



# Mechanisms of Intergenerational Environmental Stewardship Activated by COVID-19: Gratitude, Fairness, and Legacy Motives

Stylianios Syropoulos<sup>1\*</sup> and Ezra M. Markowitz<sup>2</sup>

<sup>1</sup> Department of Psychological and Brain Sciences, University of Massachusetts Amherst, Amherst, MA, United States,

<sup>2</sup> Department of Environmental Conservation, University of Massachusetts Amherst, Amherst, MA, United States

## OPEN ACCESS

### Edited by:

Michelle Leigh Johnson,  
United States Forest Service (USDA),  
United States

### Reviewed by:

Julia Puaschunder,  
Columbia University, United States  
Kimberly Wade-Benzoni,  
Duke University, United States

### \*Correspondence:

Stylianios Syropoulos  
ssyropoulos@umass.edu

### Specialty section:

This article was submitted to  
Urban Resource Management,  
a section of the journal  
Frontiers in Sustainable Cities

**Received:** 10 May 2021

**Accepted:** 08 September 2021

**Published:** 06 October 2021

### Citation:

Syropoulos S and Markowitz EM  
(2021) Mechanisms of  
Intergenerational Environmental  
Stewardship Activated by COVID-19:  
Gratitude, Fairness, and Legacy  
Motives.  
*Front. Sustain. Cities* 3:707888.  
doi: 10.3389/frsc.2021.707888

The COVID-19 pandemic has caused an immense loss of human life, increased economic uncertainty, and negatively impacted individuals' mental health and close relationships. At the same time, experts have noted a concurrent improvement in many environmental quality indicators, including significant decreases in both localized air pollution and global greenhouse gas emissions. These positive trends are due to changes in human behavior necessitated by social distancing and self-quarantining measures (e.g., reduced car and air travel). However, there is already evidence that these improvements in environmental quality are only temporary. This suggests that more intentional efforts will be necessary in order to maintain positive environmental benefits and address major environmental issues as the world gets back to some version of pre-pandemic economic and social activity. Still, our collective experience over the course of the pandemic provides clear evidence that such change is possible and on a rapid timetable. Our individual and collective responses to COVID-19 reveal that we do indeed have the ability to respond to novel societal threats in highly coordinated and effective ways, suggesting that confronting the existential threat of climate change may in fact be feasible. Here, we theorize that the COVID-19 pandemic has potentially activated and made more salient some key psychological mechanisms—including norms of fairness and reciprocity, feelings of gratitude, and consideration of personal legacies—that previous empirical work suggests can be harnessed to promote beneficent intergenerational decision-making aimed at solving the environmental challenges we and our descendants will face in the twenty-first century.

**Keywords:** COVID-19, climate change, gratitude, legacy, fairness

## INTRODUCTION

Near the end of 2019, a new coronavirus spread rapidly around the globe, causing an epidemic of acute respiratory syndrome (COVID-19). Within a few months (i.e., by March 11, 2020) the World Health Organization (WHO) declared the spread of the virus a global pandemic (World Health Organization, 2020). At the time of this writing (May 2021), a year after the declaration of the pandemic, COVID-19 has infected more than 200 million people globally, resulting in

more than 4 million deaths (Johns Hopkins University, 2021). The COVID-19 pandemic has also generated unprecedented uncertainty in the global economy by disrupting supply chains, decreasing consumer demand for many goods and services, and increasing unemployment across the globe (Wagner, 2020). The pandemic has also negatively influenced mental health at a massive scale, increasing depression and stress worldwide (Talevi et al., 2020). Personal relationships have also been subjected to increased stressors (Goodwin et al., 2020; Pieh et al., 2020; Pietromonaco and Overall, 2020).

At the same time, experts have noted a concurrent improvement in many environmental quality indicators over the past year, including significant decreases in both localized air pollution and global greenhouse gas emissions. These positive changes can be traced directly to the economic and social impacts COVID has had on society, largely due to changes in human behavior necessitated by social distancing and self-quarantining measures (e.g., reduced car and air travel). Thus, at the same time that COVID has imposed a massive new threat and stressor on humanity it has also revealed that large-scale, bottom-up and top-down changes in the structure and functioning of society can occur extremely rapidly under certain conditions. This insight holds critical implications in the fight against anthropogenic climate change.

## CLIMATE CHANGE AND COVID-19

A recent perspective elucidates the connection between climate change and the COVID-19 pandemic (Barouki et al., 2020). In it, the authors discuss that ever-increasing populations, rapid urbanization, large-scale destruction of natural habitat, and growing consumption all combine to increase societal risk for the spread of zoonotic pathogens (Plowright et al., 2017; Gibb et al., 2020; OECD, 2020). Extant research has highlighted that climate change can contribute to the spread of epidemics, as it can impair biodiversity and damage natural habitats (Boissier et al., 2016; Bartlow et al., 2019; Caminade et al., 2019; Ryan et al., 2019). Climate change can also increase air pollution, another factor contributing to pathogen emergence (Karan et al., 2020; Woodby et al., 2020). In fact, some researchers have found evidence for a positive association between air pollution and increased transmission rates of COVID-19 (Ali and Islam, 2020). Further, scholars have pointed out several compounding environmental factors that could increase the spread of the pandemic (Phillips et al., 2020).

It is clear, then, that climate change and the destruction of natural environments are intertwined with the COVID-19 pandemic. It is almost ironic, then, that the spread of the pandemic has actually led to some unexpected positive outcomes for the environment. Researchers have noted a significant, if likely short-lived, reduction in daily global CO<sub>2</sub> emissions over the course of the pandemic, a result in part of social distancing and self-quarantining measures that restrict movement (e.g., Forster et al., 2020; Le Quéré et al., 2020). However, these changes are likely temporary if a post-pandemic world is not carefully planned for in advance; for durable, meaningful change

to occur a more systematic and consistent effort is required (Forster et al., 2020). Below we discuss how three psychological factors likely made more salient and powerful by the pandemic—fairness, gratitude, and legacy motives—could be harnessed to help promote that durable and much needed change to confront long time-horizon environmental challenges like climate change.

## PSYCHOLOGICAL IMPACTS OF COVID-19

Starting in early 2020, the COVID-19 pandemic upended people's lives across the globe. Since then, it has become increasingly clear that in addition to changing our patterns of consumption, travel, and interpersonal interaction, the pandemic has also had a massive, multifaceted, and complex impact on mental health and psychological functioning more broadly. In addition to the direct stress imposed by both actual illness and the sustained threat of potential illness (and death), the experience of living through the pandemic has also had subtler effects on a wide diversity of psychological dimensions and forces that, in turn, shape our understanding of the world and daily decision-making. For example, past work on mortality salience suggests that being bombarded with constant reminders of one's own mortality—a common experience over the course of the pandemic for most individuals—likely activates a slew of psychological mechanisms that have evolved to protect our mental well-being in the face of mortal threat (Pyszczynski et al., 2021).

Of particular interest here is the potential effect of the pandemic on activating and making particularly salient three core psychological mechanisms that have previously been shown to promote both prosocial behavior between contemporaries as well as intergenerational prosociality: (1) norms of fairness and reciprocity (e.g., Wade-Benzoni, 2002; Wade-Benzoni et al., 2008); (2) feelings of gratitude toward others (e.g., Ma et al., 2017; Watkins and Goodwin, 2020); (3) and endorsement of a personal legacy motive (e.g., Zaval et al., 2015; Syropoulos and Markowitz, 2021). All three of these mechanisms have been linked with willingness to engage in prosocial and pro-environmental behavior, largely through their positive effects on generating a durable (and intertemporal) sense of responsibility toward others (Wade-Benzoni, 2002; Wade-Benzoni and Plunkett-Tost, 2009). In the sections that follow, we first highlight how each psychological factor has been activated by the pandemic. We then elucidate the important role that each factor plays in promoting intergenerational environmental stewardship. Finally, we conclude by discussing potential avenues for future scholarship and practice focused on promoting intergenerational environmental stewardship including some interventions that could be employed utilizing these psychological mechanisms.

## FAIRNESS

The COVID-19 pandemic has laid bare the vast inequalities that exist in contemporary society. Although everyone is vulnerable to the disease itself, it is clear that the impacts of COVID-19 have been distributed in highly inequitable ways as a function of geography, class, race, and other sociodemographic factors. For

example, whereas job and income losses have mostly accrued to lower-class workers (Bottan et al., 2020), billionaires have seen their wealth rapidly increase during the pandemic. In fact, the International Labour Organization (ILO) suggests that while the rich got richer, workers' income fell by \$3.7 trillion (International Labour Organization, 2021). Aside from economic losses, lower socioeconomic status has also been linked with increased contraction of the virus as well as higher morbidity rates due to COVID-19 (Karmakar et al., 2021). Research also highlights racial disparities that have been highlighted by COVID-19 (e.g., people of color dying and being infected at a disproportional rate; Centers for Disease Control and Prevention, 2020). COVID-19 did not create new inequalities out of whole cloth; rather, it revealed existing, structural, and massive inequalities that already existed pre-pandemic. One result is that the pandemic has likely elevated concerns about *fairness*, given the tight linkages between conceptions of fairness and inequality (Graham et al., 2009; Low and Wui, 2015).

Fairness is a moral foundation which pertains to altruism and reciprocity (Graham et al., 2009) and promotes prosociality even at the expense of the individual actor (Van den Bergh et al., 2006; Crone and Laham, 2015). Scholars posit that fairness is universal, and that moral evaluations of others rely on whether they are fair/unfair in their treatment of others (Haidt and Joseph, 2004). Fairness is particularly important in the context of intergenerational decision making, that is, situations in which present decision-makers make choices that affect future generations. Fairness and concerns about reciprocity within intergenerational dilemmas can be driven by egotistical motivations, which can bring about a breakdown in intergenerational stewardship (Wade-Benzoni et al., 1996, 2008). Importantly, fairness also drives intergenerational reciprocity (i.e., when present generations act toward the future based on how they perceive past generations treated them), which can lead to either beneficial or deleterious outcomes for future generations (Wade-Benzoni et al., 2008). In this manner, fairness in intergenerational decision-making processes can instill norms about fairness and reciprocity in future generations that will continue or at least maintain intergenerational stewardship.

Harnessing the newfound attention COVID-19 has placed on our considerations of fairness could prove influential for promoting concern for issues that rely on norms surrounding fairness and reciprocity, including climate change. Like COVID-19, climate change involves deep inequalities, especially across time (i.e., intergenerational inequality) because its most severe consequences will be experienced by future generations. Yet, like other issues that unfold over long time horizons, societal action on climate change is characterized by high levels of intertemporal discounting, i.e., the tendency for individuals to discount the future value of harms and benefits relative to those experienced today solely based on the fact that they accrue at a future point in time (Frederick et al., 2002).

Research on efforts to combat temporal discounting has suggested that norms of reciprocity—which are tightly linked with perceptions and values of fairness—are crucial in this context (e.g., Wade-Benzoni and Plunkett-Tost, 2009). Wade-Benzoni (2002), for example, has emphasized that a

sense of fairness is a key motivator responsible for promoting reciprocity. Empirically, research has highlighted that being concerned about fairness directly translates to being altruistic in decision-making settings that involve exchange and/or helping (e.g., Graham et al., 2011; Nilsson et al., 2020).

We suggest that the powerful ways in which the COVID-19 crisis has made considerations of fairness and inequality particularly and widely salient reveals a possible opportunity to leverage this core prosocial motivation in the context of other fairness-involving issues such as climate change. The COVID-19 pandemic has made it clear that economic inequality and systemic racism are prominent in our societies, and that collective efforts are needed to address these issues. In a similar vein, equitable climate change action must be rooted in a collective conceptualization of fairness, particularly in an intergenerational fashion. Our actions today and in the near future directly affect future generations' exposure to climate-related risks (e.g., threats of extreme weather events, water and food shortages). Moreover, because future generations are not "at the table" in present-day negotiations over climate change, it is up to present generations to effectively advocate on behalf of future others. Promoting a sense of fairness may go a long way toward engaging individuals in collective efforts to preserve nature, understand the needs of the natural world, and engage in constructive intergenerational environmental stewardship.

The pandemic has demonstrated in a powerful way that humans are indeed capable of acting in a manner that emphasizes altruism and reciprocity (made evident by collective efforts to prevent the spread of the pandemic; e.g., Chan, 2021; Syropoulos and Markowitz, 2021). Building upon such collective efforts to prevent the spread of COVID-19 as well as the collective acknowledgment of the inequalities that have been emphasized as a result of the pandemic as a stepping stone for future endeavors could prove beneficial in promoting collective action efforts to mitigate the impact of climate change. This theorizing is in line with extant research which finds that of the five major moral foundations that influence decision making processes and moral judgement, concerns about compassion and fairness are the two most robust predictors of willingness to act to prevent climate change (Dickinson et al., 2016). Research on policy acceptance also supports this claim. In an experiment in which participants evaluated the acceptability of pro-environmental policies, ratings of how acceptable a policy was correlated positively with how fair each policy was perceived to be (Clayton, 2018). Another study utilizing data from a large-scale experimental survey found that in Germany, the U.S., the U.K. and France, public support for global climate change agreements was dependent on how prominently principles of fairness were featured (Bechtel and Scheve, 2013). In fact, a recent review of the literature also supports this theorizing, concluding that morality and notions of justice can promote cooperation within the context of climate change (Pearson et al., 2021).

Given these findings, behavioral interventions should strive to maintain an emphasis on fairness, while also ensuring that individuals have an accurate perception of whether their own decisions are fair (from a variety of perspectives, including intergenerationally). From our childhood we rely on fairness

norms to inform our distribution of resources to others (for a review see Ruthland and Killen, 2016). Ensuring that these norms are upheld at later stages of life could thus prove beneficial. One potential avenue that could reinforce norms of fairness is the use of historical examples of fair and unfair treatment of (out)groups by the ingroup, with an emphasis on the consequences of these interactions. Such an example could instill a predisposition for fairness in future interactions by highlighting the benefits of engaging in fair treatment of a group as well as past injustices caused by the ingroup. Another intervention could focus on just/fair moral exemplars. This approach would focus on the use of individuals who throughout history were champions of justice, equality and fairness as examples that should be followed. Research on moral exemplars has shown that they are capable of influencing attitudes. For example, research in the field of intergroup relations has highlighted that the use of moral exemplars can promote intergroup reconciliation (for a review see Cehajić-Clancy and Bilewicz, 2020). Similarly, in the sphere of intergenerational decision making, utilizing examples of people who were fair in their distribution of resources could reinforce fairness norms, leading to a more equitable distribution of resources to future generations. As long as the historical examples and exemplars are utilized in ways that are not indoctrinating, such approaches could instill or maintain norms of fairness that are key in promoting fairness in intergenerational decision making.

## GRATITUDE AND RESPONSIBILITY TO OTHERS

As with the spotlight that COVID-19 has shined on considerations of fairness, so too has it provided countless opportunities for people to experience gratitude, in ways both small and profound. Strangers and neighbors alike acting to help others in need, stories and images of everyday heroes working to save people's lives under terrible circumstances, recognition of the risks grocery store and other essential workers have taken every day in order to keep society fed and operating—all of these instances and more have helped many people feel a deep sense of gratitude throughout the course of the pandemic, despite all of the challenges it has presented. What's more, there is evidence that these feelings of gratitude help predict greater prosocial behavioral tendencies aimed at reducing the spread of COVID-19 (Syropoulos and Markowitz, 2021).

Gratitude is often described as “appreciation felt after one has been the beneficiary of an altruistic act” (Emmons and Crumpler, 2000, p. 56–57). From a theoretical perspective, researchers posit that gratitude seems to have evolved as a mechanism that promotes cooperation within and between groups (Trivers, 1971; Stellar et al., 2017). Gratitude often promotes altruism and helping behaviors, even at high personal cost to the actor (Bartlett and DeSteno, 2006). Increased gratitude, both as a disposition (i.e., trait) and as a transient, experienced emotion (i.e., state), predicts greater prosociality (Moss and Page, 1972; Buck, 2004; Harpham, 2004; Komter, 2004; Bartlett and DeSteno, 2006; DeSteno et al., 2010; Grant and Gino, 2010; Ma et al., 2017).

Further, research also highlights that gratitude also promotes reciprocity in helping behaviors (Froh et al., 2010; Emmons and Mishra, 2011).

Recently, researchers have found that gratitude is a key motivator of intergenerational stewardship (Barnett et al., 2019; Syropoulos et al., 2020). To the extent that people's experiences with COVID-19 may have increased trait-level gratitude and/or the salience of gratitude across a wide swath of the general public (see Fishman, 2020, for recommendations on how to harness gratitude during COVID-19), the extant research on gratitude as a motivator of intergenerational environmental stewardship (e.g., Syropoulos et al., 2020; Watkins and Goodwin, 2020) suggests there may be a new opportunity emerging to leverage these shifts to promote greater engagement and action on issues like climate change. The aforementioned instances of reciprocity and prosocial behaviors observed during the COVID-19 pandemic serve as instances during which gratitude toward the actors behind these actions is felt. Harnessing this gratitude as a tool for increasing prosociality, either through public campaigns or through individual practices, could prove effective in promoting intergenerational stewardship.

As alluded to earlier, climate change and COVID-19 are intertwined crises (at least to some degree). Thus, one could argue that to prevent such a pandemic in the future, and to ensure that we live up to the sacrifices that others have made for us already, it is our responsibility to protect the environment for the sake of future others. In fact, the primary psychological mechanism capable of increasing environmental stewardship that gratitude activates is its capacity to strengthen perceived responsibility toward future generations (Syropoulos et al., 2020; Watkins and Goodwin, 2020; Syropoulos and Markowitz, 2021). Given these connections, a potential avenue worth exploring is how the current generation is acting in a way that is grateful to its predecessors. Reinforcing such norms (i.e., valuing gratitude), or targeting people's felt gratitude toward those who have sacrificed to help others during the pandemic, may help promote concern for the environment by strengthening feelings of generativity and thankfulness which can help combat temporal discounting, a major obstacle to action on climate change and other long-term societal problems (Wade-Benzoni and Plunkett-Tost, 2009).

As noted above, much research has charted the prosocial effects of gratitude, with evidence also highlighting its ability to increase pro-environmental behaviors and attitudes (e.g., Syropoulos et al., 2020). Future interventions could thus utilize this psychological mechanism to reinforce altruistic intergenerational decision making. One avenue is elevating people's grateful disposition. Encouraging reflection for the people and things in one's life that an individual is grateful for could be prove to be impactful in this respect. Alternatively, another proposed mechanism is that of gratitude meditations (e.g., O'Leary and Dockray, 2015). By elevating people's grateful disposition, we would expect improved levels of mental health, prosociality, and, to an extent, charitable and pro-environmental behaviors. Alternatively, interventions with an educational focus could instead emphasize gratitude as a norm in our society. Feeling grateful toward the effort that past generations have exerted to ensure our well-being

could in turn promote our sense of responsibility toward future generations, an established predictor of intergenerational reciprocity (Wade-Benzoni and Plunkett-Tost, 2009) and of a host of pro-environmental attitudes (e.g., Syropoulos and Markowitz, 2020).

## LEGACY MOTIVES

Perhaps most obvious of all is the impact COVID-19 has had on increasing the salience of our own mortality. Because the pandemic has led to an unprecedented loss of life, death has become salient to people, regardless of whether they believe that the impact of the virus has been exacerbated. In a recent article published by Pyszczynski et al. (2021), the authors highlight the psychological mechanism of terror management in response to the COVID-19 pandemic. The authors state that “the salience of death brought on by COVID-19 plays a central role in driving the attitudes and behavior of even those who believe that the dangers of the virus have been vastly exaggerated” (Pyszczynski et al., 2021). Research highlights that when faced with credible threats to one’s own survival, some people react by denigrating messengers and denying the threat whereas others become more focused on living a good life with the time they have remaining (Zaleskiewicz et al., 2013). Further, researchers have found that one way in which individuals engage productively with their own mortality is to think about the positive legacies they can leave behind (Wade-Benzoni, 2019).

Broadly speaking, legacies are defined as “an enduring meaning attached to one’s identity” (Wade-Benzoni and Plunkett-Tost, 2009, p. 183). A legacy motive, therefore, is the motivation to build a legacy that will last the test of time. Legacy motives have been revealed to be a powerful mechanism capable of reducing intertemporal discounting and promoting (intergenerational) environmental stewardship (e.g., Fox et al., 2010; Tost and Wade-Benzoni, 2013; Zaval et al., 2015).

Empirically, research has shown that concern for one’s legacy is a robust predictor of proenvironmental attitudes. One study found that experimentally priming individuals to think about their legacy increased donations to environmental charities as well as strengthened their belief that climate change is a real phenomenon (Zaval et al., 2015). Another study found that regardless of the method employed to prime concerns about one’s legacy, individuals who were primed to think about their legacy reported greater cooperation with future generations (i.e., reported less temporal discounting, a key obstacle of efforts to address climate change; Hurlstone et al., 2020). Further, there is evidence suggesting that legacy motives are independent (i.e., uncorrelated) of key antecedents of climate change skepticism, such as political ideology (Syropoulos et al., 2021).

One potential avenue that people can utilize to cope with the hyper salience of death brought about by the pandemic (i.e., mortality salience) is to focus on their legacies. Researchers have posited that “when people are primed with thoughts of death, their inherent desires to generate a positive legacy can transform the expected barriers to intergenerational beneficence (i.e., social and temporal distance) into conditions

that promote beneficent allocations to other people in the future.” (Wade-Benzoni et al., 2012, p. 704). By actively working toward establishing a positive legacy, individuals can first and foremost think about their mortality in constructive way. Further, they can honor the sacrifices of those dear to them (supported by recent evidence highlighting a positive association between gratitude and heightened legacy motives; Syropoulos and Markowitz, 2021). In addition, they can strive to act in a way that promotes intergenerational stewardship, ensuring that future generations do not have to face the same adversity that they have (Wade-Benzoni et al., 2012).

Climate change has been a persistent threat that has been met with inaction as present generations are not facing the worst of its consequences. However, because of the COVID-19 pandemic, we now have a clear example of how not rising up to the challenge of a collective threat as soon as possible, can impact our society as a whole. We have seen that humanity can stand together and unite against major threats to our existence. Being concerned with one’s legacy, and actively working toward establishing a positive legacy, can aid a great deal in these efforts. Those who are concerned about their legacy engage in more conservation behaviors in their daily life, are more accepting of and concerned about climate change, and engage in greater environmental movement activism (Syropoulos et al., 2021). Crucially, those primed to think about their legacies expend more personal resources toward climate change for the sake of future generations (Zaval et al., 2015; Hurlstone et al., 2020; Shrum, 2021). Thus, by promoting legacy motivation as an avenue of dealing with one’s own perceived mortality, we could engage people in the issue of climate change and increase our efforts toward reducing our contributions to its impacts on our planet.

Experimental research on legacy motives has found that asking individuals to reflect on their personal legacy in different ways (e.g., Zaval et al., 2015; Bang et al., 2017; Hurlstone et al., 2020; Shrum, 2021) activates a domain-general legacy motivation, thus increasing how much individuals think about future generations. In fact, evidence by Bang et al. (2017) suggests that this legacy induction is even capable of overcoming the tendency to act selfishly in an intergenerational decision making context, even when past generations acted selfishly. However, it is also important to note that these manipulations induce a general legacy domain but not more fine-grained and specific legacy motives such as motives focusing on the impact of an individual or efforts to establish a good reputation (Syropoulos et al., 2021).

We recommend two avenues for interventions focusing on legacy motives. One is the use of a legacy diary or the creation of a letter to one’s future self (e.g., Shrum, 2021). In the case of the legacy diary, asking individuals to reflect daily or weekly on their efforts to establish a prosocial legacy, as well as on their success in meeting this goal, could potentially prolong the effects observed in the aforementioned studies which induced legacy motives by means of reflecting on one’s legacy. The latter attempt (i.e., letter to one’s future self) would act in a similar way and is in line with past literature on the positive effects of goal-setting on behavior change. Individuals could write monthly or yearly letters to their future selves, setting reasonable and attainable environmental goals (e.g., recycling more; reducing the use of

electricity), and read those letters in the future to re-activate their legacy-building motives. Alternatively, the use of advertisements that aim to increase support for proenvironmental policies or movements should attempt to leverage existing legacy motives that most people hold. Framing such a policy or movement as a means to create a lasting legacy could increase support toward the set goal. Individuals who are concerned about their legacy would potentially be inclined to lend their support. In turn, these individuals could serve as moral exemplars for other people, creating a cycle of public support for proenvironmental causes (e.g., Han et al., 2017).

## CONCLUSION

The coronavirus pandemic has been, without a doubt, a universal crisis of unprecedented proportions. Despite all of the aforementioned destructive consequences that the spread of the coronavirus has resulted in, hope emerges from two positive outcomes. First, humanity has largely come together as a whole and responded to the virus effectively, both at the micro and local scales and more broadly. Nearly all countries have passed legislation to help their citizens confront the fallout of the pandemic, people have volunteered huge amounts of time, money and other resources to help those in need, inspiring stories have emerged around the world about people's selfless efforts to help one another, and scientists have produced several highly-effective vaccines within the span of just 1 year to help bring the pandemic under control. These and so many other efforts over the past year make evident that as a global community we are capable of acting in unison for the collective good when faced with a global threat. And second, because of our virus-imposed confinement and reduction in travel, there have been significant, if likely short-lived, improvements in global sustainability indicators, particularly those tied to air quality and greenhouse gas emissions (Forster et al., 2020; Le Quéré et al., 2020).

At the same time, the COVID-19 pandemic has also, we argue here, activated and made more salient three key psychological mechanisms in individuals that hold important implications for addressing other pressing societal challenges, including climate change. By highlighting the inherent inequalities that reside in societies, norms focusing on fairness were reinforced. Through their personal actions, the sacrifices of moral exemplars, and the inherent moral emotions that individuals exhibited during the pandemic, the emotion of gratitude as well as our sense of responsibility toward others may have been made more salient and concrete. And as death has become a collective, vivid experience for so many, attention has been drawn to our own mortality and the legacies we want to establish.

Climate change is an existential and realistic threat that we are facing as a species. The increased number of droughts, heat waves, and hurricanes will continue to deteriorate our natural habitat, cause the loss of human and animal life, and damage economies worldwide. Similar effects from flooding are expected due to the rise in sea levels, increased melting of large ice masses around the globe, and changes in precipitation patterns. Even

though concern about climate change has increased globally, with roughly 70% of people perceiving climate change as a major threat (Fagan and Huang, 2019), another 30% still considers climate change a minor threat or no threat at all. Increasing recognition of climate change as a clear and present danger may not be sufficient to promote proactive action, but it can support positive engagement moving forward.

The window to spur into action is closing, and in the near future the negative consequences of climate change may be rendered largely irreversible (United Nations General Assembly, 2019). Changes are needed both at the micro (i.e., individual) and macro (i.e., collective) levels. Moreover, when engaging in efforts to enact such change, regardless of whether such efforts are targeting individuals, organizations, or entire systems, it is important to consider that climate change is an issue that is deeply interconnected with essentially all other major social issues of our time (Islam and Winkel, 2017), including inequality, justice, health and prosperity. As such, there are many paths that can and will need to be taken in order to address the complex web of threats posed by climate change, only some of which need to directly target "climate change" itself; many other approaches will indirectly support the conditions necessary to bring climate change under control through their targeting of other major societal challenges we face. For example, addressing major educational inequalities and focusing on efforts to promote social justice and economic equality can ensure that more people are in a position to advocate on behalf of themselves and future others in the context of climate change, and are financially capable to engage pro-environmental and conservation behaviors that could reduce their carbon footprint. Given the scope of the challenge we collectively face, we must search for and embrace these indirect paths at least as strongly as we do more direct approaches to confronting climate change.

We believe that the three psychological mechanisms we have highlighted are crucial for efforts aimed at increasing individuals' and society's willingness to confront other looming, global threats to humanity (and other species), including the existential threat of climate change. Amid the terrible death and destruction caused by COVID-19, we see a glimmer of hope that these powerful motivators of prosocial behavior—fairness, gratitude and legacy making—might be newly renewed in their salience, personal relevance, and power to promote collective action to confront the threat of climate change that humanity faces in the coming decades.

## DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

## AUTHOR CONTRIBUTIONS

SS conceived the theoretical framework of the perspective and wrote the manuscript. EM offered feedback and revisions to the manuscript. Both authors contributed to the article and approved the submitted version.

## REFERENCES

- Ali, N., and Islam, F. (2020). The effects of air pollution on COVID-19 infection and mortality—a review on recent evidence. *Front. Public Health* 26:580057. doi: 10.3389/fpubh.2020.580057
- Bang, H. M., Koval, C. Z., and Wade-Benzoni, K. A. (2017). It's the thought that counts over time: the interplay of intent, outcome, stewardship, and legacy motivations in intergenerational reciprocity. *J. Exp. Soc. Psychol.* 73, 197–210. doi: 10.1016/j.jesp.2017.07.006
- Barnett, M. D., Archuleta, W. P., and Cantu, C. (2019). Politics, concern for future generations, and the environment: Generativity mediates political conservatism and environmental attitudes. *J. Appl. Soc. Psychol.* 49, 647–654. doi: 10.1111/jasp.12624
- Barouki, R., Kogevinas, M., Audouze, K., Belesova, K., Bergman, A., Birnbaum, L., et al. (2020). The COVID-19 pandemic and global environmental change: emerging research needs. *Environ. Int.* 146:106272. doi: 10.1016/j.envint.2020.106272
- Bartlett, M., and DeSteno, D. (2006). Gratitude and prosocial behavior: Helping when it costs you. *Psychol. Sci.* 17, 319–325. doi: 10.1111/j.1467-9280.2006.01705.x
- Bartlow, A. W., Manore, C., Xu, C., Kaufeld, K. A., Del Valle, S., and Ziemann, A. (2019). Forecasting zoonotic infectious disease response to climate change: mosquito vectors and a changing environment. *Vet. Sci.* 6:40. doi: 10.3390/vetsci6020040
- Bechtel, M. M., and Scheve, K. F. (2013). Mass support for global climate agreements depends on institutional design. *Proc. Nat. Acad. Sci. U.S.A.* 110, 13763–13768. doi: 10.1073/pnas.1306374110
- Boissier, J., Grech-Angelini, S., Webster, B. L., Allienne, J. F., Huysse, T., and Mas-Coma, S. (2016). Outbreak of urogenital schistosomiasis in Corsica (France): an epidemiological case study. *Lancet Infectious Diseases* 16, 971–979. doi: 10.1016/S1473-3099(16)00175-4
- Bottan, N., Hoffmann, B., and Vera-Cossio, D. (2020). The unequal impact of the coronavirus pandemic: evidence from seventeen developing countries. *PLoS ONE* 15:e0239797. doi: 10.1371/journal.pone.0239797
- Buck, R. (2004). “The gratitude of exchange and the gratitude of caring: a developmental-interactionist perspective of moral emotion,” in *The Psychology of Gratitude*, eds R. Emmons and M. McCullough (Oxford: Oxford University Press), 100–122.
- Caminade, C., McIntyre, K. M., and Jones, A. E. (2019). Impact of recent and future climate change on vector-borne diseases. *Ann. N. Y. Acad. Sci.* 1436, 157–173. doi: 10.1111/nyas.13950
- Cehajić-Clancy, S., and Bilewicz, M. (2020). Appealing to moral exemplars: shared perception of morality as an essential ingredient of intergroup reconciliation. *Social Iss. Policy Rev.* 14, 217–243. doi: 10.1111/sipr.12067
- Centers for Disease Control and Preventions (2020). *COVID-19 Racial and Ethnic Health Disparities*. Available online at: <https://www.cdc.gov/coronavirus/2019-ncov/community/health-equity/racial-ethnic-disparities/increased-risk-illness.html>
- Chan, E. Y. (2021). Moral foundations underlying behavioral compliance during the COVID-19 pandemic. *Pers. Individ. Dif.* 171:110463. doi: 10.1016/j.paid.2020.110463
- Clayton, S. (2018). The role of perceived justice, political ideology, and individual or collective framing in support for environmental policies. *Soc. Justice Res.* 31, 219–237. doi: 10.1007/s11211-018-0303-z
- Crone, D. L., and Laham, S. M. (2015). Multiple moral foundations predict responses to sacrificial dilemmas. *Pers. Ind. Diff.* 85, 60–65. doi: 10.1016/j.paid.2015.04.041
- DeSteno, D., Bartlett, M., Baumann, J., Williams, L., and Dickens, L. (2010). Gratitude as moral sentiment: emotion-guided cooperation in economic exchange. *Emotion* 10, 289–293. doi: 10.1037/a0017883
- Dickinson, J. L., McLeod, P., Bloomfield, R., and Allred, S. (2016). Which moral foundations predict willingness to make lifestyle changes to avert climate change in the USA? *PLoS ONE* 11:e0163852. doi: 10.1371/journal.pone.0163852
- Emmons, R. A., and Crumpler, C. A. (2000). Gratitude as a human strength: appraising the evidence. *J. Soc. Clin. Psychol.* 19, 56–69. doi: 10.1521/jscp.2000.19.1.56
- Emmons, R. A., and Mishra, A. (2011). “Why gratitude enhances well-being: what we know, what we need to know,” in *Series in Positive Psychology. Designing Positive Psychology: Taking Stock and Moving Forward*, eds K. M. Sheldon, T. B. Kashdan, and M. F. Steger (Oxford: Oxford University Press), 248–262. doi: 10.1093/acprof:oso/9780195373585.003.0016
- Fagan, M., and Huang, C. (2019). *A Look at How People Around the World View Climate Change*. Pew Research Center. Available online at: <https://www.pewresearch.org/fact-tank/2019/04/18/a-look-at-how-people-around-the-world-view-climate-change/>
- Fishman, M. D. C. (2020). The silver linings journal: gratitude during a pandemic. *J. Radiol. Nurs.* 39,149–150. doi: 10.1016%2Fj.jradnu.2020.05.005
- Forster, P. M., Forster, H. I., Evans, M. J., Gidden, M. J., Jones, C. D., Keller, C. A., et al. (2020). Current and future global climate impacts resulting from COVID-19. *Nat. Clim. Chang.* 10, 913–919. doi: 10.1038/s41558-020-0883-0
- Fox, M., Tost, L., and Wade-Benzoni, K. (2010). The legacy motive: a catalyst for sustainable decision making in organizations. *Bus. Ethics Q.* 20, 153–185. doi: 10.5840/beq201020214
- Frederick, S., Loewenstein, G., and O'Donoghue, T. (2002). Time discounting and time preference: a critical review. *J. Econ. Lit.* 40, 351–401. doi: 10.1257/002205102320161311
- Froh, J., Bono, G., and Emmons, R. (2010). Being grateful is beyond good manners: gratitude and motivation to contribute to society among early adolescents. *Motiv. Emot.* 34, 144–157. doi: 10.1007/s11031-010-9163-z
- Gibb, R., Redding, D. W., and Qing, C. K. (2020). Zoonotic host diversity increases in human-dominated ecosystems. *Nature* 584, 398–402. doi: 10.1038/s41586-020-2562-8
- Goodwin, R., Hou, W. K., Sun, S., and Ben-Ezra, M. (2020). Quarantine, distress and interpersonal relationships during COVID-19. *Gen. Psychiatry* 33:e100385. doi: 10.1136/gpsych-2020-100385
- Graham, J., Haidt, J., and Nosek, B. A. (2009). Liberals and conservatives rely on different sets of moral foundations. *J. Pers. Soc. Psychol.* 96, 1029–1046. doi: 10.1037/a0015141
- Graham, J., Nosek, B. A., Haidt, J., Iyer, R., Koleva, S., and Ditto, P. H. (2011). Mapping the moral domain. *J. Pers. Soc. Psychol.* 101, 366–385. doi: 10.1037/a0021847
- Grant, A., and Gino, F. (2010). A little thanks goes a long way: explaining why gratitude expressions motivate prosocial behavior. *J. Pers. Soc. Psychol.* 98, 946–955. doi: 10.1037/a0017935
- Haidt, J., and Joseph, C. (2004). Intuitive ethics: how innately prepared intuitions generate culturally variable virtues. *Daedalus* 133, 55–66. doi: 10.1162/0011526042365555
- Han, H., Kim, J., Jeong, C., and Cohen, G. L. (2017). Attainable and relevant moral exemplars are more effective than extraordinary exemplars in promoting voluntary service engagement. *Front. Psychol.* 8:283. doi: 10.3389/fpsyg.2017.00283
- Harpham, E. (2004). “Gratitude in the history of ideas,” in *The Psychology of Gratitude*, eds R. Emmons, and M. McCullough (Oxford: Oxford University Press), 19–36.
- Hurlstone, M. J., Price, A., Wang, S., Leviston, Z., and Walker, I. (2020). Activating the legacy motive mitigates intergenerational discounting in the climate game. *Glob. Environ. Change* 60:102008. doi: 10.1016/j.gloenvcha.2019.102008
- International Labour Organization (2021). *LO Monitor: COVID-19 and the World of Work. Seventh Edition Updated Estimates and Analysis*. Available online at: [https://www.ilo.org/wcmsp5/groups/public/@dgreports/@dcomm/documents/briefingnote/wcms\\_767028.pdf](https://www.ilo.org/wcmsp5/groups/public/@dgreports/@dcomm/documents/briefingnote/wcms_767028.pdf)
- Islam, S. N., and Winkel, J. (2017). *Climate Change and Social Inequality*. DESA Working Paper No. 152. Available online at: <https://www.un.org/development/desa/publications/working-paper/wp152>
- Johns Hopkins University (2021). *COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU)*. Available online at: <https://coronavirus.jhu.edu/map.html>
- Karan, A., Ali, K., Teelucksingh, S., and Sakhamuri, S. (2020). The impact of air pollution on the incidence and mortality of COVID-19. *Global Health Res. Policy* 5:39. doi: 10.1186/s41256-020-00167-y

- Karmakar, M., Lantz, P. M., and Tipirneni, R. (2021). Association of social and demographic factors with COVID-19 incidence and death rates in the US. *J. Am. Med. Assoc.* 4:e2036462. doi: 10.1001/jamanetworkopen.2020.36462
- Komter, A. (2004). "Gratitude and gift exchange," in *The Psychology of Gratitude*, eds R. Emmons, and M. McCullough (Oxford: Oxford University Press), 195–212.
- Le Quéré, C., Jackson, R. B., Jones, M. W., Smith, A. J. P., Abernethy, S., Andrew, R. M., et al. (2020). Temporary reduction in daily global CO<sub>2</sub> emissions during the COVID-19 forced confinement. *Nat. Clim. Chang.* 10, 647–653. doi: 10.1038/s41558-020-0797-x
- Low, M., and Wui, M. G. L. (2015). Moral foundations and attitudes towards the poor. *Curr. Psychol.* 35, 650–656. doi: 10.1007/s12144-015-9333-y
- Ma, L. K., Tunney, R. J., and Ferguson, E. (2017). Does gratitude enhance prosociality? A meta-analytic review. *Psychol. Bull.* 143, 601–635. doi: 10.1037/bul0000103.supp
- Moss, M., and Page, R. (1972). Reinforcement and helping behavior. *J. Appl. Soc. Psychol.* 2, 360–371. doi: 10.1111/j.1559-1816.1972.tb01287.x
- Nilsson, A., Erlandsson, A., and Västfjäll, D. (2020). Moral foundations theory and the psychology of charitable giving. *Euro. J. Pers.* 34, 431–447. doi: 10.1002/per.2256
- OECD (2020). *Biodiversity and the Economic Response to COVID-19: Ensuring a Green and Resilient Recovery*. Available online at: <http://www.oecd.org/coronavirus/policy-responses/biodiversity-and-the-economic-response-to-covid-19-ensuring-a-green-and-resilient-recovery-d98b5a09/#contactinfo-d7e7152>
- O'Leary, K., and Dockray, S. (2015). The effects of two novel gratitude and mindfulness interventions on well-being. *J. Altern. Complement Med.* 21, 243–245. doi: 10.1089/acm.2014.0119
- Pearson, A. R., Tsai, C. G., and Clayton, S. (2021). Ethics, morality, and the psychology of climate justice. *Curr. Opin. Psychol.* 42, 36–42. doi: 10.1016/j.copsyc.2021.03.001
- Phillips, C. A., Caldas, A., Cleetus, R., Dahl, K. A., Delect-Barreto, J., Licker, R., et al. (2020). Compound climate risks in the COVID-19 pandemic. *Nat. Clim. Chang.* 10, 586–588. doi: 10.1038/s41558-020-0804-2
- Pieh, C., O'Rourke, T., Budimir, S., and Probst, T. (2020). Relationship quality and mental health during COVID-19 lockdown. *PLoS ONE* 15:e0238906. doi: 10.1371/journal.pone.0238906
- Pietromonaco, P. R., and Overall, N. C. (2020). Applying relationship science to evaluate how the COVID-19 pandemic may impact couples' relationships. *Am. Psychol.* 76, 438–450. doi: 10.1037/amp0000714
- Plowright, R. K., Parrish, C. R., McCallum, H., Hudson, P. J., Ko, A. I., and Graham, A. L. (2017). Pathways to zoonotic spillover. *Nat. Rev. Microbiol.* 15, 502–510. doi: 10.1038/nrmicro.2017.45
- Pyszczynski, T., Lockett, M., Greenberg, J., and Solomon, S. (2021). Terror management theory and the COVID-19 pandemic. *J. Human. Psychol.* 61, 173–189. doi: 10.1177/0022167820959488
- Ruthland, A., and Killen, M. (2016). Fair resource allocation among children and adolescents: the role of group and developmental processes. *Child Dev. Perspect.* 11, 56–62. doi: 10.1111/cdep.12211
- Ryan, S. J., Carlson, C. J., Mordecai, E. A., and Johnson, L. R. (2019). Global expansion and redistribution of Aedes-borne virus transmission risk with climate change. *PLoS Negl. Trop. Dis.* 13:e0007213. doi: 10.1371/journal.pntd.0007213
- Shrum, T. R. (2021). The salience of future impacts and the willingness to pay for climate change mitigation: an experiment in intergenerational framing. *Clim. Change* 165:18. doi: 10.1007/s10584-021-03002-6
- Stellar, J. E., Gordon, A. M., Piff, P. K., Cordero, D., Anderson, C. L., Bai, Y., et al. (2017). Self-transcendent emotions and their social functions: compassion, gratitude, and awe bind us to others through prosociality. *Emot. Rev.* 9, 200–207. doi: 10.1177/1754073916684557
- Syropoulos, S., and Markowitz, E. (2020). Perceived responsibility towards future generations and environmental concern: convergent evidence across multiple outcomes in a large and nationally representative sample. *J. Environ. Psychol.* 76:101651. doi: 10.1016/j.jenvp.2021.101651
- Syropoulos, S., and Markowitz, E. M. (2021). Prosocial responses to COVID-19: Examining the role of gratitude, fairness and legacy motives. *Pers. Individ. Dif.* 171:110488. doi: 10.1016/j.paid.2020.110488
- Syropoulos, S., Watkins, H., Goodwin, G. P., and Markowitz, E. (2021). Disentangling the effects of impact-oriented versus reputation-focused legacy motives on intergenerational concern and action. *Pers. Social Psychol. Bull.*
- Syropoulos, S., Watkins, H., Shariff, A., Hodges, S., and Markowitz, E. (2020). The role of gratitude in motivating intergenerational environmental stewardship. *J. Environ. Psychol.* 72:101517. doi: 10.1016/j.jenvp.2020.101517
- Talevi, D., Soggi, V., Carai, M., Carnaghi, G., Faleri, S., Trebbi, E., di Bernardo, A., Capelli, F., and Pacitti, F. (2020). Mental health outcomes of the COVID-19 pandemic. *Riv. Psichiatr.* 55, 137–144. doi: 10.1708/3382.33569
- Tost, L. P., and Wade-Benzoni, K. A. (2013). "Intergenerational beneficence and the success of sustainability initiatives in organizational contexts," in *The Oxford Handbook of Business and the Environment*, eds A. Hoffman and P. Bansal (Oxford: Oxford University Press).
- Trivers, R. (1971). The evolution of reciprocal altruism. *Q. Rev. Biol.* 46, 35–57. doi: 10.1086/406755
- United Nations General Assembly (2019). *Only 11 Years Left to Prevent Irreversible Damage From Climate Change, Speakers Warn During General Assembly High-Level Meeting*. Available online at: <https://www.un.org/press/en/2019/ga12131.doc.htm>
- Van den Bergh, B., Dewitte, S., and De Cremer, D. (2006). Are prosocials unique in their egalitarianism? The pursuit of equality in outcomes among individualists. *Pers. Soc. Psychol. Bull.* 32, 1219–1231. doi: 10.1177/0146167206289346
- Wade-Benzoni, K., and Plunkett-Tost, L. (2009). The egoism and altruism of intergenerational behavior. *Pers. Soc. Psychol. Rev.* 13, 165–193. doi: 10.1177/0146167209339317
- Wade-Benzoni, K. A. (2002). A golden rule over time: reciprocity in intergenerational allocation decisions. *Acad. Manag. J.* 45, 1011–1028. doi: 10.2307/3069327
- Wade-Benzoni, K. A. (2019). Legacy motivations and the psychology of intergenerational decisions. *Curr. Opin. Psychol.* 26, 19–22. doi: 10.1016/j.copsyc.2018.03.013
- Wade-Benzoni, K. A., Hernandez, M., Medvec, V., and Messick, D. (2008). In fairness to future generations: the role of egocentrism, uncertainty, power, and stewardship in judgments of intergenerational allocations. *J. Exp. Soc. Psychol.* 44, 233–245. doi: 10.1016/j.jesp.2007.04.004
- Wade-Benzoni, K. A., Tenbrunsel, A. E., and Bazerman, M. H. (1996). Egocentric interpretations of fairness in asymmetric, environmental social dilemmas: explaining harvesting behavior and the role of communication. *Organ. Behav. Hum. Decis. Process.* 67, 111–126. doi: 10.1006/obhd.1996.0068
- Wade-Benzoni, K. A., Tost, L. P., Hernandez, M., and Larrick, R. P. (2012). It's only a matter of time: death, legacies, and intergenerational decisions. *Psychol. Sci.* 23, 704–709. doi: 10.1177/095679761243967
- Wagner, A. F. (2020). What the stock market tells us about the post-COVID-19 world. *Nat. Human Behav.* 4:440. doi: 10.1038/s41562-020-0869-y
- Watkins, H. M., and Goodwin, G. P. (2020). Reflecting on sacrifices made by past generations increases a sense of obligation towards future generations. *Pers. Soc. Psychol. Bull.* 46, 995–1012. doi: 10.1177/0146167219883610
- Woodby, B., Arnold, M. M., and Valacchi, G. (2020). SARS-CoV-2 infection, COVID-19 pathogenesis, and exposure to air pollution: what is the connection? *Annals N. Y. Acad. Sci.* 1486:15–38. doi: 10.1111/nyas.14512

World Health Organization (2020). *WHO Director-General's Opening Remarks at the Media Briefing on COVID-19*. Available online at: <https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19--11-march-2020>

Zaleskiewicz, T., Gasiorowska, A., and Kesebir, P. (2013). Saving can save from death anxiety: mortality salience and financial decision-making. *PLoS ONE* 8:e0079407. doi: 10.1371/journal.pone.0079407

Zaval, L., Markowitz, E. M., and Weber, E. U. (2015). How will I be remembered? Conserving the environment for the sake of one's legacy. *Psychol. Sci.* 26, 231–236. doi: 10.1177/0956797614561266

**Conflict of Interest:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

**Publisher's Note:** All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

*Copyright © 2021 Syropoulos and Markowitz. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.*