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**Rethinking Climate Change Vulnerabilities in light of the COVID-19 Crisis:
Illustrations through Conspiracy Theories and Diversity Issues**

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Abstract

Scholars have noted several connections between the COVID-19 pandemic and the climate crisis, ranging from the material influence of the pandemic on climate change processes (e.g., how lockdowns temporarily lowered climate emissions) to the similar ways the crises have been managed. Both crises are also global in scope, have exerted a significant toll in human lives and require major changes in our lifestyles. However, while collective responses to the COVID-19 were rapid and concerted, efforts to address climate change continue to be met with resistance. In this article, we investigate the social vulnerabilities common to both crises and the lessons that social scientists interested in climate change, and psychologists in particular, can take away from the pandemic. We focus on two broad topics of contemporary interest that lay bare social vulnerabilities of the coronavirus pandemic – conspiracy theories and racial and ethnic inequities – to highlight the ways that understanding psychological processes associated with the pandemic can help inform more efficient climate policies. We end by discussing recommendations as well as a framework to guide the application of psychological science findings to help address climate change.

Key-words: Covid-19, Climate Change, Vulnerability, Behavioral Sciences, Conspiracy Theories, Diversity

Rethinking Climate Change Vulnerabilities after the COVID-19 Crisis: Illustration through Conspiracy Theories and Diversity Issues

The global crisis caused by COVID-19 is one of the most serious in decades, both from a health perspective as well as from an economic and political one. Confronting this crisis has highlighted not only physical vulnerabilities to the virus, but also uniquely *social* vulnerabilities—including the pandemic's unequal toll across social groups, lack of compliance to sanitary measures, vaccine hesitancy, and adherence to conspiracy theories. At the same time, the global community faces another crisis in the form of climate change that is poised to expose physical and social vulnerabilities that are even more severe, with a number of commonalities and differences in comparison to COVID-19. As an illustration, Indian writer and activist Arundhati Roy invited humans to "consider COVID-19 as a portal" to the future climate challenges that lay ahead (Roy, 2020).

In this context, the IPCC¹ recently released the second part of its sixth report on the impact of climate change, which strikingly emphasized the increased proportion of the human population that is already vulnerable to climate impacts, which was estimated at fifty percent (Allan et al., 2021). The report also highlights the interdependencies between climate risks, ecosystems, and human societies. Climate risks are presented as interacting with "non-climatic" factors such as urbanization, demographic changes, social inequalities and, from now on, a pandemic. While analogies between COVID-19 and climate change were initially made in the physical environmental sciences (e.g., considering that global warming could be a direct cause of increased pandemics in the future, see Curseu et al., 2010), lessons from the

¹ International Panel on Climate Change, an intergovernmental body of the United Nations created in 1998 and in charge for advancing knowledge on human-induced climate change

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COVID-19 crisis are beginning to be drawn for the social sciences. The two crises have shared the qualities of being global crises, with several recent articles describing common conceptual points between them (e.g., Botzen, Duijndman, & van Beukering, 2020; Cole & Dodds, 2021; Manzanedo & Manning, 2020; Mende & Misra, 2021; Sheehan & Fox, 2020). More specifically, here we argue that understanding the social psychological mechanisms that give rise to climate vulnerabilities can benefit from the lessons that scholars are learning from the COVID-19 crisis, in line with the "integrated" approach proposed by the IPCC that links environmental, social, and psychological risks. These linkages between COVID-19 and climate change can be expressed at several levels: on the one hand, the way in which information is processed shares common points between the two crises and highlights joint risk factors, with vulnerabilities towards fake news and conspiracy theories being prime examples. Their rampant spread during the COVID-19 crisis has attracted a large amount of scholarly attention (e.g., Douglas, 2021) and invited social psychologists to reconsider the factors that make people vulnerable to misinformation and disinformation; there is also a need to think critically about what these new insights mean for climate change communication.

On the other hand, despite the apparent universality of health and climate crises, the impacts of these crises are not borne equally (e.g., Gaynor & Wilson, 2020). These differential vulnerabilities may have an impact on intergroup relations or diversity policies and are also reflected at the psychological level (Pearson & Schuldt, 2014). In this paper, we suggest that the COVID-19 crisis may impact scholarly understanding of climate change vulnerabilities by 1) allowing us to learn from widespread belief in conspiracy theories, and 2) encouraging us to adopt more ambitious climate policies aimed at alleviating climate change inequities. We will discuss these implications in light of what they imply in terms of establishing a framework for the use of psychological science to address these concerns.

1. Learning from the “success” of conspiracy theories

The management of the COVID-19 crisis reminds us of the importance of reliable scientific information and recognized experts, but also the need to be able to communicate this scientific information effectively to the general public (Semenza et al., 2021). Here, misinformation and disinformation in the form of COVID-related conspiracy theories has posed a significant challenge, offering important lessons for social scientists working in the field of climate change communication.

In general terms, conspiracy theories are beliefs about a group of actors who join together in a secret agreement to achieve a hidden goal that is perceived as unlawful or malevolent (Zonis & Joseph, 1994). With respect to climate change, conspiracy theories often reject the idea that humans are responsible for the documented steady rise in global temperatures, or that such a rise exists. According to various conspiracy theories, the notion of climate change is thought to be promoted by anti-industrial environmentalist groups (Douglas & Sutton, 2015), by scientists in search of funding, by liberals seeking to undermine local sovereignty (Inhofe, 2003), or—as suggested by Donald Trump—by foreign actors, such as China, who seek to undermine the interests of the United States. Such conspiratorial thinking has been previously discussed as one of the main drivers of climate change denialism (Lewandowsky, Gignac, & Oberauer, 2015).

COVID-related conspiracy theories, which have thrived since the beginning of the pandemic (Douglas, 2021), come in many guises. The origin of the virus has been attributed to China, which has been accused of deliberately seeing to weaken Western powers. When the pandemic hit the Western world, governments were accused of taking advantage of the virus to restrict civil liberties or to sell ineffective, but costly, medicine in order to enrich pharmaceutical companies. Vaccines have been heavily featured in these theories, which have been cast as agents of mass population surveillance (e.g., the idea that billionaires are using

vaccines as a vehicle to implant microchips in people). A common thread in both COVID-19 and climate change CTs is the idea that powerful groups wish to exert control on the population in order to deprive ordinary people of the “basic” freedoms, such as using a car, traveling, or eating meat (Uscinski & Douglas, 2017). In addition, both types of conspiracy theories are associated with a profound distrust in science as an elitist institution operating on behalf of special interests. This also suggests that conspiracy believers may embrace the scientific method and scholars who are perceived as external to this institution or resisting it (Imhoff, Lamberty, & Klein, 2018) as well as those who make abundant use of (pseudo)scientific arguments.

1.1 The societal impacts of CTs

Conspiracy theories are particularly likely to emerge and to propagate in times of crisis (van Prooijen & Douglas, 2019) which are sources of uncertainty and uncontrollability. They provide a simple explanation for these crises and thereby the hope of controlling them (Kofta, Soral, & Bilewicz, 2020): If a particular group is to blame for the Great Plague, let us eliminate them to avoid the next outbreak. Conspiracy Theories also specify who you should trust and distrust in these uncertain and often quickly changing situations. During such times, affiliation with trusted groups may provide a secure understanding of reality and also a sense of empowerment in the face of a looming threat (Hogg, 2007). Furthermore, conspiracy theories that are strongly associated with group identities (Biddlestone et al., 2020) may enhance in-group/out-group categorizations. For example, for some people of African descent, the notion that birth control and vaccination are used by Whites or Westerners for genocidal purposes (Thorburn Bird & Bogart, 2003) may make the concept of racial identity particularly salient and contribute to secure social bonds among those who espouse such theories. Further, Franks and colleagues (2017) suggest that Conspiracy Theories may be

elaborated through communication by and within groups to cope with events that symbolically threaten their worldview. In this regard, both the pandemic and climate change may lead groups to question the capacity of modern institutions (such as a subsidized health system, science, parliamentary democracies...) to protect their security and well-being.

From a practical point of view, these theories should especially concern social sciences to the extent that they influence behavior. Indeed, research suggests such an influence may exist, as people who believe in conspiracy theories may be less likely to vote, to vaccinate themselves (Jolley & Douglas, 2017), or to reduce their carbon emissions (Jolley & Douglas, 2014). In these cases, these negative effects have consequences not only at the individual level but also at the community level (i.e., by influencing the perceived legitimacy of government, reducing vaccination coverage, or maintaining the status quo in greenhouse gas emissions). It is important to note, however, that conspiracy theories do not only fuel inaction; they may also fuel action, and especially anti-social behavior such as violence or aggression (Imhoff, Dieterle, & Lamberty, 2021). For example, 5G COVID-19 conspiracy believers have been found to be more likely to condone violent action, such as burning mobile phone masts (Jolley & Paterson, 2020), and more generally, exposure to conspiracy theories has been linked to reduced prosocial behavior (e.g., charitable donations; van der Linden et al., 2015). These findings suggest that these conspiracy beliefs may undermine the cooperation needed to tackle global issues while also increasing anti-social tendencies.

1.2 From one conspiracy to another

What can we learn from our vulnerability to COVID-19 conspiracy theories when it comes to climate change? First, note that belief in conspiracy theories can be viewed as a “syndrome”: nothing predicts belief in conspiracy theories better than belief in other, even totally unrelated, conspiracy theories (Goerzel, 1994). The term “conspiracy mentality,” or the

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general tendency to ascribe to conspiracy beliefs, reflects this (Imhoff & Bruder, 2014, Moscovici, 1987, 2020). In this regard, both climate change and COVID-related conspiracy theories are emblematic of distrust towards elites that characterizes conspiracy mentality and that is evident in false beliefs about other high-profile events (e.g., the September 11th terrorist attacks, the Kennedy Assassination, the death of Princess Diana).

Second, while mapping the sociology of conspiracy belief is very challenging, a common feature of conspiracy believers is that they tend to be particularly prevalent among those who view themselves as “losers” (Uscinski & Parent, 2014). For example, after an election, the losing party is more likely to espouse conspiracy theories. We also find that low socioeconomic status is a predictor of holding conspiracy beliefs (Smallpage et al., 2020), and other research suggests that conspiracy theories may be more prevalent among ethnic minorities or those who are at the extremes of the political spectrum (Nera et al., 2021, Van Prooijen, Krouwel & Pollet, 2015). Thus, Conspiracy Theories are often espoused and shared by individuals and groups who feel that they are overlooked, stigmatized, or despised by those in power. Beyond the geographical or physical vulnerabilities to climate change pointed out by the IPCC, it is important to take integrate these social variables into a broader conception of the climate vulnerabilities that populations are increasingly faced with. This is especially crucial given that different types of vulnerabilities can interact. For example, a feeling of social exclusion may compound the effect of geographical isolation, which itself is a predictor of greater risks of climate hazards (e.g., Preston et al., 2011).

While it is therefore tempting to view adherence to such theories as a matter of irrationality or pathological psychological traits (such as paranoia), this would be overly simplistic. At the heart of conspiracy belief lies a lack of trust in authorities (Mari et al., 2020) who are seen as members of an out-group. This is evident with respect to COVID-19 (Bruder & Kunert, 2021; Karic & Mededovic, 2021; Van Oost et al., 2021), where conspiracy theories

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and distrust of experts and institutions fuel each other. These can then become amplified by within-group communication, not only through classic group polarization (Moscovici & Zavalloni, 1969) but due to the role of “influencers” (e.g., elites) within these communities (Nyhan, 2021, Tesler, 2018). Due to their central role in the group’s network, influencers can emphasize the group’s stances and exert “top-down” influence on group members. Within-group communication, of information but also of emotion, can act as a “social glue” and serve a crucial function of social integration in these subgroups (Rimé et al., 2020).

Because of such polarization, groups that trust different sources of information may not only hold different beliefs but may fail to achieve the common ground necessary for democratic debates to occur (Muirhead & Rosenblum, 2019). This occurred during the 2020 US presidential election, where even basic facts, such as Joseph Biden’s electoral college victory, were contested by large segments of Donald Trump’s supporters. This prevented democratic debate and paved the way for the violent insurrection at the U.S. Capitol on January 6, 2021. Both COVID-19 and climate change are events about which new information steadily accumulates and for which policies and measures need to be adapted depending on the evolving scientific consensus, but also in response to a host of other economic, societal, and psychological factors. Of particular relevance to the current discussion, the COVID-19 pandemic has elicited drastic action from governments around the world – much more drastic than what has been done for climate change. Such actions and policies are likely to be associated with conspiracy beliefs, especially among those who believe they stand to lose the most from these policies.

Further, it should be clear from the above that Conspiracy Theories do not necessarily reflect “bottom-up” inductive processes. Rather, they are socially transmitted within communities in which individuals may have a variety of motivations for transmitting such theories beyond accuracy (Nyhan, 2021). For instance, people may be motivated to signal

their group membership, to attract attention or even to entertain (the communication value of theories that go “against the grain” is greater than that of “bland” “official” theories, Van Prooijen et al., 2022).

Importantly, one of these motives may be to goal of mobilizing others in supporting one’s long term goals, such as supporting a political or financial agenda. Conspiracy Theories are often weaponized by wealthy or powerful agents who have a vested interest in contesting the “official” version or the scientific consensus. For example, energy companies have long fueled “climate-skeptic” studies, just as “big tobacco” companies funded research that cast doubt on the link between smoking cigarettes and cancer decades before (Oreskes & Conway, 2010), and Russian “bots” have disseminated anti-vaccine conspiracy theories (Broniatowski et al., 2018).). Similarly, far-right and populist groups, whose racism and xenophobia may be repulsive to most, have managed to attract sympathizers by capitalizing on opposition to the governments’ COVID-related policies (Stecula & Pickup, 2021). Vulnerability to Conspiracy Theories and fake news is therefore also accompanied by vulnerability to certain forms of political radicalization, making it necessary to draw conclusions from the COVID-19 crisis and to propose recommendations based on social sciences.

1.3 Recommendations regarding conspiracy beliefs

Attempting to correct misinformation

Correcting misinformation can be done through fact checking (Walter et al., 2019) or inoculation, a technique that involves presenting a weaker version of false information as well as arguments for refuting it (McGuire, 1964). When subsequently exposed to this false information, targets are less likely to be swayed by it. This technique has already proven effective in relation to climate skepticism (Van der Linden et al, 2017). However, such measures may only be effective on individuals who do not have strong conspiracy beliefs.

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Further, if such information comes from “elites” who already suffer from a credibility gap, their effect may be limited (Douglas, 2021)

Curtailling the spread, rather than belief, in misinformation.

As we have noted, people not only share conspiracy beliefs because they believe them but for many other reasons. Yet, encouraging attention to accuracy may limit the sharing of misinformation on online platforms (Pennycook et al., 2021). In this vein, Twitter has experimented with asking its users whether they have read an article before they can share it. Incentivizing such measures to make people more vigilant to what they share on social media may constitute an effective tool in the fight against conspiracy theories.

Targeting influencers.

Given the central role of influencers in communities adhering to conspiracy beliefs, a third strategy involves targeting them specifically. For example, in a field experiment, U.S. state legislators informed of the reputational effects of spreading misinformation (Nyhan & Riefler, 2015) subsequently had better fact checking records than those who were not.

Making scientific content more visible.

At the level of social networking sites and digital platforms, it is of course important that people who consult conspiracy related content do not subsequently receive similar content in an attempt to maximize their engagement with the platform. Rather, content with the scientific consensus should be easily available and visible. This policy has been adopted by Meta (the parent company of Facebook) regarding vaccination but could be implemented for climate change information as well.

Enhancing the legitimacy of public policies.

More generally, given that distrust is at the heart of conspiracism, we believe that the main avenue for combating conspiracy beliefs resides in ensuring that the policies and actions taken by authorities be perceived as legitimate. This is an especially acute concern for those who

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perceive themselves as standing to lose most for policies aimed at combating climate change. The answer on how to achieve this may come less from research on conspiracy theories than from research on procedural justice. For example, the group engagement model (Tyler & Blader, 2003) suggests that the way people are treated, not just the outcomes they experience, shape their social identity. In turn, the value they accord to their social identity predicts engagement on behalf of the collective. For example, even if members of a group suffer from a policy, they may adhere to it if they feel that their group has been treated fairly and respectfully during the decision process. Such treatment may foster identification to a larger superordinate group, such as a common human identity (Reese, 2016), for whom the same policies are considered beneficial. Specifically, community based participatory approaches, which have been widely used in the health domain (Schultz, Krieger, & Galea, 2002), could also be considered as a means to elicit trust and cooperation in support of collective efforts to address climate change. Research suggests that while committed to democratic principles, “conspiracy believers” are distrustful of parliamentary democracy (Pantazi et al., 2021) because they feel disempowered in such a system. Hence, the challenge is to identify decision making procedures in which people feel that their voice is heard. Forms of participatory democracy, possibly in combination with direct democracy, may constitute an avenue for doing so.

Finally, all of these recommendations can be accompanied by broader measures that target social vulnerabilities to conspiracy theories. In this sense, the feeling of exclusion or social downgrading can enrich the factors that encourage the success of Conspiracy Theories. In the case of climate change, geographical factors can also interact. In a way that complements conspiracy theories lessons, the COVID-19 crisis thus provides strong incentives to rethink intergroup relations and diversity policies associated with climate change.

2. Building an inclusive climate diversity policy based on lessons learned from vulnerabilities to COVID-19

One of the perceived commonalities between COVID-19 and the climate crisis is that both events would be global and universal—so-called “great equalizers” that affect all of humanity. This illusion does not stand up to evidence: the relative risk of dying from COVID in 2020 was for example 2.8 for African Americans and 2.3 for Hispanics in the U.S. compared to whites in the U.S. (Haynes et al., 2020). More troubling, the social vulnerabilities underlying disparate COVID-19 outcomes appear similar to those underlying climate change inequities, which include race, ethnicity, and social class.

Yet, the worldwide response to the pandemic has been far more rapid and concerted than the response to climate, raising questions about what lessons to be learned from the pandemic for climate management. We propose here to develop a climate policy that is attuned to these social vulnerabilities based on the management of COVID-19. This link can be made to future climate change issues in three areas: population vulnerabilities in the face of risk, stigmatization of certain social groups, and the possible conceptualization of these events as systemic environmental crises. We propose recommendations that draw lessons from COVID-19 to develop a diversity-focused climate policy: further integrating race, ethnicity, and social class into climate prevention messages, bringing vulnerable populations closer to climate issues, and proposing a diversity climate science that will learn from the current pandemic.

2.1 Equity of vulnerabilities in the face of climate and health crises

Climate change has the potential to exacerbate inter-group tensions (Pearson & Schuldt, 2014) due to the associated political and environmental issues (e.g., climate

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refugees). In this regard, the vulnerability of populations in the Global South to climate challenges has been repeatedly highlighted (see for example Field & Barros, 2014). Several regions of the intertropical zone are already feeling the effects of global warming, such as heat waves in the Sahel or Central Asia, disruption of monsoon systems in the Indo-Pacific region, melting Andean glaciers, threats to biodiversity or rising sea levels which have already caused the disappearance of a number of Pacific Islands. In Western countries, especially since the Hurricane Katrina disaster in southern states of the U.S., environmental risks are increasingly recognized as affecting members of racial and ethnic minority groups more so than members of majority groups (e.g., Zoraster, 2010). Conversely, because of their random and global nature, pandemics and viruses seem at first glance to pose an equal threat to all groups in society, regardless of status and privilege. However, previous pandemics, such as AIDS, show that this is not the case (Bowleg, 2020): because of pre-existing vulnerabilities, certain groups are more impacted by viruses, just as they stand to be more impacted by climate change.

Like AIDS before it, COVID-19 has not affected all social categories equally. Race and ethnicity are risk factors for both hospitalization and death from COVID-19 (Haynes et al., 2020). Similar disparities are apparent among the country's largest minority groups. Compared to Whites, Blacks and African Americans are 1.9 times more likely to die, while Hispanics and Latinos are 3 times more likely to be hospitalized². Other cohort studies have also shown increased mortality for African Americans and Southeast Asians (Williams et al., 2020). In the United Kingdom, 34% of patients admitted to intensive care units at the beginning of the pandemic were ethnic or racial minorities, whereas they represent only 11%

² Data source: National Center for Health Statistics (NCHS) provisional death counts (<https://data.cdc.gov/NCHS/Provisional-Death-Counts-for-Coronavirus-Disease-C/pj7m-y5uh>, data through April 3, 2021). Numbers are ratios of age-adjusted rates standardized to the 2019 US intercensal population estimate.

of the general population³. The presence of early comorbidities is also found among minorities (Haynes et al., 2020) and contribute to these higher rates of severe forms of the disease. These risk disparities were also found in the following waves of the epidemic (Mathur et al., 2021).

A closer look, however, shows that the risks do not appear to be greater when sociodemographic variables are controlled for (Yehia et al., 2020). Thus, these differences may be partly explained by confounding factors, with race and ethnicity being a risk marker for other underlying conditions such as socioeconomic status, access to care, obesity, reflecting longstanding discrimination in society. Analyses of the determinants of these risks are consequently multifactorial. After more than two years of documenting of these disparities during the pandemic, the response by public authorities has largely been limited and circumstantial. In the United States, for instance, the Food and Drug Administration announced in April of 2021 a number of actions intended to address racial-ethnic disparities in COVID-19 health disparities, including its efforts to build awareness about the diversity of clinical trial participants and efforts to support the development and translation of COVID-19 educational material into more than 20 languages⁴. In the European Union, variation in strategies, timelines, and legal processes has hampered a coordinated policy strategy around diversity issues (Paccès & Weimer, 2020). The COVID-19 crisis has made group-based risks and vulnerabilities abundantly salient. Beyond health risks, the pandemic has also highlighted the increased risk of stigma faced by minorities because of COVID-19.

2.2 The risk of stigmatization

3 INARC report on COVID-19 in critical care. <https://www.icnarc.org/Our-Audit/Audits/Cmp/Reports>

4 <https://www.fda.gov/consumers/minority-health-and-health-equity/clinical-trial-diversity>

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Reports on climate change point to the potential for an increase in climate refugees in the coming years. In turn, the arrival of climate refugees is likely to reinforce pre-existing intergroup tensions and debates over immigration, create new ones, and pose burdensome legal and organizational issues in the (mostly Western) societies that will serve as hosts (Docherty & Giannini, 2009; Lister, 2014). Unlike with climate change, the COVID-19 crisis did not create health refugees; the tightening of borders and customs regulations and enhanced sanitary measures essentially precluded large-scale migration due to the pandemic. It did, however, highlight how readily minorities can find themselves faced with discriminatory and stigmatizing behavior.

There are several ways in which the pandemic has fueled stigmatization. Sanitary protection measures, such as isolation or quarantine, may have reactivated old stigmatizing tendencies linked to epidemics, as when an epidemic of typhus and cholera in 1892 was traced to Jewish populations in Eastern Europe and led to exclusionary behaviors against them (Bruns, Kraguljac, & Bruns, 2020). Throughout the COVID-19 pandemic in the U.S., members of the Asian, Asian American, and Pacific Islander communities have been victimized amid a spike in racially motivated hate crimes (Bagcchi, 2020; Yam, 2021), which many have linked to racist rhetoric regarding the geographic origin of the virus, including the former president Donald Trump's use of the terms "Chinese Virus" and "Kung Flu" (Schuldt, et al., 2021). These tendencies may have been exacerbated by the identification of different variants of interest (VOI) or variants of concern (VOC) by their supposed geographic origins (e.g., the "Indian," "English," and "Brazilian" variants). This led the WHO to formulate a formal statement on the subject ("*There should be no stigma associated with these viruses being detected,*" (Krekhove, 2020)

These reactions should alert us to the potentially stigmatizing consequences of global warming for the most vulnerable populations. As the consequences of global warming and

climate change grow more severe and acute, the most-impacted groups are at risk of being faced with a rapid increase stigmatization and ostracism, and the possibility that labels such as "climate refugees" or "climate victims"—while accurate or seemingly well-intentioned—will only reinforce these negative outcomes.

2.3 Systemic crises that underestimate the implications of diversity issues

Despite the heightened risks to members of racial and ethnic minority groups stemming from COVID-19 and climate change, we believe that the integration of race, ethnicity, and also class as key social predictors of unequal impacts of these crises is structurally undervalued. For example, geographer Kathryn Yusoff points out that the historical and geographical presentation of global warming often fails to make connections to colonial history (Yusoff, 2018). The revolutions of the great discoveries of the sixteenth century, and the industrial and technological revolutions of the nineteenth century, are regularly framed as the starting point for the energy transition that initiated the increase of concentrations of greenhouse gases in the atmosphere; however, these same periods also involved exactions committed against native peoples and the undeniable contribution of slavery to this economic boom (Ferdinand, 2019; Yusoff, 2018). Similarly, awareness in the environmental field, which often focuses on "future" impacts may sometimes overlook environmental degradation that is already occurring, including the effects that climate change is already having on some populations (Ferdinand, 2019, IPCC, 2014). These omissions are reflected in the lack of epistemological integration of colonial issues in climate studies but also in an overall lack of diversity in the climate movement. Despite their heightened vulnerability to climate impacts (see above), people of color are vastly underrepresented within both mainstream environmental organizations and in the environmental sciences (Pearson & Schuldt, 2014). During the COVID-19 crisis, a similar trend was observed:

although more vulnerable, minorities are globally underrepresented in Western countries, and several researchers warned university leaders of threat posed by COVID-19 to efforts to recruit and retain members of historically underrepresented groups within the academy (Maas et al., 2020). Specifically, Maas and colleagues (2020) note that the pandemic undermines the careers of members of underrepresented groups, in particular, and call into question decades of slow but meaningful achievements of diversity initiatives. Again here, the pandemic reveals the potential for a major crisis to disrupt and undermine progress on diversity issues, which ultimately weakens society's ability to generate effective solutions to complex global problems. We consider this in greater detail below, in our discussion of recommendations for more diversity-focused climate policies.

2.4 Recommendations for more diversity-focused climate policies

Social sciences dealing with climate issues can help to address the issues common to both crises presented above. We propose three complementary recommendations:

Taking into account social vulnerabilities into climate prevention messages

To date, there has been little integration of diversity-related content in COVID-19 awareness campaigns. There may be several reasons for this, including the prioritization of other risk factors (such as age, obesity, or chronic disease), a failure to consider diversity as a central issue in this type of crisis, and the limited early availability of data on racial/ethnic disparities in COVID-19 impacts. This resulted in a lack of interest in these campaigns among some of the most vulnerable communities. In crafting climate awareness messages, communicators should strive to learn from this mistake, as many of the communities that were overlooked in COVID-19 messaging efforts should have been the primary target audience. We suggest first that decision-makers in charge of future environmental campaigns frame their messages more explicitly in relation to issues of diversity and inclusion, to make clear

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the risk that climate change poses to minorities and other marginalized groups. Particular attention should then be paid to *who* is delivering this information, as social characteristics of the messenger may shape feelings of trust and belongingness (e.g., Lewis, Green, Ducker, & Onyeador, 2021; Pearson, Schuldt, Romero-Canyas, Larson-Konar, 2018). For instance, despite the relevance and importance of her message, it has been noted that the demographic profile of the activist Greta Thunberg corresponds very closely to the "WEIRD" (Western, Educated, Industrial, Rich, and Democratic, see for instance Muthukrishna et al., 2020) sampling biases found in psychology, which may have the effect of engaging certain audience segments more than others. The inclusion of minority spokespersons in messages is essential to rallying audiences that are often excluded or self-excluded from climate decision-making (Ferdinand, 2019; Pearson et al., 2017; Schuldt et al., 2022), as audience members may feel heightened motivation to behave in ways that match those of others in their in-group and that feel identity-congruent (e.g., Oyserman, 2009).

Bringing climate issues closer to vulnerable populations

The marginalization of minorities as key stakeholders during the COVID-19 crisis, and the need to correct for these mistakes in future climate campaigns, should be complemented by *concretely* bringing future climate public action programs closer to minority populations, in the communities in which they live. In order to mitigate the current and potentially future stigmatization of these populations, public policies should provide tools that are tailored at the local level. This could include access to IT tools, online information materials, and involving decision-makers from the affected neighborhoods and areas in climate policies. It may also involve partnerships between government and community leaders to better understand the unique environmental concerns of people living in more vulnerable communities, which may not always match those more affluent communities and government leaders (Lewis et al., 2020; Song et al, 2020). More broadly, the COVID-19 crisis

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has shown the urgency of fostering stronger connections policymakers, community leaders, and target audiences. This interconnection is largely insufficient today in the climate field and is a significant obstacle to policy implementation at the local level (Haynes et al., 2020).

Underlying these shortcomings is also the lack of a systemic link between the climate crisis and colonial and diversity issues, which will be necessary for creating climate policies that serve growing and increasingly diverse populations.

Fostering a climate science of diversity

Finally, one of the lessons to be learned from the COVID-19 crisis for the climate domain is the importance of representativeness among policy- and decision-makers, both at the institutional and academic levels. Previous calls for greater diversity in climate science (e.g., Pearson & Schuldt, 2014) are even more relevant on the heels of COVID-19. Paradoxically, amid growing recognition of the heightened vulnerability of minority communities during the COVID-19 crisis, representation of minorities among policymakers and academic staff has been threatened (Maas et al., 2020), potentially undermining the more productive and innovative solutions that diverse scientific communities have been shown to generate (Jimenez et al., 2019). We urge significant investments in efforts to recruit and retain members of minority communities and others that have been historically underrepresented in environmental science and organizations—not only on the part of individuals, but crucially, by the institutions and systems that support scientific inquiry (e.g., funding agencies). We thus urge greater intellectual and material investment in linking issues of diversity with climate change action, based on lessons learned from the COVID-19 pandemic, and a greater recognition of the deeply interconnected nature of diversity and climate issues more broadly.

3. What place for psychological science?

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The scientific links between the two crises, as we have seen, do not only concern the environmental sciences. Early after the onset of the pandemic, and because of the involvement of psychological processes that may explain reactions and attitudes toward COVID-19, debates began regarding the place of behavioral science. In an article already cited more than 3000 times, Van Bavel and colleagues (2020) discussed the use of social and behavioral sciences to respond to the problems presented by the pandemic, citing a large number of research studies in the fields of moral psychology, health psychology, and communication. In particular, they highlight key insights from the behavioral sciences that could be relevant for public health experts, policy makers, and community leaders (e.g. "There is a need for more targeted public health information within marginalized communities (...)"; "Preparing people for misinformation and ensuring they have accurate information and counterarguments against false information before they encounter conspiracy theories (...) can help inoculate them against false information", Van Bavel et al., 2020, p. 462). The application of social sciences has led some countries to design interventions based on "nudges" (Thaler & Sunstein, 2008) to increase, for example, mask use and adhering to social distance mandates in India (Debnath & Bardhan, 2020). In Sweden, no lockdowns or repressive measures were put in place at the beginning of the pandemic, in favor of "soft" behavioral incentives to comply with barrier measures (Yan et al., 2020).⁵

At first glance, and particularly because of the conceptual similarities between the two crises as discussed above, these recommendations seem to be readily applicable to current and future climate policies. However, the use of behavioral science as an inspiration for recommendations must be approached with caution. Beyond some of the theoretical complexities between the two crises that we mentioned earlier, other researchers have argued that social sciences should be used with caution to inform public policy (IJzerman et al.,

⁵ We do not discuss here the effectiveness in epidemiological terms of this choice

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2020). These authors proposed a classification framework based on the level of evidentiary value of scientific finding, recommending that decision-makers who decide to base their public policies on behavioral sciences should be take this level into account. They rely on an analogy with the levels of evidence and classification used by NASA before launching a new technology. One of the overarching ideas of this hierarchy between evidentiary levels is that the success of policy requires that scientific findings at the relevant level also abide by the criteria of all levels below it: For instance a level "6" policy (i.e., highest level) will be inherently flawed if the conditions necessary for reaching the lower levels are not met by the scientific findings informing such policy.

From the perspective of recommendations linking the COVID-19 crisis to climate change, we support the objective of taking a careful and structured approach to using social science in recommendations. The level of evidence in the behavioral sciences can indeed be problematic, depending on several parameters discussed frequently in the recent literature such as statistical power, theory robustness, sample quality, or other questionable research practices ("QRP", for a review, see Shrout & Rodgers, 2018). Lessons from COVID-19 must also be learned in this area, and careful, retrospective examination of the utility (or lack thereof) of public policies informed by behavioral science will need to be conducted before extending them to other areas such as climate change. In this respect, IJzerman and colleagues' framework can guide us. However, a direct implementation of NASA-type recommendations can also be complicated, for example, because of the training (or lack of training) of decision-makers in charge of these policies. For these reasons, in addition to the criteria developed by IJzerman and colleagues (2020) and Rodgers and Shrout (2018), we propose that a general framework for "prudent use" of social science should be accompanied by two complementary recommendations:

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- First, policymakers should engage more often with theory experts, and vice versa. While behavioral science-based research and action have made substantial progress in recent years, future policies would benefit from greater understanding of the mechanisms by which psychological processes do or do not promote certain behaviors (e.g., Brosch, 2021). Moreover, the generation, testing, and refining of theory may benefit when researchers open themselves up to the ideas and perspectives of policy makers and key stakeholders (Levine, 2020). The result of having researchers and policymakers in more frequent conversation, we believe, will lead to better policies that not only simply apply behavioral techniques from the literature, but are based on a more thorough understanding of the context in which the policy will be implemented and on a more careful investigation of the processes underlying the targeted behavior.

- Second, we believe it is important to increase the level of social science training for journalists and policymakers. The COVID-19 crisis demonstrated the difficulties journalists could face in communicating reliable and accurate information in the scientific field given the speed with which events could change (Perreault & Perreault, 2021). Explaining both the usefulness and limitations of using social science and the methodological features of behavioral science is essential to improving future climate campaigns. We posit that the responsibility for this lies primarily with social scientists, university courses for journalists and politicians, and behavioral-science or nudge-like units that have begun to be set up by some governments (e.g., the “Behavioral Insights Teams” in the UK, Australia, or Germany).

4. Concluding remarks

The IPCC reports follow one another and become more and more alarming, insisting on the little time left to humanity to accomplish the necessary changes to limit greenhouse gas emissions. The vulnerability of populations to climate changes is increasing and forecasts are

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not optimistic for the coming decades. Faced with these challenges, environmental or engineering sciences will probably not be sufficient to find solutions. Climate researchers are increasingly emphasizing the role of social science in the climate transition (Allan et al., 2021). Paradoxically, the COVID-19 crisis can teach us lessons about how to make collective and rapid decisions to address threats. In this article, we have raised commonalities and possible inspirations for understanding common social vulnerabilities to COVID-19 and climate. However, other connections are possible between the two crises in the social sciences domain, for example in investigating the emotions involved or the different cognitive appraisals between the two crises on dimensions like certainty/uncertainty (see for instance Graton et al., 2022). The pursuit of social science research on these issues is inextricably linked to policy recommendations. The objective of both improving the level of evidence for interventions based on behavioral science and increasing the effectiveness of future climate policy requires, in our view, greater collaboration between policymakers, scientists and even the media. The success of these future projects depends on this greater integration of the link between the political, academic, and journalistic spheres.

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STATEMENT & DECLARATIONS

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