

The sense of social influence: pluralistic ignorance in climate change

Social factors play key roles in human behavior. Individuals tend to underestimate how much others worry about climate change. This may inhibit them from taking collective climate action

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We have been aware of the threat of anthropogenic climate change caused by the production of greenhouse gasses for more than 50 years. Yet, emissions continue to increase at an alarming rate, resulting in dangerously high levels of CO₂ in the Earth's atmosphere. Our meager response is a puzzling phenomenon given what we stand to lose. It is apparent that something is holding us back from making a serious effort to adjust our carbon-intensive behavior.

“Merely focusing on stimulating individuals’ motivation for changing behavior—whether be it psychological, economic, or moral—may prove ineffective if there are other social forces involved as well.”

Indeed, our collective failure to comprehensively respond to climate change is not the only issue that appears in conflict with a broad scientific consensus. For example, recent studies show that a growing number of parents are applying for exemptions due to social pressure from other parents with strong anti-vaccine sentiments, despite the fact that routine childhood vaccines save thousands of lives every year [see Oraby, Thampi & Bauch (2014), recommended reading]. It is easy to dismiss such behaviors as irrational. However as C. T. Bauch, one of the researchers of the quoted study, notes: “Our research suggests that health

officials need to have a really good understanding of the social context to better understand vaccine scares and why people refuse vaccines”. Reason and rationality are not the only driving forces for understanding collective attitudes and groupthink. We also need to consider aspects such as social pressure and the sense of social influence.

“Research shows that individuals tend to misjudge others’ beliefs about climate change.”

A well-known psychological explanation, known as the *cognitive dissonance theory*, suggests that individuals tend to adjust their beliefs rather than change their behavior once they become aware their behavior and beliefs are in conflict. This can be observed where individuals have strong anti-vaccine sentiments. It can also be applied to climate change, where the theory predicts that individuals prefer to adapt their beliefs and attitudes concerning climate change rather than change their carbon-intensive behavior. Such rearrangements include denying or doubting climate science, arguing that one's personal emissions are too insignificant to make a difference, blaming “America” and “China”, arguing that global warming is not as bad as scientists say, and engaging in wishful thinking [for instance, see Stoknes (2015), recommended reading].

Another explanation is that climate change is essentially a *tragedy of the commons*. The idea is that individual efforts

to reduce emissions are insignificant and rather costly on a personal level, unless everyone else cooperates as well. On the other hand, if everyone else took action to reduce emissions, the problem is solved, so from an individual perspective, it is also a waste of effort to comply. Hence, the theory suggests that, irrespective of the actions of others, it is irrational for individuals to reduce their personal carbon emissions or to participate in political campaigns or social movements that put pressure on, for instance, businesses or policymakers [for a philosophical account, see Gardiner (2001), recommended reading]. It has been suggested that people need more or better education on climate change, or need to understand their moral duty to reduce emissions, in order to motivate more climate-friendly actions [for instance, see Shapiro, Rooney-Varga & Niepold (2017) and Hedberg (2018), recommended reading]. However, it seems clear there are more complex social phenomena in play as well.

“Being able to travel all over the world, buy new things, and so on, used to be regarded as an absolutely positive thing. But much has changed since 1959.”

What the above explanations have in common is an emphasis on the way *individuals* perceive and handle facts about climate change. Yet, merely focusing on stimulating



Figure 1. We all think individually that we – personally – are the only ones who cares.

Credit: Shirin Ørberg

individuals' motivation for changing behavior—whether be it psychological, economic, or moral—may prove ineffective if there are other social forces involved as well. Indeed, social psychology has shown that beliefs and actions of individuals are heavily influenced by what they perceive the actions and beliefs of their peers to be [see Myers (2014), recommended reading]. In social psychology, a concept known as *pluralistic ignorance* precisely describes situations where social forces overrule individual thinking and decision making.

Daniel Katz, Floyd H. Allport, and Margaret Jenness introduced the concept in 1931 to label and explain situations where group members, in an attempt to conform to a perceived “group opinion”, act contrary to their private opinions, attitudes, feelings, or preferences [1]. Later, the term came to be

identified with the belief that one's private attitudes and judgments are different from those of others, even though one's public behavior is identical [2,3]. Furthermore, it has been used more broadly to describe situations where group members significantly underestimate the popularity of a majority opinion [4–6].

Social scientists have applied the concept to a number of real-life social situations to explain why harmful, unhealthy, or simply outdated social practices continue to be accepted despite being privately rejected by many of those partaking in the practices. For example, it has been used to explain the persistence of norms of racial segregation in the mid-1900s [1,5], of excessive drinking habits at universities [3], and the slow pace of the resolution of issues such as gender inequality [4]. In all these cases, the mere

fact that individuals falsely believed most others supported the practices was sufficient for the individuals to comply with them.

Biased higher-order climate beliefs

Now, what are the private beliefs, feelings, and attitudes of the European, the USA, and the Chinese public concerning climate change? A recent Eurobarometer revealed that 92% of European citizens view climate change to be a serious problem and, of these, 74% view it as a *very* serious problem. Likewise, an even fresher report conducted by the Yale Program on Climate Change Communication and the George Mason University Center for Climate Change Communication showed that 73% of registered American voters think global warming is happening, that 59% think it is caused

mostly by human activities, and that 63% are worried about it [see European Commission (2017) and Leiserowitz *et al* (2018), recommended reading]. In China, no less than 98% believe global warming is happening [7]. The majority of people living in some of the most carbon-emitting areas of the planet agree that climate change is real.

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At the same time, research shows that individuals tend to misjudge others' beliefs about climate change. Most notably, a recent examination of higher-order beliefs of American and Chinese citizens and of political and intellectual elites in the USA showed that all groups greatly underestimated the public's pro-climate change beliefs [7]. Similarly, another large study demonstrated that Australian citizens generally overestimate the proportion of people who think climate change is not happening and, likewise, underestimated the proportion understanding climate change to be human-induced [6]. A third study showed that American students systematically underestimated the number of other people who believe climate change to be a serious problem, and as a consequence, they were less willing to discuss the issue with their peers [8]. Remarkably, even climate change experts have fallen victim to pluralistic ignorance: A poll measuring experts' estimates of the opinions of other experts about the Intergovernmental Panel on Climate Change (IPCC)'s 2007 assessment of global sea-level rise indicated a tendency to overestimate the climate change optimism of other experts [9].

Causes of pluralistic ignorance

There are several theories about the causes of pluralistic ignorance, many of which are clearly applicable to the climate change context.

One is that individuals take the opinions of outspoken group members to reflect the opinions of most others in the group [4]. In cases where the most outspoken people hold

an opinion only shared by a minority within the group, group members may get the false impression that most others hold the minority opinion in question. In their 2011 book, historians Naomi Oreskes and Erik Conway found that a handful of professional climate contrarians garnered a disproportionate amount of attention in the media landscape around the turn of the millennium. While the views of climate contrarians were widely refuted within the scientific community, biased reporting created a distorted belief that contrarians represented a large proportion of scientists [see Oreskes & Conway (2011), recommended reading].

Media bias may be explained by the structural conditions of the current information market. Information consumes the attention of its recipients and, in the information age, attention is a prime asset. This generates an economy heavily geared toward capturing attention. Attention may be converted into money, power, status, or influence. Actors in this new market have an incentive to speculate as to which information will best attract audiences of, say, online users, independently of whether the information is true. This can create an environment conducive to misinformation, fake news, and agenda-setting in the media [for a detailed analysis of the market of attention in the information age, see Hendricks & Vestergaard (2018), recommended reading]. Numerous robust studies confirm that our attention is more likely to be captured by content that rouses activity-mobilizing sentiments like anger, fear, and indignation [for instance, see Berger & Milkman (2013), recommended reading]. This has been observed in many issues where there is a strong consensus among the scientific community. For example, minority views on the alleged danger related to the human papillomavirus (HPV) vaccine in teenagers have featured centrally in debates—despite having no scientific grounding—as they feed on people's fear. This gives reporting on such issues a false balance, as it provides disproportionate airtime to what is very much a minority view, elevating its status alongside the views of the majority of scientists. Similarly, the views of climate contrarians have disproportionately dominated discussions on anthropogenic climate change for similar reasons—even minority anger may turn into an attention grabber.

A second theory about the cause of pluralistic ignorance relates to how humans

interpret and explain the behavior of others. In a famous experiment, social psychologists Dale Miller and Cathy McFarland showed that pluralistic ignorance arises precisely when individuals observed others who behaved exactly like themselves but falsely assumed that others' behavior reflected internal states or opinions that *differed* from their own [2]. Here, the cause of pluralistic ignorance is not that minority opinions are too prominent in the social environment, but instead that individuals silently attribute opinions to others based on what they observe their behavior to be. In wealthy countries, where levels of consumption are high, similar factors may be in force—affluent inhabitants, privately aware that their lifestyle is unsustainable, may falsely infer from observing similar carbon-intensive behaviors of others that most people believe this practice is acceptable.

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A third, related explanation concerns times of social change where individuals gradually change their private opinions about an issue, although the social structures do not change at the same speed. In these cases, the social structures become misleading in the sense that individuals assume most others still support the old practices, even though they themselves are perfectly aware that the practices are outdated [3,4]. For example, in David J. Schwartz's classic self-help book *The Magic of Thinking Big* from 1959, he states: “Success means many wonderful, positive things. Success means personal prosperity: a fine home, vacations, travel, new things (...). Being able to travel all over the world, buy new things, and so on, used to be regarded as an absolutely positive thing. But much has changed since 1959. We now have information in abundance available on how damaging such a lifestyle is. Yet, the majority of people still uphold these carbon-intensive practices and—publicly—look up to those who are “successful” in Schwartz's

outdated sense of the term. This creates a misleading social environment where people are mistakenly led to think that most others do not view climate change as a serious problem—at least, not a problem so serious that individuals should make an effort to reduce personal emissions, and publicly demand political action.

Consequences of pluralistic ignorance

Studies in social psychology demonstrate that people's perception of the social norm influences their behavior. If individuals mistakenly believe they are more or less alone in worrying about climate change, they may be less willing to reduce their personal efforts and openly demand political climate action. In other words, the mere fact that individuals falsely believe most others support carbon-intensive practices may be sufficient for individuals to comply with them. Early researchers of pluralistic ignorance hypothesized that social conformity leads individuals to alter their behavior to be in accordance with a misperceived group opinion. In other words, pluralistic ignorance may result in group members acting contrary to their own preferences and opinions [1]. Related to this point, philosopher Clive Hamilton and psychologist Tim Kasser stress that the fear of being ridiculed as an “eco-obsessive” may prevent worried individuals from changing to a more sustainable lifestyle [10].

Recalling the results from the public opinion studies in Europe, the USA, and China, it is likely that a vast majority of these public in fact *want* to make a greater effort to combat climate change but avoid doing so out of fear of deviating from a misperceived social norm. A distorted view of the public's lack of climate concerns and support for pro-climate policies inhibits political action.

From a game-theoretical perspective, Matto Mildemberger and Dustin Tingley argue that individuals' participation in actions that are individually costly but collectively beneficial may depend on their perceptions of others' beliefs. If individuals do not believe others are willing to cooperate, their own motivation for cooperating likewise decreases: “actors may not invest scarce time or resources in political climate activism because they don't believe their efforts will help elect a pro-climate political official, will help pressure an existing official to support some pro-climate policy or will help mobilize peers to engage in climate-friendly behaviors” [7].

Therefore, pluralistic ignorance about climate change may be a key factor in our hesitation to adjust our carbon-intensive behavior, on both individual and national level.

What to do about it?

By providing information about the true distribution of climate opinions, pluralistic ignorance may be corrected—for climate

Recommended reading list

On the history of climate science

1. Oreskes N, Conway E (2011) *Merchants of doubt: how a handful of scientists obscured the truth on issues from tobacco smoke to global warming*. New York, NY: Bloomsbury Press

On cognitive dissonance in climate change

2. Stoknes PE (2015) *What we think about when we try not to think about global warming – toward a new psychology of climate action*. Chelsea Green Publishing
3. Hamilton C, Kasser T (2009) Psychological adaptation to the threats and stresses of a four-degree world. “Four Degrees and Beyond” conference, pp 28–30
4. Stoll-Kleemann S, O'Riordan T, Jaeger CC (2001) The psychology of denial concerning climate mitigation measures: Evidence from Swiss focus groups. *Global Env Change* 11: 107–117

On climate change as a “tragedy of the commons”

5. Gardiner SM (2001) The real tragedy of the commons. *Philos Public Aff* 30: 387–416

On the role of education to stimulate change of behavior

6. Ledley TS, Rooney-Varga J, Niepold F (2017) Addressing climate change through education. *Encyclopedia of Environmental Science*

On the role of ethics to stimulate change of behavior

7. Hedberg T (2018) Climate change, moral integrity, and obligations to reduce individual greenhouse gas emissions. *Ethics, Policy Environ* 21: 64–80
8. Markowitz EM, Shariff AF (2012) Climate change and moral judgement. *Nat Clim Chang* 2: 243–247

A textbook introduction to social psychology and the importance of social norms

9. Myers DG (2014) *Social Psychology*. North Ryde, NSW: McGraw-Hill Education

More empirical studies in pluralistic ignorance

10. Monin B, Norton MI (2003) Perceptions of a fluid consensus: uniqueness bias, false consensus, false polarization, and pluralistic ignorance in a water conservation crisis. *Personal Soc Psychol Bull* 29: 559–567
11. Fields JM, Schuman H (1976) Public beliefs about the beliefs of the public. *Public Opin Q* 40: 427–448

On the market of attention, attention speculation in the information age and its consequences for democracy

12. Berger J, Milkman K (2013) Emotion and virality: what makes online content go viral? *GfK Marketing Intelligence Review* 5: 18–23
13. Hendricks VF, Vestergaard M (2018) *Reality lost: markets of attention, misinformation and manipulation*. New York, NY: Springer Nature

A review and discussion of norm-based interventions to change behavior

14. Miller DT, Prentice DA (2016) Changing norms to change behavior. *Annu Rev Psychol* 67: 339–361

Some recent public opinion studies on climate beliefs

15. European Commission (2017) *Special Eurobarometer 459: Climate change*
16. Leiserowitz A, Maibach E, Roser-Renouf C, Rosenthal S, Cutler M, Kotcher J (2018) *Politics & Global Warming, March 2018*, New Haven

Societal pressure and the spread infectious diseases

17. Oraby T, Thampi V, Bauch CT (2014) The influence of social norms on the dynamics of vaccinating behaviour for paediatric infectious diseases. *Proceedings of the Royal Society B: Biological Sciences* 281: 20133172

change issues, but possibly also in other areas such as vaccine programs. It is important that the information is personalized, so individuals find it relevant. This may be accomplished in a way in which individuals realize their own bias when receiving the information, and where the reference group is one that individuals identify with [for a detailed review and account outlining the logic behind norm-based interventions, see Miller & Prentice (2016), recommended reading]. If the information is successfully delivered in the sense that recipients understand it and revise their biased higher-order belief on the basis of it, they may be more motivated to cooperate with others in combatting climate change. A recent example to this effect was when a random subset of the public in the USA was informed that 98 percent of the Chinese population believes global warming is happening, which led to significantly increased support for a USA–China climate treaty [7].

While it is difficult to directly measure if an intervention has caused overall behavioral change, it may be fruitful to look more closely at various subgroups in follow-up studies. Oftentimes, a certain proportion correctly perceives the majority opinion, but do not themselves agree with it. If they are provided with information about the true distribution of opinions, they probably will not change their behavior, since they are already to some degree aware of the true distribution. The interesting subgroups to look at from a post-intervention perspective are those who clearly have false perceptions of the majority opinion, and, even narrower, those who actually hold the majority opinion but mistakenly believe they are part of a minority. In the case of climate change, the majority opinion in Europe, the USA, and China is that climate change is a real

phenomenon and that it is a serious problem. If a certain proportion of those people falsely believe their opinion is only shared by a minority, and if this perception is what inhibits them from taking climate action, interventions targeting such a group may lead to much more collective action and in turn make the public's climate concerns more visible to policymakers.

Conclusion

Much emphasis has been put on furthering individuals' understanding of the causes and consequences of climate change. Public opinion studies show that these efforts have been fruitful in the sense that a majority of individuals understand that climate change is a serious problem. However, individuals tend to underestimate public support for policies to reduce carbon emissions. This may be partly due to the large media exposure of the views and opinions of climate contrarians, and partly due to a misleading information environment where individuals infer from the carbon-intensive behavior of others that most people do not really care about climate change. The consequences of such biased higher-order beliefs are that a majority of concerned individuals are inhibited from taking climate action, out of fear of deviating from a misperceived social norm. This lack of action from the civil society in turn leads to policymakers underestimating the support for ambitious climate policies. Interventions providing correct information to the public and policymakers about the distribution of climate opinions may be the key to solving our current dangerous collective climate inaction. It may also inform policies to address other similar problems such as (perceived) public resistance to

vaccination programs, and other health-related policies or lifestyle changes.

Conflict of interest

The authors declare that they have no conflict of interest.

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3. Prentice DA, Miller DT (1993) Pluralistic ignorance and alcohol use on campus: some consequences of misperceiving the social norm. *J Pers Soc Psychol* 64: 243–256
4. Shamir J, Shamir M (1997) Pluralistic ignorance across issues and over time. *Public Opin Q* 61: 227–260
5. O'Gorman HJ (1975) Pluralistic ignorance and white estimates of white support for racial segregation. *Public Opin Q* 39: 311–330
6. Leviston Z, Walker I, Morwinski S (2013) Your opinion on climate change might not be as common as you think. *Nat Clim Chang* 3: 334–337
7. Mildemberger M, Tingley D (2017) Beliefs about climate beliefs: the importance of second-order opinions for climate politics. *Br J Polit Sci* 10: 1–29
8. Geiger N, Swim JK (2016) Climate of silence: pluralistic ignorance as a barrier to climate change discussion. *J Environ Psychol* 47: 79–90
9. VisionPrize, Last updated 2012, Accessed on 2012
10. Hamilton C, Kasser T (2009) Psychological adaptation to the threats and stresses of a four-degree world. "Four Degrees and Beyond" conference, pp 28–30