poverty and Disasters in the United States: A Review of Recent Sociological Findings." *Natural Hazards* 32(1):89-110.

Fothergill, Alice, J. Darlington, E. Maestas. 1999. "Race, Ethnicity and Disasters in the United States: A Review of the Literature" *Disasters* 23(2): 156-173.

Gamble, J.L., J. Balbus, M. Berger, K. Bouye, V. Campbell, K. Chief, K. Conlon, A. Crimmins, B. Flanagan, C. Gonzalez-Maddux, E. Hallisey, S. Hutchins, L. Jantarasami, S. Khoury, M. Kiefer, J. Kolling, K. Lynn, A. Manangan, M. McDonald, R. Morello-Frosch, M.H. Redsteer, P. Sheffield, K. Thigpen Tart, J. Watson, K.P. Whyte, and A.F. Wolkin. 2016. Ch. 9: Populations of Concern. The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment. *U.S. Global Change Research Program*, Washington, DC, 247–286.

Giordono, Leanne, C. Zanocco, H. Peterson, H. Boudet. 2022. "Shelter from the Storm: How Perceived Extreme Event Experience and Government Trust Shapes Public Support for Climate Change Mitigation Policy in the United States" *Risks, Hazards, & Crisis in Public Policy* 14: 45-67.

Giordono, Leanne, H. Boudet, A. Gard-Murray. 2020. "Local Adaptation Policy Responses to Extreme Weather Events" *Policy Sciences* 53:609-636.

Goldberg, Matthew, A. Gustafson, M. Ballew, S. Rosenthal, M. Cutler, A. Leiserowitz. 2020. "Predictors of Global Warming Risk Perceptions Among Latino and Non-Latino White Americans" *Climatic Change* 162:1555-1574.

Grindal, Matthew, D. Sarathchandra, K. Haltinner. 2023. "White Identity and Climate Change Skepticism: Assessing the Mediating Roles of Social Dominance Orientation and Conspiratorial Ideation" *Climate* 11(2): 1-16.

Hallegatte, Stéphane. 2014. *Natural Disasters and Climate Change: An Economic Perspective*. Springer International Publishing AG. ProQuest Ebook. http://ebookcentral.proquest.com/lib/unt/detail.action?docID=1965468.

Harlan, Sharon, M. Sarango, E. Mack, T. Stephens. 2019. "A Survey-Based Assessment of perceived Flood Risk in Urban Areas of the United States" *Anthropocene* 28:1-12.

Hauer, Matthew, J. Evans, and D. R. Mishra. 2016. "Millions Projected to be at Risk from Sea-Level Rise in the Continental United States" *Nature Climate Change* 6(7):691-695.

Hoffmann, Roman, R. Muttarak, J. Peisker, P. Stanig. 2022. "Climate Change Experiences Raise Environmental Concerns and Promote Green Voting" *Nature Climate Change* 12(2): 148-155.

Hori, Makiko & Schafer, M. J. 2009. "Social Costs of Displacement in Louisiana after Hurricanes Katrina and Rita" *Population and Environment* 31:64–86.

Howell, Junia and J. Elliott. 2019. "Damage Done: The Longitudinal Impacts of Natural Hazards on Wealth Inequality in the United States" *Social Problems* 66(3): 448-467.

Keenan, Jesse M., Thomas Hill, and Anurag Gumber. 2018. "Climate Gentrification: from Theory to Empiricism in Miami-Dade County, Florida" *Environmental Research Letters* 13(5): 1-11.

Konisky, David, L. Hughes, C. Kaylor. 2016. "Extreme Weather Events and Climate Change Concern" *Climatic Change* 134(4): 533-547.

Latkin, Carl, L. Dayton, D. Lee, G. Yi, M. Uzzi. 2021. "Correlates of Levels of Willingness to Engage in Climate Change Actions in the United States" *International Journal of Environmental Research and Public Health* 18: 1-16.

Li, Jennifer and K. Spidalieri. 2021. "Home is Where the Safer Ground is: The Need to Promote Affordable Housing Laws and Policies in Receiving Communities" *Journal of Environmental Studies and Sciences* 11:682-695.

Li, Min and F. Yuan. 2022. "Historical Redlining and Food Environments: A Study of 102 Urban Areas in the United States" *Health & Place* 75:1-10.

Linscott, Gabrielle, A. Rishworth, B. King, and M. Hiestand. 2021. "Uneven Experiences of Urban Flooding: Examining the 2010 Nashville Flood" *Natural Hazards* 110:629-653.

Maldonado, Alejandra, Timothy Collins, and Sara E. Grineski. 2016. "Hispanic Immigrants' Vulnerabilities to Flood and Hurricane Hazards in Two United States Metropolitan Areas" *Geographical Review* 106(1): 109-135.

Marlon, Jennifer, X. Wang, M. Mildenberger, P. Bergquist, S. Swain, K. Hayhole, P. Howe, E. Maibach, A. Leiserowitz. 2021. "Hot Dry Days Increase Perceived Experience with Global Warming" *Global Environmental Change* 68:2-11.

Marlon, Jennifer, X. Wang, P. Bergquist, P. Howe, A. Leiserowitz, E. Maibach, M. Mildenberger, S. Rosenthal. 2022. "Change in US State-Level Public Opinion About Climate Change: 2008-2020" *Environmental Research Letters* 17: 1-18.

McPhillips, Lauren, Chang, H., Chester, M. V., Depietri, Y., Friedman, E., Grimm, N. B., Kominoski, J. S., McPhearson, T., Méndez-Lázaro, P., Rosi, E. J., & Shafiei Shiva, J. 2018. "Defining Extreme Events: A Cross-Disciplinary Review" *Earth's Future* 6:441–455.

Mendez, Michael, G. Flores-Haro, L. Zucker. 2020. "The (In)visible Victims of Disaster: Understanding the Vulnerability of Undocumented Latino/a and Indigenous Immigrant" *Geoforum* 116:50-62.

Mendez, Michael. 2020. *Climate Change from the Streets: How Conflict and Collaboration Strengthen the Environmental Justice Movement*. New Haven: Yale University Press.

Myers, Teresa, E. Maibach, C. Roser-Renouf, K. Akerlof, A. Leiserowitz. 2013. "The Relationship Between Personal Experience and Belief in the Reality of Global Warming" *Nature Climate Change* 3(4):343-347.

Nardone, Anthony, K. Rudolph, R. Morello-Frosch, J. Casey. 2021. "Relines and Greenspace: The Relationship between Historical Redlining and 2010 Greenspace across the United States" *Environmental Health Perspectives* 129(1):1-9.

National Geographic. 2022. "Maybe It's Cold Outside" Last modified June 2, 2022. https://education.nationalgeographic.org/resource/maybe-its-cold-outside/.

National Institute of Environmental Health Sciences. 2022. "Health Impacts of Extreme Weather" Last modified August 30, 2022. https://www.niehs.nih.gov/research/programs/climatechange/health_impacts/weather_related_morbidity/index.cfm#:~:text=Extreme%20heat%20can%20lead%20to,heat%2Drelated%20complications%20or%20death.

Nogueira, Leticia, K. White, B. Bell, K. Alegria, G. Bennett, D. Edmondson, E. Epel, E. Holman, I. Kronish, J. Thayer. 2022. "The Role of Behavioral Medicine in Addressing Climate Change Related Health Inequities" *Translational Behavioral Medicine* 12(4): 526-534.

NOAA National Centers for Environmental Information (NCEI). 2023. "U.S. Billion-Dollar Weather and Climate Disasters ". https://www.ncei.noaa.gov/access/billions/mapping.

Ojerio, Ryan, C. Moseley, K. Lynn, and N. Bania. 2011 "Limited Involvement of Socially Vulnerable Populations in Federal Programs to Mitigate Wildfire Risk in Arizona" *Natural Hazards Review* 12(1): 28-36.

Oliver-Smith, Anthony. 2020. "Hurricanes, Climate Change, and the Social Construction of Risk" *International Journal of Mass Emergencies and Disasters* 38(1): 1-12.

Peisker, Jonas. 2023. "Context Matters: The Drivers of Environmental Concern in European Regions" *Global Environmental Change* 79: 1-15.

Perry, Ronald W., and Marjorie R. Greene. 1982. "The Role of Ethnicity in the Emergency Decision-Making Process." *Sociological Inquiry* 52(4):306-34.

Ray, Aaron, L. Hughes, D. Konisky, C. Kaylor. 2017. "Extreme Weather Exposure and Support for Climate Change Adaptation" *Global Environmental Change* 46: 104-113.

Reynolds, Travis, A. Bostrom, D. Read, M Granger Morgan. 2010. “Now What Do People Know About Global Climate Change? Survey Studies of Educated Laypeople” *Risk Analysis* 80(10):1520-1538.

Riad, Jasmin K., Fran H. Norris and R. Barry Ruback. 1999. "Predicting Evacuation in Two Major Disasters: Risk Perception, Social Influence, and Access to Resources." *Journal of Applied Social Psychology* 29(5):918-34.

Rudman, Lauri, M. McLean, M. Bunzl. 2013. "When Truth Is Personally Inconvenient, Attitudes Change: The Impact of Extreme Weather on Implicit Support for Green Politicians and Explicit Climate-Change Beliefs" *Psychological Science* 24(11):2290-2296

Rumbach, Andrew, E. Sullivan, C. Makarewicz. 2020. "Mobile Home Parks and Disasters: Understanding Risk to the Third Housing Type in the United States" *Natural Hazards Review* 21(2): 1-13.

Schuldt, Jonathon and A. Pearson. 2016. "The Role of Race and Ethnicity in Climate Change Polarization: Evidence from a U.S. National Survey Experiment" *Climatic Change* 136(3-4): 495-505.

Shao W, Hao F. 2020. "Approval of political leaders can slant evaluation of political issues: evidence from public concern for climate change in the USA" *Clim Change* 158: 201-212.

Shepherd, Marshall and Binita KC. 2015. “Climate Change and African Americans in the USA” *Geography Compass* 9(11):579-591.

Shi, Linda and S. Moser. 2021. "Transformative Climate Adaptation in the United States: Trends and Prospects" *Science* 372(6549): 1-10.

Shonkoff, Seth B., R. Morello-Frosch, M. Pastor, J. Sadd. 2011. "The Climate Gap: Environmental Health and Equity Implications of Climate Change and Mitigation Policies in California—a Review of the Literature" *Climatic Change* 109: 485-503.

Smith, Adam B. and Jessica L. Matthews. 2015. "Quantifying Uncertainty and Variable Sensitivity Within the U.S. Billion-Dollar Weather and Climate Disaster Cost Estimates" *Natural Hazards* 77:1829-1851.

Smith, Adam B. and R.W. Katz. 2013. "U.S. Billion-Dollar Weather and Climate Disasters: Data Sources, Trends, Accuracy, and Biases" *Natural Hazards* 67(2):387-410.

Smith, Adam. 2023. "2022 U.S. Billion-Dollar Weather and Climate Disasters in Historical Context" Accessed March 28, 2023. https://www.climate.gov/news-features/blogs/2022-us-billion-dollar-weather-and-climate-disasters-historical-context.

Smith, Genee, E. Anjum, C. Francis, L. Deanes, C. Acey. 2022. "Climate Change, Environmental Disasters, and Health Inequities: The Underlying Role of Structural Inequalities" *Current Environmental Health Reports* 9:80-89.

Stott, Peter, N. Christidis, F. Otto, Y. Sun, J Vanderlinden, G. Oldenborgh, R. Vautard, H. Storch, P. Walton, P. Yiou, F. Zwiers. 2015. "Attribution of Extreme Weather and Climate-Related Events " *WIREs Climate Change* 7(1): 23-41.

Swope, Carolyn, D. Hernandez, L. Cushing. 2022. "The Relationship of Historical Redlining with Present-Day Neighborhood Environmental and Health Outcomes: A Scoping Review and Conceptual Model" *Journal of Urban Health* 99:959-983.

Thomalla, Frank, T. Downing, E. Spanger-Siegfried, G. Han, J. Rockstrom. 2006. “Reducing Hazard Vulnerability: Towards a Common Approach Between Disaster Risk Reduction and Climate Adaptation” *Disasters* 30(1): 39-48.

Thomas, Kimberly Anh and B. Warner. 2019. "Weaponizing Vulnerability to Climate Change" *Global Environmental Change* 57: 2-11.

Thomas, Kimberly, R. Hardy, H. Lazrus, M. Mendez, B. Orlove, I. Rivera-Collazo, J. Roberts, M. Rockman, B. Warner, R. Winthrop. 2018. "Explaining Differential Vulnerability to Climate Change: A Social Science Review" *WIREs Climate Change* 10(2):1-18.

Toya, Hideki and Mark Skidmore. 2007. "Economic Development and the Impacts of Natural Disasters" *Economic Letters* 94(1):20-25.

U.S. Climate Resilience Toolkit. 2023. "Regions" Accesses March 28, 2023. https://toolkit.climate.gov.

U.S. Department of Agriculture. 2023. "Extreme Weather" Accessed. March 26, 2023. https://www.climatehubs.usda.gov/content/extreme-weather.

U.S. Department of Defense. 2023. "Tackling the Climate Crisis" Accessed March 24, 2023. https://www.defense.gov/spotlights/tackling-the-climate-crisis/.

U.S. Global Change Research Program. 2014. "Climate Change Impacts in the United States: The Third National Climate Assessment" U.S. Government Printing Office doi:10.7930/J0Z31WJ2.

U.S. Global Change Research Program. 2018. "Fourth National Climate Assessment: Impact, Risks, and Adaptation in the United States" U.S. Government Publishing Office doi: 10.7930/NCA4.2018.

United Nations. 2023. "What is Climate Change" Accessed March 23, 2023. https://www.un.org/en/climatechange/what-is-climate-change.

United States Environmental Protection Agency. 2016. "What Climate Change Means for Texas" Accessed March 28, 2023. https://www.epa.gov/sites/default/files/2016-09/documents/climate-change-tx.pdf

United States Environmental Protection Agency. 2023a. "Climate Change Indicators" Accessed March 24, 2023. https://www.epa.gov/climate-indicators/weather-climate.

United States Environmental Protection Agency. 2023b. "Climate Change Indicators: Heat Waves" Accessed March 26, 2023. https://www.epa.gov/climate-indicators/climate-change-indicators-heat-waves

USGS. 2023. "Droughts and Climate Change " Accessed March 27, 2023. https://www.usgs.gov/science/science-explorer/climate/droughts-and-climate-change.

Van der Linden, Sander. 2014. "On the Relationship Between Personal Experience, Affect and risk Perception: The Case of Climate Change" *European Journal of Social Psychology* 44(5):430-440.

Versey, Shellae H. 2021. “Missing Pieces in the Discussion on Climate Change and Risk: Intersectionality and Compound Vulnerability” *Policy Insights from the Behavioral and Brain Sciences* 8(1): 67-75.

Wachinger, Gisela, O. Renn, C. Begg, C. Kuhlicke. 2012. "The Risk Perception Paradox--Implications for Governance and Communication of Natural Hazards" *Risk Analysis* 32(6):1049-1065.

Wilder, Margaret, D. Liverman, L. Bellante, T. Osborne. 2016. "Southwest Climate Gap: Poverty and Environmental Justice in the US Southwest" *Local Environment* 21(11): 1332-1353.

Williams, A.P., J.T. Abatzoglou, A. Gershunov, J. Guzman-Morales, D. Bishop, J. Balch, and D. Letternmaier. 2019. “Observed Impacts of Anthropogenic Climate Change on Wildfire in California” *Earth’s Future* 7(8): 892-910.

Wong-Parodi, Gabrielle and D. Garfin. 2021. "Hurricane Adaptation Behaviors in Texas and Florida: Exploring the Roles of negative Personal Experience and Subjective Attribution to Climate Change" *Environmental Research Letters* 17:1-13.

Xia, Ziqian, J. Ye, Y. Zhou, P. Howe, M. Xu, X. Tan, X. Tian, C. Zhang. 2022. "A Meta-Analysis of the Relationship Between Climate Change Experience and Climate Change Perception" *Environmental Research Communications* 4(10): 1-10.

Zanocco, Chad, H. Boudet, R. Nilson, J. Flora. 2019. "Personal Harm and Support for Climate Change Mitigation Policies: Evidence from 10 U.S. Communities Impacted by Extreme Weather" *Global Environmental Change* 59:1-9.

Zanocco, Chad, Hilary Boudet, Roberta Nilson, Hannah Satein, Hannah Whitley, and June Flora. 2018. “Place, Proximity, and Perceived Harm: Extreme Weather Events and Views about Climate Change” *Climatic Change* 149: 349-365.

Zanocco, Chad, J. Flora, H. Boudet. 2022. "Disparities in Self-Reported Extreme Weather Impacts by Race, Ethnicity, and Income in the United States" *Plos Climate* 1(6):1-20.