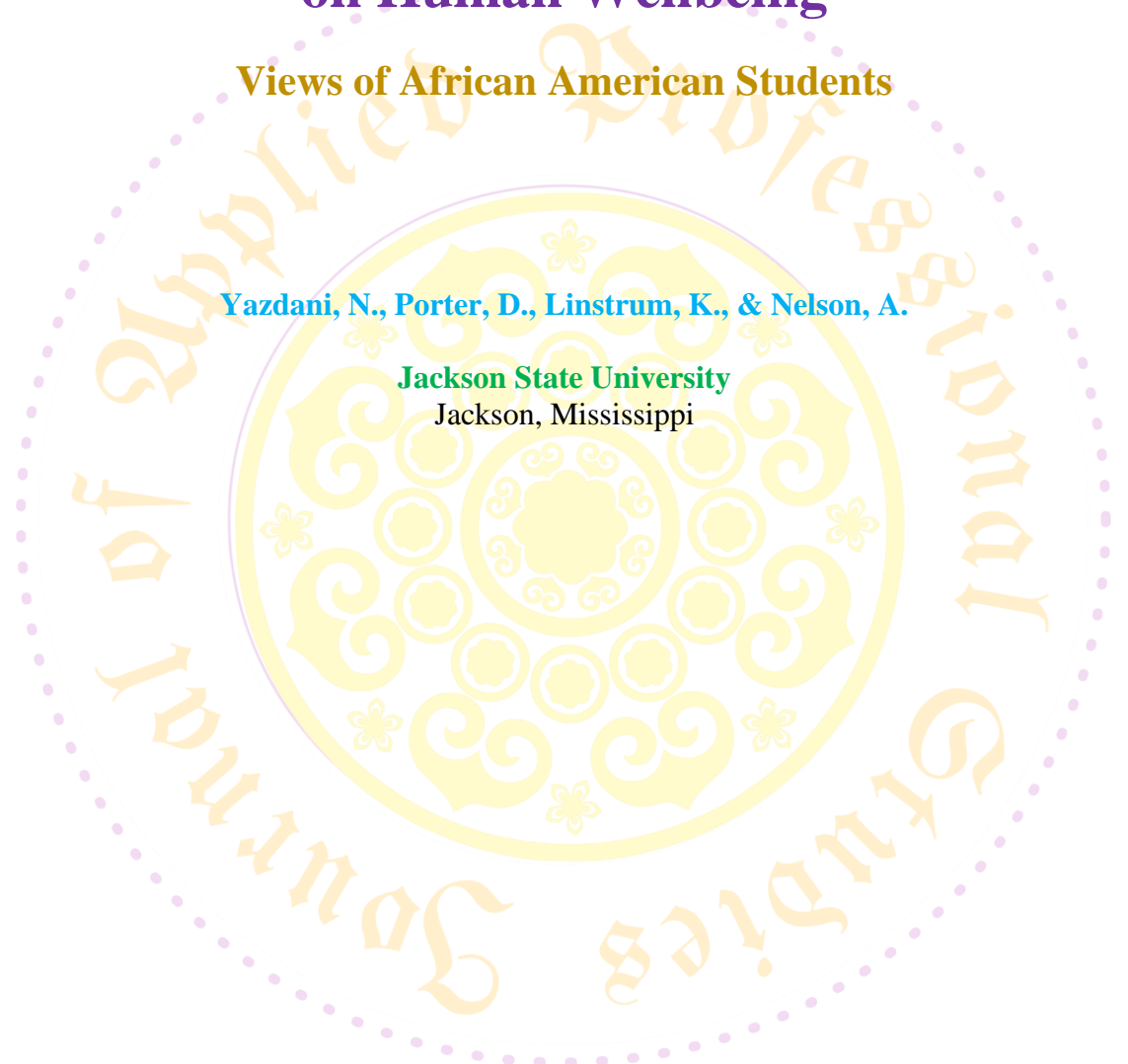


Processing Disaster Caused by Climate Change on Human Wellbeing

Views of African American Students

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Abstract

The complex phenomenon of global climate change has been demonstrated to have a grave impact on human wellbeing when global economy, human safety and security on global scale become the points of covenant. The vast majority of climate change researchers are driven by preservation of human lives and environmental circumstances. Since atmospheric carbon dioxide concentration is constantly on the rise, its impact on food supplies, human safety, global economy, and health issues becomes the center of attention. Consequently, perception of climate change, perceived as the discernment of disaster, exacerbates human wellbeing in regard to health, economy, and security in a disproportionate scale. This analysis presents the perception of African American college students on the increasingly serious consequences of human involvement on catastrophic climate change impacting their wellbeing with respect to health, economy, security, and raising sea level. These findings reveal that climate change's desolation, from human influences is resulting in severe storms, tornados, droughts, distressing heat waves, polluted air, more unstable global economy and more global insecurity. In conclusion, this complex phenomenon, perceived as disaster, manifests itself as a barrier to the wellbeing of African American students when the issues of health, global security and global economic are at stake. Allocation of resources to raise the awareness of the public and involvement of world leaders and policy developers to fragility of our planet is in grave need.

Keywords: African American Students, Human Wellbeing, Climate Change, Global Security, Global Economic, Raising Sea Level, and Greenhouse gas.

INTRODUCTION

In recent years, the association between climate change and human wellbeing has gained significant attention (Yazdani, et al. 2021). The recognition of intersectionality between climate change, security, the global economy, and human wellbeing places inhabitants in a highly vulnerable position (United Nations Environmental Programme, (UNEP) (2022). Research indicated that rapid changes in the global climate are attributed to human behavior (Swim, et al., 2011). Nevertheless, the balance between the chemistry of the planet and society become vitally important (Kerbs, 2009). There appears to be a conflict between science and irrationality. The debate on the impact of global climate change on the planet and society can be viewed as a battle of coexistence. Moves and counter-moves of greed, ignorance, and common sense with regard to the origin of climate change often result in stalemates on policies.

The impact on the global economy and security to human psychological wellbeing have been directing the maneuvering of chaos (Yazdani, et al. 2021). Ignoring the signals from the planet around us, ignoring the voice of logic, places this blue planet and its residents toward a critical point. As a result, climate change is threatening mental health, physical health, human security, as

well as the global economy. This chaos realistically impacts the well-being of the global population, according to the United States Climate Change Research Program (CCRP) (2022). Based on this inquiry, Hulme (2009) believed that the full story of climate change is an unfolding story which is transforming the way society thinks, feels, and acts. Based on the World Resources Institute (WRI) (2015), rapid changes in weather patterns and the oceanic environment intensify localized stress and anxiety among people.

The intensified stress results in increasingly serious psychological disorders such as anxiety. The negative impact on fisheries, tourism, coastal protection, and human relocation further increases stress. The comprehensive report from the CCRP (2022) indicated that there is an explicit disparity in the United States between those who benefit from the causes of climate change and those who bear the costs of climate change. The report reflected that African Americans have already been disproportionately hindered by the effects of climate change. Climate change has increase health issues such as deaths during heat waves and increasing air pollution. Unemployment and economic hardship, associated with climate change, has primarily impacted African American communities. Additionally, the CCRP report indicated that African Americans are less responsible for climate change than other Americans. The findings of the CCRP reveal that policies intended to alleviate climate change can cause large health and economic costs for African Americans. There is a need to pay greater attention to mitigate the policies' effects or adapt to them. Climate change will degenerate existing equity issues within the United States.

LITERATURE REVIEW

Climate change is a term that denotes major changes in temperature, rainfall, snow, or wind patterns. The changes are lasting for decades or longer. The greatest contributing factor to these changes has scientifically been correlated to greenhouse gases. Earth is surrounded by a shield of gases. The atmosphere allows the light from the sun and other cosmic rays to pass through to the surface. The light is absorbed by the Earth's surface and transformed into heat energy. This heat energy is re-emitted by the surface on the Earth during the night (Environmental Protection Agency (EPA), (2010).

The report from Intergovernmental Panel on Climate Change (IPCC) (2013), indicated that due to the excessive presence of gasses in the atmosphere, the emission of heat from the earth's surface is prevented, resulting in increased temperatures referred to as global warming. The gases which are responsible for causing global warming, are called "greenhouse gases." According to Lindsey and Dahlman, (2023) the Earth's temperature has risen by an average of 0.14-degree Fahrenheit (0.08 Celsius) per decade since 1880 or about 2-degrees F in total.

The cause of climate change is either initiated by people or nature resulting in a shift in Earth's equilibrium (NASA, 2016). Clearly, human use of fossil fuels, deforestation, over-developed land for farming, the expansion of cities and building roads greatly increase the release of greenhouse gases into the atmosphere. The natural causes of climate change include changes in the Earth's orbit, the sun's intensity and the circulation of the ocean. Included in natural causes are the winds within the atmosphere and volcanic activity. Although the Earth's climate has changed many times throughout history, the rapid warming seen today cannot be explained by natural processes (EPA, 2010).

Today's scientific community is largely in agreement that human activity has had a drastic effect on the ecology of the planet. The acceleration of greenhouse gases, increasing temperatures are some of the results documented (Doppelt, 2016 & Weir, 2016). According to the World Health Organization (WHO) (2007), these climatological variations are having significant consequences on a wide variety of health issues, including psychological distress. (Haines and Patz (2004), noted that other disastrous changes being studied include heat waves, prolonged droughts, powerful storms, the rise in the sea level, and air pollution. All of these factors have resulted in a vast cost within the mental health system.

According to an estimate by Psychologist for Social Responsibility (PSR) (2017), billions of dollars in human capital will be lost as people, jobs, and families are displaced. The infrastructure is damaged by climate changes and ultimately people struggle with severe psychological responses. A growing body of research concerning mental health is focused on people with preexisting serious mental illness diagnoses. Costello, et al. (2009) as well as Page and Howard (2009) noticed that the effects of climate change continue to be discovered in many areas of life. As society delays a commitment to alter their responses concerning climate change with laissez faire attitudes, an increase of damaging consequences to human wellbeing will occur. Neria and Shultz (2012) commented that at the rate society is reacting with regard to the human contribution to greenhouse gas emissions, an ultimate catastrophic event is inevitable.

Greenhouse Gas and Its Role in Raising Temperature

Wolfson (2011) also recognized that one of the crucial factors in global warming and its impact on human wellbeing, is the stability between activities and functions of plants and animals. Kerbs (2009) stated that scientifically, the concept of ecology consists of distribution, profusion, and relation of organisms and their interactions with the environment. The stability between the chemistry of the planet and its residences becomes vitally important. NASA (2016) wrote that unfortunately, the greenhouse gas emissions has chiefly been created by industrialized countries. Thereby threatening the balance of the harmony between nature and people. The human footprint has been left all over the planet.

Greenhouse gas is a form of gas in the earth's atmosphere that absorbs and releases radiation from the sun within the thermal infrared range (Sathaye & Meyers, 2010). The primary greenhouse gases in the Earth's atmosphere are water vapor (H₂O), carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), CFC's (Chlorofluorocarbons- Freon gas), and ozone (O₃) (Karl and Trenberth, 2003). In addition to these main greenhouse gases, NASA (2016) has identified other gases which have a high potential to cause global warming, including: sulfur hexafluoride, hydrofluorocarbons, perfluorocarbons, and nitrogen Trifluoride. Kitchen (2014) noted that without greenhouse gases, the average temperature of Earth's surface would be approximately – 18 degrees Celsius, which is equivalent to 0 degrees Fahrenheit; rather than the current average of 15 degrees Celsius, which is roughly equivalent to 59 degrees Fahrenheit.

The infrared lights used in heat lamps, in restaurants to keep food warm, is also discharged from ordinary light bulbs and correspondingly impacts the greenhouse gas emission phenomenon. The WRI (2015) noted that as a result of greenhouse gas emissions, the air gets too hot, and the balance of life is disrupted. Species of plants and animals will die and the food chain would be disturbed.

Mora (2013) predicated if the greenhouse gas emissions continue at the existing rate, Earth's surface temperature could exceed historical levels as early as 2047. The temperature will potentially have harmful effects on ecosystems, biodiversity, and the livelihood of humans on the planet. Earth then absorbs radiant energy received from the sun and reflects some of it back in the form of light and heat. Earth's temperature balance becomes dependent on this equilibrium of incoming and outgoing energy. Kitchen (2014) reported that since global warming leads to an inequity in Earth's temperature, this energy balance translates to drastic changes in temperature. EPA (2016) simply stated that carbon dioxide absorbs heat. The more carbon dioxide there is in the atmosphere, the warmer the air will be.

How People Perceive Climate Change

Over the past three decades, there has been growing interest and increased awareness in the impact of climate change on human wellbeing, sense of security, and economic factors associated with mental health (NASA, 2016). Since the climate continues to change, the risks to human physical and psychological health will increase. The existing health threats and other health challenges will impact more people of all ages in more places globally (Kitchen, 2014). Based on the IPCC, (2013), a human's wellbeing concerning the cognitive and emotional domains, are provoked directly and indirectly by the perceptions of climate change.

According to the PSR (2017), there is an explicit disparity in the United States among those who benefit from the causes of climate change, and those who bear the costs of climate change. The basic findings of this report are threefold:

- 1) African Americans are already disproportionately burdened by the health effects of climate change, including deaths during heat waves and from worsened air pollution. Similarly, unemployment and economic hardship associated with climate change will fall most heavily on the African American community.
- 2) African Americans are less responsible for climate change than other Americans. Both historically and at present, African Americans emit less greenhouse gas.
- 3) Policies intended to mitigate climate change can generate large health and economic benefits or costs for African Americans, depending on how they are structured. Unless appropriate actions are taken to mitigate its effects or adapt to them, climate change will worsen existing equity issues within the United States.

WHO (2007) noted that the impact of global climate change on human well-being, global economy, and security of people also has been the subject of several researchers. The recent studies indicate that communities of color report greater climate change concern. These communities report environmental concerns as well.

Research concerning social justice documented how the impact of environmental problems are inequitably distributed across socioeconomic and racial/ethnic groups. The WHO reported that disadvantaged and historically underserved groups unduly experience environmental problems such as air, water, and soil pollution. These communities are exposed to hazardous waste thus, people of color in the United States recognize a great vulnerability to environmental threats like climate change. These communities are aware of their disadvantaged position in society. Doherty

and Clayton (2011) reported three modules of psychological impact of climate change: Direct (critical or disturbing effects of extreme weather events and changed environment); Indirect (threats to emotional well-being based on observation of impact and concern or uncertainty about future risks); and Psychosocial (chronic social and community effects of factors such as heat, drought, migrations, climate-related conflicts, and post disaster adjustment.) Carroll, et al., (2009) recognized that heavy rainfall and floods can cause panic attacks, difficulty sleeping, low motivation, and obsessive behavior. Simpson et al., (2011) reported persistent distress and anxiety may be especially prevalent in children and youth.

The report indicated that young people who were in a drought-affected area, felt undue levels of distress. These young people reported to their family about feeling anxious, isolated, and worried about the future. Neria and Shulz (2012), further noted these psychological consequences seem to be related to the exposure to sever climate changes. Climate changes apparently impacts human perception, feelings and behavior.

According to the Center for Disease Control (CDC) (2015), widespread scientific agreement indicated that the world's climate is changing at a fast pace and has a devastating impact on human wellbeing. Some of these climate changes will likely include more variable weather, heat waves, intense storms with heavy precipitation, flooding, droughts, sea level rising, and air pollution. Mora (2013) reported that each of these various events could negatively affect human wellbeing, and a sense of security. The purpose of this study is to examine African American college student's perception of how climate change impacts their wellbeing and their view of global security due to the devastating climate changes, and the impact on the global economy.

METHODOLOGY

Participants

Participant of this study consisted of ($N = 120$) undergraduate and graduate students. 75% of participants were female ($N=90$) and 25% were male ($N=30$) from Jackson State University in Jackson, Mississippi. Jackson State University is a Historically Black College and University (HBCU). These participants were randomly assigned to groups. The first group included 42% undergraduate students and 58% graduate students who were asked to complete a survey questionnaire.

Measures and Procedures

Flourishing wellbeing indicators were indexed by a 20-item measure of four forms of threats as the source of wellbeing (T); three patterns of disaster Exposure (E); and two root cause of disaster (R). Diagnostic criteria for identifying the presence or absence of wellbeing symptoms were deployed in most of the items. The participants cast their responses based on true and false statements indicating presence or absence of phenomenon. All the participants were furnished with informed consent that included information and about the process of this experiment.

RESEARCH DESIGN AND STATISTICS

A 4x3x2 MANOVA (Barsalou & Smith, 2018), was used to test the significance of 4 forms of threats as the main source of human wellbeing(T); 3 patterns of espousers to disaster (E); and 2 root causes of disaster (R). This design provides access to main and interaction effects of three independent variable namely (a) four forms of threats (human health, economy, global security, and raising sea level); (b) two root cause of disaster (natural phenomenon and human factor); and (c) three pattern of disaster exposure (direct, indirect, and both direct and indirect) which collectively impact dependent variable namely “human wellbeing”. Subjects was randomly selected for this inquiry. The dependent variable was the score on measure of human wellbeing in regard to health, economy security, and threat of rising sea level. Seven null hypotheses that were formulated were tested for significance by 4X2X3 weighted means factorial analysis of variance for equal cell.

RESEARCH HYPOTHESIS

1. There is no statistically significant main effect of the four forms of threats (T) on human wellbeing.
2. There is no statistically significant main effect of the three patterns of disaster Exposure (E) on human wellbeing.
3. There is no statistically significant main effect of two root cause of disaster (R) on human wellbeing.
4. There are no statistically significant interaction effects of the impact of (T x E)
5. There are no statistically significant interaction effects of the impacts of (T x D) disaster.
6. There are no statistically significant interaction effects of (E x R).
7. There are no statistically significant interaction effects of (T x R x E).

Purpose of Research

Since within the past several years numerous climate related disasters have devastated our community in Mississippi. This research is intended to assess the perception of African American students on climate change and its effects on their wellbeing from the stand point of health, economic factors, security factors, and raising sea level.

Within the past several years, our community has been experiencing violent tornados, excessive heat, and catastrophic rainfall as well of periods of droughts. Our state has a shoreline with the Gulf of Mexico; thus, our communities are concerned with the unstable sea water levels in the Gulf of Mexico. These experiences triggered the inquiry about the perception of African American as the work force of tomorrow in this unpredictable planet.

In this inquiry, MANOVA was used to analyze how multiple factors variables affects multiple response variables (Barsalou & Smith, 2018). In this analysis- MANOVA- we are looking at various combinations of independent variables to compare how they differ in their effects on the dependent variable (Wellbeing of African American Students). In this research we will assess the main effects and interaction effects of three independent variables (Barsalou & Smith, 2018). This study was designed to determine the effects of fours forms of threats (health, global insecurity,

global economic disaster, and raising sea levels) to human wellbeing due to the climate change based on three modes of exposure on participates to climate change (direct, indirect, and combination of both); and two source of disasters human and natural cause. The seven null hypotheses that were formulated were tested for significance by 4X2X3 weighted means factorial analysis of variance for equal cell.

Table 1
Variables characteristics as a percentage of the sample

Variable characteristics	Female <i>n</i> =90	Male <i>n</i> =30
Root Cause of Disaster		
Human	81.2%	93.40%
Natural Phenomenon	18.80%	16.60%
Disaster Exposure		
Direct	37.80%	96.67%
Indirect	1.40%	0%
Both Direct and Indirect	60.80%	3.33%
Forms of Threat		
Health	74.44%	31.14%
Global Economy	14.44%	37.00%
Global security	1.00%	27.86%
Raising sea level	0.98%	4.0%

Table 1 indicates that the rising sea levels are not as crucial to the wellbeing of students as much as health and global economy threat. Additionally, independent from gender, male and female are common opinion in regard to the impact of human as a root cause of climate change leading to disaster.

Table 2
Analysis of Variance Summery table for 4X3X2 Factorial Design

Source of Variance	<i>df</i>	SS	MS	<i>F</i>
Treats or Source of Wellbeing (T)	3	2715.14	905.04	24.89*
Pattern of Exposure (E)	2	911.37	455.85	12.53*
Root Cause (R)	1	32.14	32.14	0.88
TE	6	1371.90	228.65	6.28*
TR	3	73.26	26.08	0.73
ER	2	818.92	409.46	11.26*
TER	6	1077.06	179.51	4.93
S/TER	96	3491.37	36.36	

* $P < 0.01$

Table 2 provides breakdown of main effects and interaction effects of four forms of threats as a source of wellbeing, three modes of exposures, and two root cause climate change. However, the main effects of four forms of threat on human wellbeing was significant, $F(3, 96) = 24.89$, $p < 0.1$ and the main effect of pattern of exposure, was significant $F(2, 96) = 12.53$, $P < 0.1$ In conclusion the hypotheses 1 and 2 were significant. Therefore, all four forms of climate change have significant potential to impact human wellbeing and this human wellbeing is significantly

influenced by threat of health issues, global security, global economy, and raising of sea levels. Hypothesis 3, root cause and threat, $F(1, 96) = 0.88$, $P < 0.1$ was not significant. Furthermore, hypothesis 4, threat and pattern, $F(6, 96) = 6.28$, $p < 0.1$ was significant. Additionally, hypothesis 6, $F(2, 96) = 11.37$, $p < 0.1$ was significant. Also, the hypothesis 5, $F(3, 96) = 0.73$, $P < 0.1$ was not significant. Additionally, the hypothesis 7 is not significant either at $F(6, 96) = 4.93$, $P < 0.1$.

Conclusions

The increasing evidence for the bearing of global climate change and its psychological impact on human wellbeing has been the focus of many researchers. These gradual unfolding environmental changes are deeply associated with acute and chronic psychological impacts related to the human wellbeing (Mora, 2013). Addressing the psychological well-being of people and the impact of climate change, such as excessive heat and extreme weather patterns, damaging rain fall, raising of sea level, threats to the world security, and economic instability were the basis of this study. Since this study is designed to test the impact of different climate change in conjunction with human wellbeing from positions of health, global security, global economy, and raising sea levels impacting the well-being of human, three themes emerged. Theme 1: Climate change has the potential to impact human relationships. Theme 2: The climate change may be a serious threat to the global economic instability leading to the global insecurity. Theme 3: Threats to human wellbeing due to climate change are real and a wealth of research has testified to this fact.

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