

Psychology and Climate:

Behavioral and Cognitive Origins of Climate Change

Crystal Li



Richard Montgomery High School: 250 Richard Montgomery Drive, Rockville, MD 20852



Abstract

Climate change is arguably one of the most consequential global crises today. The present paper reviews multiple concepts in social and cognitive psychology that can illuminate the roots of the problem within human behavior and cognition. Specifically, the choice between cooperation and defection in the tragedy of the commons social dilemma explains why many people who understand the consequences of their environmentally damaging actions continue to pollute. Further, the perception among many residents of developed nations that climate change is unurgent and distant can be attributed to the availability heuristic, and the prevalence of outright disbelief in anthropogenic global warming is due to belief perseverance and motivated reasoning. Finally, the law of effect and the motivating power of rewards and punishments can provide insight into possible solutions to the problem by incentivizing more environmentally-friendly behaviors.

Introduction

It has become increasingly clear over the past decades that the earth is on track toward dangerously high temperatures. The globe has warmed by 1.19 °C since preindustrial times (National Oceanic and Atmospheric Administration, 2021) and the seven hottest years on record have been the last seven (World Meteorological Association, 2022).

Humans release millions of tons of greenhouse gasses each day, trapping sunlight within the atmosphere. Subsequent rising temperatures generate extreme climate irregularities, which have catastrophic effects. Severe storms, floods, wildfires, droughts, and heat waves have grown alarmingly common in recent years and serve as a preview of what stands to come.

While climate change is a global crisis, extreme weather has disproportionately impacted members of minority and developing communities, which often don't have the resources for climate adaptation measures, leaving them unequipped to handle natural disasters. In the remote Pacific island nation of Kiribati, for example, rising sea levels have caused floods that threaten to demolish the nation within the coming decades (Ives, 2016). Coastal cities from Manila to Miami face floods and hurricanes that have and will continue to destroy homes and upend lives.

The communities that contribute least to climate change tend to suffer its worst repercussions (Levy, 2015), while those that contribute most are largely free from its consequences, making climate change not only an issue of sustainability, but also one of justice.

The climate crisis is a systemic one: its causes are rooted in the way societies across the world function. Since the onset of industrialization, lives and economies have depended on the burning of fossil fuels for energy in vast domains, including transportation and manufacturing.

The Tragedy of the Commons

Because climate change is caused by routine habits and behavior patterns of humans (Redlin & Gries, 2021), psychology can provide insight into the roots of the issue. Specifically, the environmentally damaging behaviors of humans can be understood by examining what individuals do when given the choice between convenient but harmful activities and inconvenient but clean alternatives—and why.

An analogous scenario used in social conflict studies—the “tragedy of the commons” (Hardin, 1968)—provides insight into this. This social dilemma forces individuals to choose between immediate personal gain and the long-term interests of the community: a group of individuals shares a pool of resources (the “commons”) that is just sufficiently stocked for each to have their fair share. If too many individuals defect and take more than their share, the resources will be depleted and unable to replenish. Importantly, if only a *few* individuals take more than their share, the resources can still replenish and sustain the community. This is what creates opportunity for greedy individuals to exploit the mutual trust of the community. Larger resource pools make the “tragedy” outcome more likely (Kerr, 1989), illustrating how the dilemma plays out on a much larger scale in the real world.

In particular, pollution is a significant manifestation of this dilemma: the environment represents the “commons”—the common resource pool—and the “tragedy” lies in that each of the billions of carbon footprints produced every day is negligible but in aggregate result in disastrous consequences for the planet. For example, it is the sum of many gasoline-powered automobiles that produces large-scale emissions, not any single vehicle.

The “tragic” outcome of this dilemma explains why humans continue to pollute: there is no visible payoff for individuals to make lifestyle sacrifices in order to reduce their personal

carbon footprint. The immediate benefits to the individual of polluting a little bit—a comfortable, convenient life—far outweigh the potential help to the environment if they cut emissions.

The tragedy of the commons suggests that the persistence of negative behaviors can be attributed to utility-seeking rationality, selfishness, and diffusion of responsibility and efficacy. Indeed, researchers have found that a common justification for exploitation or noncooperation at the expense of a community is “I couldn’t have made a difference anyway” (Kerr & Kaufman-Gilliland, 1997).

The Psychology of Climate Change Denial

One category of contributors to climate change is represented by defectors in the commons dilemma: those who participate in activities that hurt the environment *in spite of* the knowledge that their actions are harmful. The other category consists of people who lack this understanding in the first place. Despite overwhelming scientific consensus that anthropogenic global warming is a dire reality, a substantial group of people do not believe in it, and still more don’t sense its urgency.

Social psychology can illuminate the causes for the discrepancy between scientific and public understandings of climate change by explaining how and why individuals form beliefs regarding this issue.

The availability heuristic, the tendency to rely on the accessibility of relevant examples in memory to inform judgments of how common something is (Tversky & Kahneman, 1973), can partly explain beliefs that global warming is insignificant. The logic behind this heuristic is that the more readily examples of a phenomenon come to mind, the more prevalent that phenomenon

must be. In this case, the more instances of natural disasters and extreme weather people can retrieve from memory, the more severe climate change appears to be. However, this can be misleading, as availability of examples in memory often is not an accurate indication of how common a phenomenon actually is. Many fortunate people in developed nations don't see the disastrous impacts of climate change because their own communities are hardly affected. This lack of exposure reduces the salience of climate change and leaves the impression that it is not urgent or not real at all.

Disbelief in climate change and subsequent inaction is rooted in motivated reasoning (Bayes & Druckman, 2021). Motivated reasoning is the process of processing new information in order to align with a desired conclusion. It is well-established that in the United States, political conservatism is correlated with rejection of climate change (Rutjens, Sutton, & van der Lee, 2018; McCright & Dunlap, 2011). Because conservatives tend to prioritize business and economic development, they may be motivated to adopt beliefs that uphold such interests of their ingroup (i.e., beliefs denying the role of humans in global warming) even if they are inaccurate. Belief perseverance, the tendency to adhere to notions even after the initial basis for the claim is proven false (Anderson, Lepper, & Ross, 1980; Davies 1997), makes it difficult to persuade climate change deniers after false claims have been presented to them.

Changing Behaviors

Given the existence of climate skeptics, one of the first steps toward a sustainable future might be convincing this group of people. To counter the perception that climate change is a vague and distant phenomenon requires spreading more awareness of climate change and its devastating impacts on communities across the world. Social media, public service

announcements, and emphasis in schools can all help bring the issue to the forefront of public attention. That way, when people employ the availability heuristic to gauge the severity and salience of climate change, they will appraise the crisis more accurately.

However, convincing adamant deniers of climate change is more challenging, considering belief perseverance. Furthermore, changing attitudes regarding climate change may be limited in its ability to yield congruent environmentally-protective behaviors. Attitudes often fail to predict behavior because there are many other extraneous influences on both (Kraus, 1995). A more effective route to desired reforms may therefore be to influence behaviors directly using incentives.

One of the most elementary principles of human behavior is the law of effect (Thorndike, 1898): behaviors that are rewarded are likely to repeat, while behaviors that are punished are unlikely to repeat. Applying this to environmental protection through incentive systems encouraging environmentally-friendly practices has already been widely advocated for. Incentives can come in the form of carbon taxes, subsidies, and tax credits and deductions for purchases of energy-saving alternatives such as electric vehicles. In support of such strategies, numerous studies have found that rewarding cooperation and punishing defection in social dilemmas effectively increases cooperation (see Balliet, Mulder, & van Lange, 2011). In the context of food consumption, monetary rewards and punishments such as subsidies and carbon taxes are effective in directing individuals toward more sustainable behaviors (Osman, Schwartz, & Wodak, 2021).

Conclusion

A problem as societally and anthropogenically rooted as climate change merits examination through a psychological lens. Understanding the human origins of climate change can offer potential remedies on a systemic and societal level.

Greenhouse gas emissions are caused by the routines of society, and changing those routines requires a sacrifice on the part of each individual that is perceived to be an unworthy exchange of short-term convenience for minute environmental benefits, as the tragedy of the commons dilemma illustrates. The availability heuristic explains why many don't view climate change as a pressing crisis, and this understanding reveals that spreading awareness may be an effective remedy. However, because of motivated reasoning and belief perseverance, it may prove difficult to combat beliefs that anthropogenic climate change doesn't exist at all. Research and theory on motivation and rewards and punishments demonstrates that using incentives can change behaviors directly by discouraging practices that contribute to global warming.

References

- Balliet, D., Mulder, L. B., & Van Lange, P. A. M. (2011). Reward, punishment, and cooperation: A meta-analysis. *Psychological Bulletin*, 137(4), 594–615. <https://doi.org/10.1037/a0023489>
- Bayes, R. & Druckman, J. N. (2021). Motivated reasoning and climate change. *Current Opinion in Behavioral Science*, 42, 27-35. <https://doi.org/10.1016/j.cobeha.2021.02.009>
- Groenendyk, E., & Krupnikov, Y. (2021). What motivates reasoning? A theory of Goal-Dependent political evaluation. *American Journal of Political Science*, 65(1), 180-196. <http://dx.doi.org/10.1111/ajps.12562>
- Hardin, G. (1968). The tragedy of the commons. *Science*, 162, 1243–1248.
- Ives, M. (2016, July 2). A Remote Pacific Nation, Threatened by Rising Seas. *The New York Times*. Retrieved from <https://www.nytimes.com/2016/07/03/world/asia/climate-change-kiribati.html>
- Kerr, N. L. (1989). Illusions of efficacy: The effects of group size on perceived efficacy in social dilemmas. *Journal of Experimental Social Psychology*, 25(4), 287–313. [https://doi.org/10.1016/0022-1031\(89\)90024-3](https://doi.org/10.1016/0022-1031(89)90024-3)
- Kerr, N. L., & Kaufman-Gilliland, C. M. (1997). “and besides, I probably couldn’t have made a difference anyway”: Justification of social dilemma defection via perceived self-inefficacy. *Journal of Experimental Social Psychology*, 33(3), 211–230. <https://doi.org/10.1006/jesp.1996.1319>
- Kraus, S. J. (1995). Attitudes and the prediction of behavior: A meta-analysis of the empirical literature. *Personality and Social Psychology Bulletin*, 21(1), 58–75. <https://doi.org/10.1177/0146167295211007>

- Levy, B. S. & Patz, J. A. (2015). Climate change, human rights, and social justice. *Annals of Global Health*, 81(3), 310-322. <https://doi.org/10.1016/j.aogh.2015.08.008>
- McCright, A. M., & Dunlap, R. E. (2011). Cool dudes: The denial of climate change among conservative white males in the United States. *Global Environmental Change*, 21(4), 1163–1172. <https://doi.org/10.1016/j.gloenvcha.2011.06.003>
- National Oceanic and Atmospheric Administration. (2021, March 15). Climate Change: Global Temperature. Retrieved from <https://www.climate.gov/news-features/understanding-climate/climate-change-global-temperature>
- Osman, M., Schwartz, P., & Wodak, S. (2021). Sustainable consumption: What works best, carbon taxes, subsidies and/or nudges? *Basic and Applied Social Psychology*, 43(3), 169–194. <https://doi.org/10.1080/01973533.2021.1889553>
- Redlin, M., & Gries, T. (2021). Anthropogenic climate change: the impact of the global carbon budget. *Theoretical & Applied Climatology*, 146(1/2), 713–721. <https://doi.org/10.1007/s00704-021-03764-0>
- Rutjens, B. T., Sutton, R. M., & van der Lee, R. (2018). Not All Skepticism Is Equal: Exploring the Ideological Antecedents of Science Acceptance and Rejection. *Personality and Social Psychology Bulletin*, 44(3), 384–405. <https://doi.org/10.1177/0146167217741314>
- Thorndike, E. L. (1898). Animal intelligence: An experimental study of the associative processes in animals. *The Psychological Review: Monograph Supplements*, 2(4), i-109. <https://doi.org/10.1037/h0092987>
- Tversky, A., & Kahneman, D. (1973). Availability: A heuristic for judging frequency and probability. *Cognitive Psychology*, 5(2), 207–232. [https://doi.org/10.1016/0010-0285\(73\)90033-9](https://doi.org/10.1016/0010-0285(73)90033-9)

World Meteorological Association. (2022, January 19). 2021 one of the seven warmest years on record, WMO consolidated data shows. Retrieved from <https://public.wmo.int/en/media/press-release/2021-one-of-seven-warmest-years-record-wmo-consolidated-data-shows>