Effective Policy Applications of Psychological Science: Drawing Parallels between COVID-19 and Climate Change

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Executive Summary: In 2021, the world continues to face a serious, widespread challenge from the COVID-19 pandemic. Governments and civil society are grappling with unprecedented impacts on healthcare and the economy as well as restrictions of normal social interactions of millions. Still, the climate emergency has not rested. Unless addressed, carbon levels will continue to rise through this pandemic, the development and disbursements of vaccines, and the next pandemic. From a psychological perspective, there are many commonalities between the current COVID-19 pandemic and the ongoing crisis of climate change. This whitepaper begins by summarizing the broad similarities between these two crises. From there, we draw parallels between COVID-19 and climate change across four domains of psychological research. In doing this, we identify evidence-based approaches that policymakers and other key decision-makers can adopt to holistically respond to the two global crises of climate change and public health. We conclude with a broad discussion on the role of psychological science (and other social and behavioral sciences) in policy.

I. Introduction

Both the COVID-19 pandemic and climate change crises are heavily influenced by human action, including everyday individual human behaviors and activities that rely on carbon-emitting technologies. For example, travelling by airplane, especially for short routes, is being increasingly recognized as a large contributor to carbon and greenhouse gas emissions. It has also been linked to the rapid transmission of SARS-CoV-2, the virus which causes COVID-19, from China to Europe and other parts of the world (Kallbekken and Sælen 2021). Thus, both crises extend beyond geographical borders and pose global challenges. Moreover, there are clear group disparities in the impacts of COVID-19 and climate change stemming from historical injustice and

current inequalities. Both events disproportionately impact marginalized and vulnerable groups, including racial and ethnic minorities, Indigenous persons, displaced persons, low-income individuals, and other systematically disadvantaged persons.

Similarly, both the climate crisis and pandemic developed into divisive and politically destabilizing issues, particularly in countries where attribution and prevention beliefs are partisan. For example, in 2020, prominent government leaders, such as in the United States and Brazil, denied scientific facts about mask wearing efficacy and other health preventative behaviors (Haltiwanger 2020). In that same year, the United States federal governments' denial of climate change resulted in withdrawal from the Paris Climate Agreement. Both crises underscored the ultimate lesson that science plays a critical role in politics, and psychological science is no exception. We assert that an effective response to climate change and the public health crisis requires grounding in evidence conducted and translated by scientific experts. Information circulated through groups, such as the World Health Organization (WHO), the United States' Center for Disease Control in response to COVID-19, and the United Nations' Intergovernmental Panel on Climate Change must be heeded by the public and policymakers.

Lastly, it is abundantly clear that public health and climate are not wholly separate issues. As with most global challenges that the United Nations is called upon to resolve, they are interwoven and touch upon the multiple Sustainable Development Goals (a focal point of United Nations efforts), such as the impact of COVID-19 on Sustainable Development Goal 3 (health) and Goal 13 (climate change). One pertinent example of the interrelation of the current crises comes from the United States where disparate exposure to a particular air pollutant, a byproduct of burning fuel and natural forest fires, was related to greater COVID-19 mortality (Wu et al. 2020). Similarly, in Europe, nitrogen dioxide concentrations, which is a pollutant emitted from road transport, decreased in cities that imposed lockdown measures (European Environment Agency 2020). Given the intertwined nature of these global issues, comprehensive solutions should aim to resolve climate change and the pandemic hand in hand. A survey conducted by the Yale Program on Climate Change Communication and George Mason University Center for Climate Change found persistent, ongoing concern for climate change even while concern regarding COVID-19 emerged, revealing that climate change has matured into a durable worry in the minds of Americans (*Climate Change in the American Mind* 2020; J. Schwartz 2020). Indeed, some leaders claim that the global nature of the pandemic has made it easier to talk about the equally global scope of climate change (Goldberg 2020).

In recovering from the global health crisis, the United Nations Secretary-General, António Guterres, has suggested that "the current crisis is an opportunity for a profound, systemic shift to a more sustainable economy that works for both people and the planet" and has offered six climate-positive action plans that nations can implement in rebuilding economies during the post-pandemic era (United Nations 2020b). Currently, a large portion of the global economy is untaxed and unmonitored, including jobs and employees not protected by the state, such as the "gig" economy. These groups are vulnerable in times of crisis, such as during a global pandemic. In contrast, shifting to a more sustainable and equitable economy would create jobs and practices that are also resilient and stable in the face of crisis (Harvey 2017 20). A top priority should be the consideration of parallel impacts between climate change and the COVID-19 pandemic, as well as how nations can leverage recovery efforts to address both concurrently. Here, we suggest a role for psychological science.

i. A role for psychology

As psychologists, we share the goal of utilizing a myriad of different scientific methods and approaches to understand human behavior and improve wellbeing for all. Psychology provides a critical framework for reflecting upon public policy, justice, and wellbeing issues in the face of the COVID-19 pandemic (see Van Bavel et al. 2020; Rosenfeld et al. 2020 for recent publications examining the relationship between psychological research and COVID-19). It also presents an opportunity to create effective, evidence-based strategies for communities, nations, regions, and

localities to mitigate the effects of climate change. Human behavior is an essential factor in both crises, which highlights the critical role that psychology can play in shaping how individuals, communities, and nations respond. In what follows, we apply a psychological perspective to this endeavor, which draws from theoretical and empirical research. A psychological perspective allows us to explore these issues within, across, and between individuals and their various environments; we recognize that changing behavior requires an understanding of how individuals make sense of their world as well as the ways in which culture, status, and location impact human meaning-making. In this regard, collaborative, cross-disciplinary approaches in responding to COVID-19 and climate change must be encouraged, including the consideration of the psychological and behavioral sciences.

This document will highlight and present relevant insights on several psychological areas of investigation that are common to both the COVID-19 pandemic and to climate change. Our goal is to elucidate each of the issues and potential strategies for their resolution. *We contend that considering the intersection of both global crises will provide a more holistic view of each issue and the ways in which individuals, communities, nations, and civil societies can address them.* We acknowledge that the cross-cutting psychological issues outlined in this document may in no way cover the vast expanse of psychological and behavioral science research. Instead, like Rosenfeld et al. (2020), we approach this topic by applying four key areas of psychology as a first step in this conversation: cognitive, social, clinical, and community.

II. Cognitive Underpinnings of Behavior Change

Individual and collective behavior change is critical to mitigate further devastations caused by COVID-19 and climate change. A cognitive approach includes identifying mental obstacles and harnessing effective strategies to induce behavior change. Specifically, cognitive approaches in psychological science address ways of thinking, such as attention, memory, mental shortcuts, decision-making, and language.

Achieving behavior change is complex, and many cognitive obstacles can stand in the way of responding to public health and climate crises, such as psychological distance, tendencies to focus on present situations, and the fast-growing nature of disease transmission and climate change. We begin by summarizing three key cognitive approaches that can assist policymakers and individuals interested in the cognitive underpinnings of behavior change, and then delve deeper into the evidence supporting these approaches:

- Adopt narratives and personal storytelling to close the psychological distance of COVID-19 and climate change which can encourage others to engage in effective and healthy behavioral change through enhanced empathy.
- Use clear and accessible language to free up memory and attention to key evidence necessary for promoting positive behavior change.
- Establish positive norms, images, or perceptions of others engaging in preventative behavior to inspire broader adoption of those behaviors.

A major cognitive obstacle to behavioral change in the face of a global health or climate crisis is the downplaying of risk, including unrealistic thoughts of personal invincibility and perceptions of immediate versus long-term threats (Halpern, Truog, and Miller 2020; R.I. McDonald, Chai, and Newell 2015). For example, an individual might think: "Other people have a high chance of contracting the virus, but not me," or, "climate change might be slowly rising sea levels, but it won't be that bad in my lifetime." These thoughts and beliefs are nurtured through psychological distance, or the idea that events that are more cognitively distant are also harder to comprehend. They are also facilitated by a present bias, or the idea that current events, like the COVID-19 pandemic, are more important than what will happen in the future, such as climate change (Halpern, Truog, and Miller 2020; R.I. McDonald, Chai, and Newell 2015). These patterns of thinking about global crises can impede necessary behavioral change to address the long-term consequences of COVID-19 and climate change. Most importantly, psychological distance and present bias are dangerous because they are illusions. Anyone can contract COVID-19. In a similar way, science has demonstrated that the harmful impacts of climate

change are threatening our world today, rather than at some intangible point in the future, as exemplified by overwhelming forest fires in the Western United States (Rust 2020) and Australia (Fountain 2020). The illusions are further fueled by the exponential, or fast-growing, nature of disease transmission and climate change. Scientists have demonstrated that much like the fast-growing, bell-shaped curve of case counts resulting from person-to-person transmission of the coronavirus, carbon dioxide emissions and their harmful effects on the environment have been growing exponentially over the past few decades as well (Earth System Research Laboratories 2020). Most people struggle to wrap their minds around the rapid, exponential nature of how these crises grow, which hinders the mobilization of timely and effective responses.

In the following sections, we elaborate on the psychological evidence that supports three policy-oriented approaches for overcoming these cognitive obstacles to promote effective behavior change.

i. Use storytelling and personal narratives

Storytelling or personal narratives are emotionally powerful ways to spread information and motivate action against climate change and adherence to public health guidelines. Stories can be effective in communicating complex and abstract concepts, like the exponential nature of disease transmission or the long-term trajectory of climate change. Policymakers, decision makers, and community leaders can leverage a good story, which must be interesting, concrete, relatable, and digestible to induce desirable behavior change (Kearney 1994). Using stories to promote public concern about global climate change motivates more positive behaviors to combat climate change compared to simply listing facts (Clayton et al. 2016; Kearney 1994). Moreover, stakeholders seeking to increase support of mitigating climate change among those who may be more hesitant to believe climate change, can share news stories of victims of climate change who are like the target audience (Hart and Nisbet 2012). Similarly, to increase willingness to act on climate change, policymakers should highlight stories of how socially similar others will be impacted (R.I. McDonald, Chai, and Newell 2015; Allcott et al. 2020).

Stories also exercise our capacity to understand other people's thoughts and points of view, which can further motivate targeted behaviors (Kidd and Castano 2013). This perspective-taking behavior can close psychological distance by figuratively putting us in someone else's shoes. Practicing perspective-taking decreases conflict between groups (Todd and Galinsky 2014) and may also help bring about positive behavior change to mitigate transmission of COVID-19 and climate change. For COVID-19, realizing that other people might have a compromised immune system, work in healthcare, or be otherwise at-risk may increase mask wearing and adherence to physical distancing guidelines (Favero and Pedersen 2020; Pfattheicher et al. 2020). Similarly, perspective-taking may encourage concern for future generations beyond those that most individuals report caring about, such as generations older than their grandparents or generations younger than their own grandchildren (West, El Mouden, and Gardner 2011). Another example is when individuals disregard climate change because they claim it will not be a problem during their lifetime (i.e., psychological distance). Taking the perspective of a few generations in the future may induce greater willingness to implement small behavior changes to combat climate change in the future, including not flying in an airplane as frequently, minimizing water and energy waste, and more.

ii. Target attention to key evidence and create clearer messages

Greater cognitive functions, like working memory capacity, or the ability to keep several items actively engaged in memory, relate to stricter compliance of stay-at-home orders in the United States. This is because these internal processes promote more effective cost-benefit analysis, or the consideration of potential pros and cons of staying distanced (Xie, Campbell, and Zhang 2020). This study found that working memory gave rise to stricter compliance even when considering other personal factors, such as mood, personality, and intelligence. Indeed, related research has shown that overwhelming

environmental information over a long period of time exacerbates working memory capacity (Islam et al. 2020). Thus, finding ways to simplify information intake supports compliance to public health and other guidelines.

Working memory capacity can also impact the relationship between pro-environmental attitudes and "green actions" (Langenbach et al. 2019). Individuals who hold positive attitudes about the environment do not necessarily act on them to engage in climate change mitigating behaviors unless they also have greater working memory capacity. Other aspects of cognition, including attention, seem to further predict a person's willingness to act against climate change. One study assessed how likely people in the United States were to sign a climate petition or donate to an environmental organization after their attention was directed to strong or weak evidence of climate change (Luo and Zhao 2019). When attention was drawn to strong evidence that climate change is real, some people were more likely to engage in pro-climate actions. Whether a person ultimately engaged in pro-climate actions was also based on their political affiliation, indicating that political orientation and attention jointly shape perceptions of climate evidence and actions to mitigate climate change. These group differences will be discussed in greater detail in subsequent sections. Based on this evidence, companies and policymakers can adopt targeted communication and marketing strategies to better engage the attention of stakeholders on key issues (e.g., Coca-Cola's "Share a Coke" campaign; Trudel 2016).

Attention and memory also shape how individuals understand language. Thus, policymakers and public health officials can also circulate critical public health and global climate information in multiple languages, which can further alleviate cognitive load and encourage more widespread positive behavior change. Prior to the emergence of the COVID-19 pandemic, nations and civil societies, such as the WHO, limited global public communication to a small number of the world's languages, with English dominating public communication and knowledge circulation (Piller 2016; Piller, Zhang, and Li 2020). As the virus spread around the world, these organizations only released critical public health information in a small set of official languages, leaving linguistic minorities, including migrants and Indigenous peoples, excluded from potentially life-saving information (Piller, Zhang, and Li 2020). In response to the exclusion of linguistic minoritized communities through official channels, grassroots groups across the world initiated local campaigns to translate and communicate this information to diverse language communities, such as in the Philippines, Taiwan, Tibet, and the United States ("COVID-19 Health Literacy Project"; Chen 2020; Lising 2020; Yu 2020).

Delivering emergency and health-related information in local languages supports broader access to and deeper comprehension of important directives, such as physical distancing, proper hygiene, and other preventative measures. In a similar way, some research has shown that comprehension of texts containing climate change information is shaped by how well one can generally comprehend complex text (Strømsø, Bråten, and Britt 2010). This skill, which draws upon working memory and juggling multiple information sources, is found to be more challenging when reading in a second language, especially for low proficiency readers (Foucart et al. 2016). Synthesizing these two areas of psychological research reveals that providing access to critical public health and global climate information across a broader array of languages will lessen cognitive barriers and aid in more widespread comprehension of the facts.

iii. Promote normative and positive representations of people who engage in protective behavior

Prevention behaviors can be driven by two primary social forces: 1) what is perceived as normal in important social groups, such as one's family or community, and 2) positive representations in social prototypes, which are images of the typical person who does the behavior. Norms are unique cognitive drivers of behavior in that they capture what people think about other *people* engaging in a specified behavior, rather than cognitions about the behaviors themselves. Normative influence captures, "customs, traditions, standards, rules, values, fashions, and all other criteria of conduct which are standardized as a consequence of the contact of individuals" (Sherif

1936). Perceiving a positive image, or prototype, of a similar person who engages in the prevention behavior can enhance a person's own behavioral uptake.

Psychological findings on the power of norms and prototypes have proven crucial in the coronavirus pandemic with respect to informing effective prevention behavior. Prevention behavior is defined as engaging in behaviors that are helpful to prevent disease transmission and includes actions such as wearing a mask, washing hands, and physically distancing. In the United States, greater normative perceptions of family, friend, and community members alongside positive prototypes of those who participate in these behaviors increased coronavirus prevention behavior participation two weeks later through increased planning to engage in these behaviors. Here, the impact of norms and positive prototypes contributed to coronavirus prevention regardless of political orientation, the severity of the epidemiological infection rate in the respondent's community, geographic area, age, gender, race, social class, and personal experience with the virus. Together, this illustrates the power of social cognitions to change prevention behavior above and beyond identity and across community contexts (Peterson et al. 2021). International research demonstrates that higher normative perceptions of behavioral approval predict greater intentions to engage in prevention behavior and future increases in social distancing, mask wearing, hand washing/sanitizing, and respiratory hygiene across Singapore, Australia, Iran, and the United States (Hagger et al. 2020; Kim and Tandoc Jr. 2021; Lin et al. 2020). Given these robust effects, we encourage policymakers to integrate social normative influence into health messaging. When behaviors are perceived as normal in a particular geographic area or group, highlighting normative participation can increase community adherence. For example, normative information integrated into field-based interventions during the H1N1 pandemic increased hand sanitation usage by 44%, compared to hand sanitizing stations without normative information (Updegraff et al. 2011).

Similarly, carbon-reduction and environmental behaviors performed in public can also be highly informative within certain community contexts. For example, a family in a rural coal country area that opts to install a solar panel on their property, a worker in a non-bike friendly city who commits to cycling to work to reduce carbon emissions, or an urban apartment dweller who begins composting in their apartment patio can signal others to do the same. In these instances, holding a positive image of typical people who participate in environmentally friendly behaviors may be strong drivers of individual behavior change, such as reducing thermostat use, increasing efficient lightbulb use, composting, walking, biking, and use of public transport. In addition to these positive representations, normalizing these preventative behaviors in the environment can also encourage carbon-reducing behaviors. For instance, perceptions of neighbors' behaviors influenced both energy reduction and low-energy appliance purchase intentions in the United States and the United Kingdom, and these effects were more effective than appeals for cost-saving or the environment. Indeed, descriptive norms for neighbors' behaviors tend to be one of the most important social drivers of energy conservation above and beyond appeals for the environment or cost-saving information; these effects are robust even when respondents do not report that their behavior is influenced by their neighbors (R.I. McDonald and Crandall 2015). In sum, social cognitions of norms and prototypes are powerful indicators of "social proof" in community contexts and can be harnessed by policymakers to enhance both health and environmental behavior choices and participation.

iv. Conclusion

In conclusion, an understanding of human cognition can not only clarify *why* behavior change in response to COVID-19 and climate change is difficult, but also *how* we may more effectively change our behaviors to mitigate disease transmission and climate deterioration. To this end, policymakers can engage with narrative and personal storytelling, present clear and accessible language, and convey positive norms and prototype images to promote collective behavior change in alleviating the ongoing climate and current and future public health crises.

III. The Role of Relationships and Social Networks

Social relations are a powerful driver of collective actions and a source of wellbeing but are also fundamentally threatened by pandemics and climate change. Social relations encompass interpersonal relationships, cooperation between and within social groups, and networked relations within groups. Overwhelming research in psychology suggests that social relations are a fundamental human need, bearing importance alongside food, water, and safety (Baumeister and Leary 1995; Fiske 2003).

Communities and leaders should harness social relations to achieve adaptive behavior change, promote wellbeing, and encourage cooperation within and between groups. We begin by introducing challenges to climate change and disease prevention pertaining to social relations within a community. We then recommend three strategies informed by psychological science that policymakers can apply to pandemic prevention and climate change mitigation.

- Utilize non-traditional social connections to promote wellbeing and encourage behavior change to address disease and environmental threat mitigation.
- Promote positive relationships to support greater cooperation, reduce social inequalities, and increase the legitimacy of the policies proposed to combat both crises.
- Build and broaden social networks to enhance behavior change and promote wellbeing.

Disruptions to daily life that separate people from feeling connected with other members of their community tend to have negative consequences for psychological health. When isolated, individuals are more at risk for poor mental health and experience feelings such as loneliness, anger, and confusion (Brooks et al. 2020). Relations between different groups are also most likely to break down during times of uncertainty (Fritsche, Jonas, and Kessler 2011), during an outbreak of an infectious disease (Schaller and Neuberg 2012), and due to the effects of climate change (Doherty and Clayton 2011). While climate change may not directly cause conflict, extreme weather events could amplify interpersonal violence, and the subsequent consequences (i.e., economic deprivation and migration) could intensify intergroup conflict (Levy, Sidel, and Patz 2017; Suh, Chapman, and Lickel 2021). Disproportionate impacts by the crisis at hand is likely to exacerbate conflicts.

Both the COVID-19 and climate crises require collective behavior change, which can be challenging to adopt when mitigation behaviors are uncommon in social networks. During uncertain circumstances, the threat of ostracism carries a great weight. As such, it is often even more socially risky to act in discordance with group norms, such as reducing carbon output or being the first to take a vaccination in a community where this behavior is not typical. Further, pandemics and climate change impact social networks through disruptions in social interactions, childcare and education, community events, and employment. Neither crisis impacts members of a community at random. For example, residents with greater links within a social network are at greater risk for infectious disease than a random group of residents.

In what follows, we elaborate on the psychological evidence that supports three recommendations for policymakers that leverage social relations to overcome isolation, community disruption, and promote effective behavior change.

i. Utilize non-traditional social connections

In times of crisis, when individuals are not able to be with friends and family and feel socially included, it can result in feelings of loneliness and social isolation. However, the need to belong and have social support can be fulfilled through non-traditional social bonds. During challenging times of physical distancing laws during a pandemic or social isolation caused by climate displacement (i.e., hurricanes, fires, etc.), policymakers can help people fulfill their social need to connect with others through these non-traditional methods. For example, narratives found in television, books, music, or interactive games can serve as non-traditional social connections (Derrick, Gabriel, and Hugenberg 2009). Feelings of social connection can also be enhanced by engaging in activities that provide reminders of actual relationships, like comfort foods (Troisi and Gabriel 2011), or one-sided relationships with

celebrities (Gabriel et al. 2018). One-sided social relationships formed with fictional and real media characters bring the same social satisfaction as traditional social relationships when in-person interactions with family and friends are not possible (Derrick, Gabriel, and Hugenberg 2009).

The threat of climate change poses shared challenges that could also give rise to collective effervescence — a communal event accompanied by positive emotions that fosters a sense of connection and empowerment between those involved (Páez et al. 2015). In times of crisis, moments of collective effervescence can build community cooperation to combat shared challenges (Barry and Quilley 2009). Similarly, participation in collective gatherings (online or in person) can enhance collective effervescence. Emerging research during the COVID-19 pandemic demonstrates that collective effervescence experienced during video conferencing with loved ones and non-traditional social bonds (eating comfort foods, watching TV, reading books) were associated with feeling connected with others, which in turn predicted better wellbeing during the COVID-19 pandemic and greater compliance with physical distancing laws. Associations between non-traditional social bonds and compliance with social distancing guidelines persisted for people regardless of their overall life satisfaction before the pandemic (Gabriel 2020). This research illustrates the power of using non-traditional social bonds that leaders can leverage to increase wellbeing and promote solidarity in combating a crisis, even when disruptions to daily life caused by the climate crisis and COVID-19 pandemic lead to the separation of families and friends.

ii. Promote positive relationships

Building positive and intimate relationships between members of different groups can reduce conflict and prejudice (Allport 1954; Pettigrew and Tropp 2006), and lead to greater trust and cooperation across groups (Pagotto et al. 2013). Policies which seek to build and maintain positive relationships between members of more advantaged and more vulnerable populations can both reduce the perceived boundaries and expand one's scope of moral concern for those most affected by these crises (Swim and Bloodhart 2018). It can even drive advocacy by advantaged groups on behalf of more vulnerable populations, including supporting policies that aid communities disproportionately affected by these crises (Pearson and Schuldt 2018). Particularly, interracial relationships serve as a buffer against racial prejudice which is often heightened during times of enhanced disease threat (Mandalaywala, Gonzalez, and Tropp 2020) and increased migration and food scarcity, a common consequence of climate change (Suh, Chapman, and Lickel 2021; Swim and Bloodhart 2018). Thus, policies which create opportunities for members of advantaged and disadvantaged communities to work together can serve as important conflict-attenuating and equity-promoting strategies.

Forging relationships between government authorities and the public can also help scientists and policymakers circulate and improve the perceived legitimacy of their message. Scholars have suggested that during the dissemination of scientific knowledge, the public should be seen not just as recipients of knowledge but also those who have unique interpretations and needs in relation to the expertise of authority figures (Schalet, Tropp, and Troy 2020). One-way transmission of information assumes that facts speak for themselves and that all people will interpret received messages in the same way. However, we know this is not the case, especially for issues that are politically polarized, such as the communication of research pertaining to vaccines and climate change. Although the scientific community generally has consensus about the benefits of vaccinations and the importance of lowering global greenhouse gas emissions in mitigating the effects of climate change, vaccine hesitancy, anti-vaccination movements, and climate change denial continue to accrue popular support (Van Bavel et al. 2020). These are just a few examples of the ways members of the public are not passive recipients of information and need to be included in the development and communication of policy. Therefore, as will be discussed in subsequent sections, we recommend policymakers take more participatory approaches to communication to allow for greater perceived transparency and legitimacy of the message and build greater consensus over time (Nisbet and Markowitz 2015). Indeed, people tend to

rate a procedure as fairer and an authority figure as more legitimate if they have an opportunity to be heard (Tyler and Blader 2003). When communicating science, it is important to let the public know the facts as they are currently understood, as well as the process used to generate those facts (IJzerman et al. 2020; Lewis and Wai 2020). When a new policy is communicated to the public, particularly policies based on scientific information, policymakers should create opportunities for the public to discuss how a specific policy outcome was reached and have an opportunity to discuss any concerns they might have.

iii. Build and broaden social networks

Social networks shape how individuals respond to emergency situations (Makridis and Wu 2021). During uncertainty, networks provide an influential source of information regarding what to do during crises (Dynes 2006; Van Bavel et al. 2020). Individuals with greater social ties are also more likely to take preventative actions during emergencies such as evacuation and they tend to do so with their close ties (Dynes 2006). In the United States, adherence to COVID-19 shelter in place regulations occurred faster in communities with denser social networks (Borgonovi and Andrieu 2020). Health behaviors also spread more quickly and farther in social networks (Al-Hasan, Yim, and Khuntia 2020; Centola 2011; Makridis and Wu 2021).

To enhance adherence for climate-related emergencies, evacuation plans should complement social networks rather than disrupt them (Iacoviello and Charney 2014). Network communication may be more effective than conventional communication channels (e.g., broadcast media) (Dynes 2006) and is more effectively framed by someone from that network (Abrahamse and Steg 2013). Network intervention and communication efforts require identifying injection points: individuals who are in the best position to disseminate information and influence (Burt 2009; Soto-Vásquez et al. 2020; Kim et al. 2021). Network interactions influence information sharing and the correction of misinformation. Research indicates that nearly 40% of adults use social media platforms to get information about COVID-19 (Kim et al. 2021). Network interactions over social media also played a critical role in the discussion and correction of COVID-19 misinformation (Soto-Vásquez et al. 2020). Similarly, those who have a social connection to a member of an environmental protection organization are more likely to have their own plan to deal with climate change (Tindall and Piggot 2015). Policymakers should be mindful of identifying injection points and leveraging networks when there are language barriers and if minoritized groups do not have the same access to that information.

Networks can buffer the effects of pandemic or climate change on mental health. An Austrian study during the first months of the COVID-19 pandemic revealed that individuals with greater social network interactions had less feelings of stress, worry, and fatigue (Nitschke et al. 2021). Network communications on social media can be less anxiety provoking due to the opportunity for emoting, connecting, and sharing positive updates with close others (Greenberg et al. 2020). Policymakers should also recognize that these crises disrupt social network interactions. Both pandemics and events related to climate change can destroy or restrict accessibility to community spaces in which social interaction is facilitated, such as public spaces including coffee houses and libraries (Oldenburg 1999). Therefore, policymakers need to be conscious of where information is shared and how both crises alter where information sharing is occurring.

The dominant perspective of disaster recovery is around command and control, which assumes chaos rather than community adaptability (Dynes 2006). Instead, planners should engage social networks in all phases of disaster mitigation from preparation to action to recovery (Aldrich and Meyer 2015; Iacoviello and Charney 2014). They should also recognize that ad hoc social networks may form among seekers of assistance and providers providing new connections that can broaden disintegrated networks (Varda et al. 2009).

iv. Conclusion

Social networks and social norms provide information and, during times of uncertainty, are

influential sources of information. Explicit consideration of how community residents are embedded in social networks is essential for responses to pandemics and the disruption elicited by climate change. For policymakers, these include utilizing non-traditional social connections, facilitating positive relationships, and broadening social networks to encourage social cohesion and promote behavior change.

IV. Addressing Mental Health Needs

Mental health involves the ability to navigate through hard times while striving to maintain overall emotional, social, and psychological well-being (World Health Organization 2020b). The Lancet's 2016 report on sustainable development and global mental health defines mental health as "the most neglected of all human health conditions" and a "failure of humanity" (Hayes et al. 2018, under "background"). To address the mental health needs of individuals, policymakers need to consider three systemic changes concerning mental health care that are inclusive and accessible to everyone.

- Destigmatize mental health care and improve cultural competence.
- Provide tailored and evidence-based mental health support through the engagement of multidisciplinary teams.
- Develop and strengthen community empowerment and resilience.

The COVID-19 pandemic has caused acute psychological distress because of the unexpected changes to normalcy, loss of loved ones, and feelings of uncertainty ("Coping with Stress" 2020), similar to the devastating and pervasive effects of climate change on mental health (Klenert et al. 2020). According to the Center of Disease Control and Prevention, during the pandemic, anxiety and depression symptoms increased three to four times the previous year (Czeisler et al. 2020). Specifically, they reported elevated levels of alcohol and substance use and suicidal ideation among young adults, ethnic and racial minorities, and essential workers within the United States and observed similar outcomes among other nations like India, China, and the United Kingdom (Sebenius 2020). Moreover, fear, bereavement, guilt, loneliness, and frustration caused by the pandemic not only triggered the onset of mental health problems, but also exacerbated existing conditions (World Health Organization 2020a).

Comparably, climate change and weather-related disasters cause acute and chronic mental health conditions (Shukla 2013). Understanding and simply becoming aware of the detrimental impacts of climate change may create anxiety and emotional distress for some (Fritze et al. 2008), a state termed "eco-anxiety" (Usher, Durkin, and Bhullar 2019). The trauma that follows immediately after a disaster through loss of livelihood, lack of social support, and relocation can contribute to depression, anxiety, post-traumatic stress disorder (PTSD), sleep disturbance, and suicidal thoughts (Simpson, Weissbecker, and Sephton 2011), particularly among adolescents who also demonstrate increased levels of grief (Dean and Stain 2010; Wickrama and Kaspar 2007). Despite these study outcomes, in disaster mental health, research typically examines the impact of specific weather events like floods, hurricanes or tsunamis on mental health outcomes, rather than a holistic examination of how these events are connected to climate change (Hayes et al. 2018).

In what follows, we discuss the psychological evidence that supports three approaches that policymakers can adopt to promote inclusive and accessible mental health care in the face of global crises.

i. Destigmatize mental health care and improve cultural competence

While climate change is continuing to affect the mental wellbeing of individuals, the COVID-19 pandemic has added an additional source of compounded stress — stress that builds up over time and introduces new pressures, such as forced isolation, general uncertainty, and food shortages to already challenging situations (Clayton et al. 2017). Although the lasting effects of the COVID-19 pandemic are unclear, adverse climate events may serve as a proxy to infer short and long-term mental health consequences. For example, after two years of Hurricane Maria, Puerto Rico saw a 26% increase in death by suicide and a 15% increase in substance abuse problems as reported by emergency rooms

(Abrams 2019). In addition, 7% of youth showed clinically significant PTSD symptoms (Orengo-Aguayo et al. 2019). Experiencing feelings such as grief, sadness, anxiety, "eco-anxiety", or anger are normal responses to adverse events. Multi-year research suggests that psychological symptoms are more likely to become persistent if not addressed before or after a disaster (Schwartz et al. 2017). However, the stigma and vulnerability associated with experiencing such emotions may cause individuals to avoid disclosing their struggles or seeking professional help. De-stigmatization of mental health is necessary to prevent or mitigate persistent psychological symptoms, as well as violence that may occur after or before a disaster (Satcher, Friel, and Bell 2007).

Furthermore, an extensive body of research suggests the cultural significance of wellbeing and its influence on mental health stigma. Culture influences how people perceive health and illness, their motivation to seek treatment, to whom they go for support, from whom they seek help, and their coping strategies and treatment compliance. For instance, in some communities, individuals with mental health issues are viewed as bringing shame to the family (Han and Pong 2015). Therefore, in certain cultural contexts, seeking treatment may not be an ideal solution to protect their family reputation or maintain one's dignity (Hampton and Sharp 2014). On the other hand, the stigma around mental health issues is also woven with the systemic oppression and intergenerational trauma experienced by marginalized groups. As many of these groups have been exploited by mental health professionals and fear further discrimination through a diagnosis, their rates of accessing mental health care are lower than groups that have not been historically exploited. Since marginalized communities have been disproportionately affected by COVID-19 and climate change (Tai et al. 2021), being sensitive to their historical and cultural backgrounds becomes pivotal in providing effective treatments.

Mental health literacy and exposure to people with mental illness are key components in anti-stigma interventions. Mental Health First Aid (MHFA), a United States federally funded program, was designed to educate the public on mental health disorders and potential treatment options. It is an effective evidence-based and culturally informed tool to counter stigma by decreasing negative attitudes and enhancing supportive behaviors towards other individuals who experience mental health crises (Kitchener and Jorm 2002; Lee and Tokmic 2019). Professionals, such as teachers, have used the program (Jorm et al. 2010), and policymakers interested in immediate interventions can use it as a resource as well. Taken together, federal programs like MHFA can help participants recognize and prevent the onset of acute mental health conditions caused by the COVID-19 or extreme weather events and aids in the resilience and recovery after an adversity.

ii. Provide tailored and evidence-based mental health support

COVID-19 has presented a serious global threat to health care systems. The increasing demand of psychological services in this overstrained system is another severe risk in developing a global mental health crisis (World Health Organization 2020a). Digital psychological interventions, such as telehealth doctor visits, have received heightened attention during the pandemic due to their accessibility (Holmes et al. 2020). Providing all-inclusive accessibility to mental health care for all individuals not only decreases current disparities but may prevent a spike in persistent mental health symptoms (Clayton et al. 2017). Telehealth appears to be an effective tool in the mental health treatment of children and adolescents (Comer and Myers 2016). Nonetheless, for communities without internet access, such as the homeless, individuals in forensic or criminal justice settings, and elderly individuals, telehealth may present an impediment to accessing or continuing mental health care (to be discussed further in the next section). As for children and adolescents, there are other psychological interventions which have been found to be helpful in ameliorating or preventing psychological distress, including early detection (Psarros et al. 2008), relationship-based treatment (Osofsky et al. 2015), and social support (Wickrama and Kaspar 2007).

As a first step, mental health professionals need to become literate in how adverse global events such as

pandemics and climate change affect mental health. This can be achieved by training, participating in local actions, and engaging health workers on the impact of climate change events on mental health. A group of researchers evaluated the feasibility of task-sharing between mental health professionals and health care workers in Ethiopia, Kenya, India, Nepal, South Africa, and Uganda (Mendenhall et al. 2014). They found that clear role assignments and training by non-stigmatizing, trusted, knowledgeable, and reliable trainees was crucial to effectively engage health care workers in providing emergency, preventative, and initial mental healthcare. Additionally, when mental health experts are not members of the communities they are working in, the importance of including cultural norms during these trainings is even more critical. These trainings provide policymakers with a potentially sustainable framework that is socially and economically beneficial.

It is crucial for governments to collaborate with mental health professionals to revise public health policies based on psychological evidence to prioritize mental well-being and provide funding and resources that address individual mental health needs, especially when adverse events occur (Clayton et al. 2017). One prominent example, The Mindfulness Initiative, aimed to bridge psychological research on mindfulness with policy by teaching mindfulness practices to politicians in the United Kingdom parliament. This evidence-based approach benefited many politicians by offering tools and techniques to tackle political discourse more effectively and to broaden politicians' views on policy issues from a humanitarian perspective rather than focusing solely on economic impacts. Due to its success, the Mindfulness Initiative now collaborates and provides support for legislators and advocates from over forty-five countries including Australia, Canada, Sri Lanka, Mexico, and Germany (Bristow 2019). This could have a direct impact on how politicians view climate change since practicing mindfulness has proven to promote pro-environmental behaviors (Thiermann, Sheate, and Vercammen 2020), and thereby lead to immediate actions to address the global climate emergency.

Finally, it is important to include multidisciplinary teams of mental health professionals in policymaking, including researchers from different psychological branches, clinical psychologists, psychological organizations, social workers, individuals with lived experiences of mental illness and counselors, among others. Mental health professionals should be included in spaces where comprehensive evaluations of local psychosocial, psychological, and physiological needs are taking place (Sena et al. 2014). As a resource in adverse events, mental health professionals may help in fostering optimism, cultivating active coping and self-regulation, maintaining and upholding connection to one's social networks, place, and culture, and identifying personal meaning and preparedness (Clayton et al. 2017). One of the challenges in implementing mental health care policies is that some governmental agencies and citizens consider them impractical or expensive. However, research on the cost-benefit of mental health services has shown that the initial investment or expenditure in offering universal mental health services and creating preventative measures is more financially beneficial in the long-term than continuing to rely on individuals being able to subsidize their own services (Botzen, Duijndam, and Beukering 2021). This approach includes closing the gap on racial and economic disparities by offering high-quality mental health services, which includes culturally informed services, to individuals from diverse racial, ethnic, and economic backgrounds (Cook et al. 2015). Mental health professionals should be central in responding to COVID-19 and climate emergencies given the profound effects on individual and collective mental health.

iii. Develop and strengthen community empowerment and resilience

To ensure that mental health needs are addressed, we need to consider different scenarios in which immediate professional help may not be available or accessible. For example, adverse climate events can create circumstances where mental health services are limited. Similarly, at the start of the pandemic, the world came to a halt and many mental health clinics paused their services while they figured out a way to function under physically distanced

conditions. Prevention, mitigation, and preparation can be thought of as community pillars for facing and building resilience to climate change and other adverse global events (Sena et al. 2014). This form of resilience, or individuals' and communities' abilities to recuperate and afront the consequences of a disaster, protects against the development of persistent psychological distress (Keim 2008).

COVID-19 and climate change have had strong effects on community health through restrictions in social interaction, relocation, and lack of connection to nature. Community prevention strategies include assessment of past, current, and potential future climate conditions, and related events. This approach reduces a community's vulnerability and increases community preparedness (Pearce et al. 2009). Local communities need leaders and special committees to create plans for prevention, mitigation, and preparation, and review local resources. Further, through outreach, people can gain awareness of the services available to them (Sena et al. 2014). MHFA offers an evidenced-based tool for guiding community leaders on how to assess local needs, create awareness, and provide immediate help before, during, and after adverse events. Leaders can leverage this system to train communities in preparedness and mitigation. Through this process, individuals train community groups, those community groups train the rest of the community, and so on, creating a sustainable pyramid style of teaching (Aten et al. 2010).

Furthermore, communities that unite and build awareness of the impacts of climate change can bolster their interest in finding big-scale solutions to mitigate the effect of adverse environmental events. This interest can force representatives such as elected officials and community leaders, who are often driven by competition, to take proactive action for collective wellbeing (Van Lange, Joireman, and Milinski 2018). Additionally, communities can foster resilience in children after a disaster at the communal level by ensuring family reunification and helping families recognize their strengths, treating children with dignity through empowerment, providing a sense of normalcy, and providing individualized basic needs (Madrid et al. 2006). Resilience in families is nurtured by connection and collaboration between the members of the family and by the members of the community (Villavicencio-Colon 2020). Lastly, restoration of communal life and activities appears to be a protective and buffering factor for adolescents and children in terms of preventing psychological symptoms from becoming severe (Wickrama and Kaspar 2007). Communities are powerful drivers of fostering psychological wellbeing and building resilience. Empowering communities to take proactive, collaborative actions toward prevention, mitigation, and preparation will promote psychological and physical health.

iv. Conclusion

The growing body of research evidence shows that COVID-19 and climate change cause detrimental effects on mental health. Thus, policymakers should prioritize the protection and promotion of mental wellbeing at the individual, interpersonal, organizational, community, and policy levels. Policymakers should work collaboratively with mental health professionals, who are central in response to COVID-19 and climate emergencies given the profound effects on individual and collective mental health to identify individual, social, economic, and environmental factors that promote mental wellbeing.

V. Disparate Impacts on Communities

Both climate change and the COVID-19 pandemic have a disproportionate impact on vulnerable and systemically disadvantaged populations. Not only does this stall and disrupt human rights progress, but it exacerbates existing social inequalities and inequities (Shadmi et al. 2020). Global pandemics, such as COVID-19, exacerbate the longstanding social and economic disparities between socioeconomic, ethnic, and racial groups (Bibbins-Domingo 2020; Javaheri 2020). For instance, as of April 2021, over 75% of all global doses of COVID-19 vaccines given so far have been concentrated in ten countries (Kreier 2021). In addition, there are vast disparities in the extent to which stakeholders from marginalized groups are included in leadership and decision-making related to these events. For instance, some health programs and providers may design and implement health interventions for a community without consultation

or buy-in from said community. The result is often programs that either fail to realize the expected health outcomes or cease to function once the healthcare or implementation support team leaves the community. Among those most vulnerable include Indigenous peoples, migrants, refugees, the homeless, and low-income families and communities who, due to socioeconomic disparities, are more vulnerable to novel health and environmental concerns such as COVID-19 and climate change. Additionally, women and girls, and racial and ethnic minorities, have historically experienced gender and ethnic disparities, which tend to be exacerbated by health and environmental factors. Finally, language minority groups suffer from access issues, while children are always a vulnerable population. The risk for some groups appears to be cumulative. For instance, a migrant's experiences with either of these events may be further worsened if she is a woman and from a low socioeconomic background.

This pattern underscores the need for a human rights approach when discussing, analyzing, and planning for the effects of these disasters. This approach will allow leaders and policymakers to acknowledge, bring awareness to, and address links between climate change, COVID-19, and social inequity, thereby mitigating the effects of these disasters on the most vulnerable members of our communities. We summarize three recommendations for policymakers to address inequitable outcomes in the face of these crises:

- Build physical and social infrastructure to address needs of vulnerable populations.
- Convene stakeholders across sectors to plan, develop and implement critical policy decisions.
- Enable access to information and services and empower local leaders and decision-makers through community involvement.

We highlight one methodology, in particular, which we suggest for addressing the disproportionate impact of these disasters on vulnerable groups: Participatory Action Research. Participatory Action Research has been described as "a practice that attempts to put the less powerful at the center of the knowledge creation process, to move people and their daily lived experiences of struggle, and survival from the margins of epistemology to the center" (Hall 1992, 16). More simply stated, it aims to: equalize the role of the participant and the researcher (Kramer 2021), empower the community to change their surroundings through their role as co-creators of knowledge (Obayemi and Hamilton 2021), and include the critical perspectives of the community into research design and theory development, including their cultural and Indigenous traditions (Moola and Cilliers 2021). Thus, rather than selecting a marginalized population to serve as objects for study and intervention, Participatory Action Research includes multiple stakeholders, such as members of the selected group, as decision-makers. For example, to address depression in young women, investigators recruited young women, 16-22 years old, to design focus group questionnaires on depression. These participants were then trained as facilitators to hold group discussions with other women on depression (Ross, Ali, and Toner 2009).

In what follows, we provide recommendations to address the specific needs of vulnerable populations and eliminate social inequities during times of crisis. We highlight recommendations where Participatory Action Research could be readily implemented and promote sustainable change.

i. Build physical and social infrastructure

Local, regional, and national governments must prioritize enhancing physical infrastructure to mitigate the effects of climate change and pandemics such as COVID-19. The failure of the levees in New Orleans during Hurricane Katrina is one memorable example. Inadequate flood protection resulted in a devastating number of deaths and displaced persons, particularly in economically vulnerable communities that lacked access to mobility (e.g., personal cars) to evacuate (Colten 2006; Nigg, Barnshaw, and Torres 2006). Building new, climate resilient infrastructure, or retrofitting existing infrastructure, will help limit costs and losses due to extreme climate events (Vallejo and Mullan 2017).

Infrastructure also includes communication systems, specifically Broadband Internet Access (BIA). Recent reports from the United States' Biden and Harris

administration confirm that BIA must be included as an essential element of infrastructure ("Fact Sheet: The American Jobs Plan" 2021). COVID-19 shows that BIA is also a social determinant of health in the event of a global pandemic (Benda et al. 2020). The reliance on BIA to schedule and conduct telehealth visits or find COVID-19 testing or vaccination sites assumes reliable internet access. Unfortunately, one in four American adults do not have BIA or the devices needed to connect to the internet (Pew Research Center 2019), and as of 2019, only approximately 54.8% of global households were connected to the internet ("New Report on Global Broadband Access Underscores Urgent Need to Reach the Half of the World Still Unconnected" 2020). What is more, the least connected groups include individuals earning an annual income of less than $30,000, irrespective of race and ethnicity. Making critical healthcare information and healthcare access dependent on BIA, excludes 25% of the American population, and extends the life of the pandemic for all people.

The COVID-19 pandemic also illustrates the importance of establishing communication infrastructure with diverse formats that are trusted by the intended recipients (Burgess et al. 2020). When time is of the essence, the local and regional agencies activate their existing communication channels to disseminate information. Unfortunately, these standard channels fail to reach many Indigenous people, people in minority language groups, and those with limited or no access to the internet (UNESCO, 2020). Reliance on translation services delays the rapid transmission of critical information and allows for "disinformation campaigns" to arise that may hamper a country's ability to convey accurate and timely information to language minority groups (Piller 2016; Zarocostas 2020; Burke 2020). The consequence of the lack of information, disinformation, or lack of trust of the information can result in higher compliance failure rates, higher rates of illnesses and perhaps death among members of the language minority groups, and higher transmission rates of diseases (Xiang et al. 2020). Burgess et al. (2020) emphasize the need to establish a mechanism for delivery of communication or services in a pandemic or climate disaster, using direct outreach, peer-to-peer engagement, or social media.

Finally, in this effort, governments must also consider the role of disasters in exacerbating other human rights violations. For example, during the COVID-19 pandemic, multiple countries have documented a rise in gender-based and family violence, resulting in a secondary, "shadow pandemic" (UN Women 2020). Observations have also implicated climate change stressors in increasing gender-based violence. Rural women in the Murray-Darling Basin of Australia reported experiencing greater violence during the drought (Whittenbury 2013). In the U.S., rates of violence against women sharply increased and remained elevated for the year following Hurricane Katrina (Anastario, Shehab, and Lawry 2009). Thus, governmental response and recovery efforts should include a specific plan to address violence against women and girls during disasters. The Ask for ANI scheme — developed by the United Kingdom government for women experiencing violence seeking help — demonstrates a use of infrastructure to reduce barriers to reporting. This initiative allows victims to use the codeword "Ani" at select pharmacies, discretely signaling that they may need protection and support. Other physical and social supports may include financial assistance and education to women and girls experiencing violence (Pronyk et al. 2006), access to essential services (such as hotlines or shelters), awareness of the increased incidence of violence amongst the public, and initiatives to preserve social networks of those experiencing violence.

ii. Convene stakeholders across sectors

The task of identifying relevant stakeholders, building trust within communities, agreeing on common goals and objectives, and remaining engaged once programs are implemented are core elements of Participatory Action Research. This approach has been used successfully to engage difficult-to-reach populations, like youth in the TeenNet Research Project, a Canadian program examining best methods for promoting health among youth in Toronto, Canada (Flicker et al. 2008). The goal here was twofold: to build youth

self-esteem and efficacy in health promotion and to increase their civic engagement and opportunity to develop sustainable solutions for their cohort. As active agents of change, youth employed *photovoice,* a technology that allows the user to visually represent their community's health issues while recording their voice as they narrate their observations. Participants then reflected on their observations and commentary to develop plans for change (Flicker et al. 2008). Using the acronym *SHOWED,* this Participatory Action Research intervention encouraged the youth to use the technology to describe what they *saw* (S), explain what was really *happening* (H), explain its relevance in "*our*" lives (O), explain *why* the problem/situation exists (W), state how they can be *empowered* (E), and state what they could *do* about it (D).

Participatory Action Research is also well-suited to climate change challenges in farming and agricultural practices. For small, rain-fed agricultural districts in Ghana and Zimbabwe, variable climates and reduced rainfalls have resulted in decreased crop yields. As a result, many communities who are dependent on smallholder agricultural systems are food insecure and have a declining soil base (Mapfumo et al. 2013). The introduction of Participatory Action Research to address these agricultural challenges led to an iterative cycle involving planning, action and reflection that involved several different stakeholders, including local and Indigenous leaders. This Participatory Action Research built field-based, farmer learning centers where new agricultural techniques were field-tested and evaluated, allowing for an integration of ideas and knowledge by local leaders, farmers, and researchers. These field-based centers also provided an interactive learning opportunity for farmers and stakeholders during the implementation of Participatory Action Research (Mapfumo et al. 2013).

When inviting stakeholders to participate in post-disaster work, policymakers must carefully consider the decision-making capacity of potential participants affected by the disaster (Ferreira, Buttiel, and Ferreira 2015; Levine 2004). Policymakers should not introduce such projects if they would add to the psychological burden of a vulnerable population experiencing a disaster (Norris et al. 2006). Additionally, the risks and benefits of participating in the planned Participatory Action Research must be weighed, with particular attention given to ensuring that the benefits to participating address the needs of the participants, as in the case of the smallholder farmers in Ghana and Zimbabwe (Mapfumo et al. 2013). The "top down" approach to project development and implementation will discourage the active engagement of local communities, the intended beneficiaries of the projects.

iii. Enable access to information and services and empower local leaders and decision-makers

Community involvement was critical in addressing the HIV/AIDS and severe acute respiratory syndrome (SARS) pandemics over two decades ago (Michener et al. 2020). The impact of community involvement for vulnerable communities is apparent also in current crises. One example is the Navajo Nation's response to COVID-19, a community suffering from pervasive neglect by the United States federal government, chronic diseases, minimal access to health services, extreme poverty, and inadequate access to clean water and other factors that historically suppressed health outcomes among members of this tribe. In response, Navajo Nation President, Jonathan Nex, together with this community, launched their own testing and contact tracing efforts in collaboration with state and local governments. When government aid was slow in coming, they launched their own relief fund. Their efforts attracted the attention of many local organizations, with offers of supportive housing from the United Natives Na'nizhoozhi Treatment Center and the City of Gallup, peer-to-peer financial assistance from Auntie Project, and donations from crowdsourcing sites to lend additional financial support. National organizations partnered with 140 Native American organizations to supply surveillance and education, and Doctors without Borders sent clinicians to treat COVID-19 positive persons (Michener et al. 2020). The Navajo Nation model reflects Nez's commitment to local empowerment and mobilization of the Navajo community and can serve as a model for community organizing and empowerment. It also illustrates the power of combined local and national efforts when

confronting major disasters that may strain the capabilities of local resources.

The Maldives is a quintessential case study of the disastrous effects of climate change and the role of Participatory Action Research to advocate for the needs of developing nations, while simultaneously prompting self-help measures to avert future disasters. The Maldives contributes very little to carbon emissions, yet disproportionately experiences its consequences. Maldivians stand not only to lose their islands due to beach erosion and rising sea levels, but also lose their customs and identity as a result of forced migration. Despite this position, the Maldives have organized and undertaken ambitious mitigation and adaptation efforts to lessen the effects of climate change. Initially, the Maldives, together with other Small Island Developing States (SIDS) convened a multi-stakeholder conference including island and non-island scientists, non-scientists, Indigenous leaders, and politicians to address the problem of sea-level rising from a science, policy, and lifestyle perspective. The conference led to the "*Malé Declaration on Global Warming and Sea-Level Rising,"* to document the problem that sea-level rising presents for SIDS. From this conference, SIDS formed the Alliance of Small Island Stats (AOSIS) to lobby for international climate change action that would minimize risk to SIDS (Kelman et al. 2011). Concurrent with this effort, the Maldives engaged in self-help to stave-off the more immediate effects of sea-level rising. Following the devastating effects of a tsunami in 2004, Maldivians created an artificial island they named *Hulhumale.* By reclaiming millions of cubic meters of sand from the seabed, Maldevians elevated the new island over two meters above sea level (Miller 2021).

iv. Conclusion

In conclusion, a human rights approach to disaster planning and preparedness is essential. Policymakers should develop physical and social infrastructure to ensure access and resources for vulnerable groups. In addition, engagement with diverse stakeholders and communities is key to drive impact.

VI. Review and Final Conclusion

To conclude, the COVID-19 pandemic continues to challenge global health and the once normal way of life. However, with increasing vaccinations, there is light at the end of the tunnel. Despite the ebbs of this globally devastating public health crisis, the climate crisis persists (*Climate Change: World Mustn't Forget "deeper Emergency* 2020). A primary goal of this review was to explore the interrelated nature of these two global crises. As discussed, there are a number of parallels drawn between the COVID-19 pandemic and climate change. For instance, while the pandemic temporarily reduced the global greenhouse gas emissions by 6% in 2020 (United Nations 2020a), regions with high concentrations of climate change-induced air pollutants in the United States also demonstrated higher mortality rates of COVID-19 patients (Wu et al. 2020). In a similar way, both sparked political divisiveness and mistrust of science and evidence-based preventative measures. Importantly, both the pandemic and persistent climate change continue to pose threats to fundamental human rights. Despite these shared traits, there is also an opportunity for holistic solutions that simultaneously mitigate the impacts of the pandemic and build a more sustainable planet. For instance, many believe that the global nature of the pandemic has opened conversations on climate change (Goldberg 2020). Similarly, systemic shifts for greener, more sustainable global economies will not only preserve the planet but will also lead to more resilient jobs that will be less impacted by other global crises, like future pandemics.

In the spirit of designing holistic solutions to COVID-19 and climate change, we presented cross-cutting policy recommendations from cognitive, social, health, clinical, and community psychology to mitigate climate change and promote global health, particularly for vulnerable groups. To promote desired prevention behaviors (e.g., get a vaccine, reduce driving) from the cognitive perspective, we advise ubiquitous representation of positive prototypes, narrative, and personal storytelling, and decreasing information overload through accessible language. Similarly, to encourage collective action from a social lens, we advise utilizing non-traditional social connections, promoting positive relationships, and building and

broadening social networks. To ensure mental well-being in response to these global crises, we propose destigmatizing mental health care and improving cultural competence, providing tailored and evidence-based mental health support, and strengthening community empowerment and resilience. Lastly, to ensure equitable support across communities and populations, we recommend building physical and social infrastructure to address the needs of vulnerable populations, identifying and engaging with all stakeholders, and empowering local communities in efforts to reduce disparities. Finally, we acknowledge that at the point of writing this paper, it may still be too early to tell the full impact of the global pandemic. As such, we expect the discussion of how psychology jointly informs policy solutions to global health and climate change to be an ongoing and dynamic one.

A primary takeaway from our report is that both global crises need to be resolved in a holistic manner, incorporating diverse perspectives during decision-making. We believe psychological science (and other social and behavioral disciplines) must play a major role in post-pandemic recovery. While STEM fields expertly design life-saving *vaccines*, the social and behavioral sciences can improve attitudes and promote behaviors necessary to seeking out these life-saving *vaccinations,* shedding light on the lived social realities that make people embrace or reject the vaccine and other public health preventative behaviors. Indeed, as stated by the Chief Executive of the British Academy in London, "Governments have sought expert advice from the beginning of the pandemic, but that expertise tended to come from people in science, technology, engineering, and math (STEM) — despite it being clear from the start that human behavior, motivations, and culture were key to an effective response." (Shah 2021). For example, within the eighty individuals on the United Kingdom's Scientific Advisory Group for Emergencies, only a handful were social scientists as of March 2021 (Sample 2020). Nevertheless, government and policymakers across the globe are beginning to involve social and behavioral scientists. In the United States, sociologist Dr. Alondra Nelson, was appointed to lead the White House Office of Science and Technology Policy — a top scientific policy advising position (Subbaraman 2021). Likewise, researchers in Bangladesh leveraged the social and behavioral sciences to assess the psychosocial and socioeconomic impacts of the pandemic (Bodrud-Doza et al. 2020).

In the same way, social and behavioral scientists are joining the conversation on climate change. In Canada, an annual summer school at the Université de Québec à Montréal trains cognitive scientists to apply their expertise to the implementation of climate change mitigation and adaptation policies ("ISC 2021 Summer School Cognition & Climate"). Researchers have shown that the window of opportunity for responding to climate change is narrowing and will require robust social and behavioral adaptations. However, funding for social and behavioral scientific studies of climate change are limited. One prominent paper published in April 2020 reported that between 1990 and 2018, only 0.12% of all federal funding for research on climate action was allocated to the social and behavioral sciences (Overland and Sovacool 2020).

Although psychological sciences are effective in forecasting and informing person-driven behavior change, through this report, we have demonstrated that this perspective also has a place in informing top-driven policy and encouraging structural change (Sunstein 2015; Cairney and Kwiatkowski 2017). For instance, policy scholars have long drawn from psychological research to understand the role of emotion in decision-making and group-based behavior, with one notable example (Houghton 2008) pointing to these psychological phenomena in revealing the errors of the Bush administration in the United States during the invasion and occupation of Iraq. To this end, we advocate for continued, two-way dialogue between policymakers and scientists, including psychological scientists, in making decisions that will impact individuals, groups, and societies.

Lastly, an effective pathway towards addressing the compound risks of the pandemic and climate change must be guided by human rights principles. Prevention, mitigation, and adaptation strategies should ensure full participation and inclusion, equity and non-discrimination, transparency, and accountability for all. Nevertheless, the Fifth

Assessment Report of the Intergovernmental Panel on Climate Change (2014) states that marginalized communities contribute least to global warming but bear the most burden of climate change consequences. On the other hand, the pandemic shed light on the existing social and racial inequity that put minority groups at highest risk of infection and mortality with poor healthcare access and vaccine accessibility (Bibbins-Domingo 2020; Javaheri 2020; Center for Disease Control and Prevention 2021). Consequently, social and behavioral scientists not only aim to understand the root causes (from individual, group, to community levels) of social inequity in global health and sustainability, but also develop equitable and culturally sensitive interventions to reduce such disparities among underserved communities.

Overall, psychological science provides a wealth of knowledge and evidence to understand and improve underlying social, mental, and behavioral processes that contribute towards global crises such as climate change and pandemic. Therefore, collaborative efforts between social and behavioral scientists and policymakers to build back a just, resilient, and sustainable future, are of paramount importance.

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