Institute and Faculty of Actuaries

Independent thinking from the IFoA

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think

Behavioural interventions for building climate resilience

by **Rajeshwarie VS**

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Part of the IFoA's purpose is to promote debate within and beyond the profession, and to position our members as leading voices on the biggest public policy challenges of our time.

We aim to showcase the diverse range of expertise and critical thinking both within and outside the profession.

Our 'think' series seeks to promote debate on topics across the spectrum of actuarial work, providing a platform for members and stakeholders alike and sharing views that may differ from the IFoA's house view. In doing this, we hope to challenge the status quo, question the orthodoxy, and shine a light on complex or under-examined issues, thereby stimulating discussion and dialogue to help tackle issues in a different way.

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Introduction

Climate change is a global crisis that requires immense investment of effort and resources at the highest levels of administration to be able to produce a significant impact. This is most likely the belief that all including the educated and urban elite hold. States have taken/adopted top-down approaches - regulations and investments that target the goal of limiting global warming to under 1.5 - 2°C above pre-industrial levels, and it is easy to believe that they are alone effective given the huge scale, significance, and widespread prevalence of the problem. It is perhaps not realistic to expect that at the individual level, people see their actions as contribution to the effort to limit global warming to within the agreed levels of the Paris accord. Limiting warming to under a certain threshold is not a onetime step which, once achieved, means we no longer need to adhere to those standards.

It is a continuous effort to ensure that warming does not exceed tolerable levels and should not spiral out of control, making earth uninhabitable for all of us. This is probably where bottom-up approaches play as important a role as regulations. A large number of individuals taking small steps can still collectively add up to a significant impact. Such a bottom-up approach to tackling climate change will not only help achieve the Paris Agreement's goal but can go further in sustaining global warming within acceptable levels. Bottom-up approaches involve people acting in a way that promotes sustainability, and require inculcating beliefs and behaviours at an individual or locality level. Behavioural economics can be a very powerful tool to help identify target areas/behaviours/beliefs, design and monitor interventions that could ultimately promote sustainability.

The remainder of this text looks at the various attempts at using behavioural interventions to promote more environmentally responsible behaviour, learnings from these experiments and the challenges and opportunities for leveraging behavioural studies to nudge individuals, localities and society towards more climate responsible behaviour.

A large number of individuals taking small steps can still collectively add up to a significant impact.

Identifying areas for targeted interventions

The key areas where behavioural changes in individuals and their daily routines can have an impact on alleviating global warming are transportation, reducing waste, recycling, and diets.

Of these, transportation and food consumption behaviours - avoiding fossil fuels, adopting electric vehicles, avoiding animal products, reducing food waste and better cooking equipment – are the ones with greatest potential to produce significant impacts on greenhouse gas emissions. Some behaviours are easy to change, while other behaviours are not very easy for people to alter, although there might be the intent.

For example, with transportation, there is a lot of awareness around vehicular emissions, but it is not always feasible to change modes of transportation or the number of trips one needs to take without significant disruption to daily lives or consideration to household budgets.

Socio-economic status, geography/ terrain or inclement weather, the public transport infrastructure not being available or reliable, may all be factors that necessitate adopting a certain mode of transport. Electric vehicles are gaining popularity but are costly, their charging and maintenance may also be difficult. An individual who has just purchased a petrol-driven car may not be able to afford to immediately replace it with an electric vehicle, or a bicycle.

Original beliefs or attitudes are key to determining if successful behavioural interventions are possible or not.

Though food habits and diets are easier to change, and plant-based diets and vegan options abound these days, there can be barriers to adopting these.

Food is very personal, and people have strong preferences, likes and dislikes. Dietary awareness levels differ and there is a common misconception that all nutritional needs cannot be met by pure plant-based diets.

Abundance and availability, psychological and sometimes religious reasons, peer pressure, or just an attachment to certain animal products, can prevent moving to a plant-based diet.

With transportation and food being easily identifiable target behaviours but difficult to change, that leaves us with options for reducing energy usage, reducing waste and recycling as areas to target for changing attitudes and beliefs. These are likely to fare better in terms of adoption since they give the added sense of satisfaction of doing something for the planet and can also give instantaneous and tangible rewards in the form of reduced energy bills or food spending.

Original beliefs or attitudes are key to determining if successful behavioural interventions are possible or not. When views that people hold are very strong, it would be hard to influence them through education, awareness or even providing financial incentives.

A study in Germany showed that people with less strong views on global warming were more likely to pay

What kind of Interventions work?

Interventions were found to be most effective in changing behaviours when based on social/peer comparisons and financial incentives, but least effective when based on education or feedback alone. Often people are influenced more by how they fare in comparison to others and how others perceive them and their actions. Education can create awareness, but is not a great motivator for adoption of lifestyle changes for the 'greater good' that can be inconvenient or mildly painful.

Social or peer pressure

In terms of success of behavioural interventions, a number of independent studies have found that residential electricity consumption reduces when bills provide comparison of energy consumption vis-a-vis neighbours' consumption.

In all these studies, households using lower energy than neighbours did not demonstrate the undesirable outcome of increasing consumption to match their neighbours The highest energy consuming households decreased consumption by as much as **6%**[1], which goes to show that there is an inherent understanding that reducing energy usage is a positive and social 'good'.

Likewise, it may be easy for neighbours to be influenced to set up solar panels if more and more homes in the locality are shifting to solar power. Peer pressure can be used in a more nuanced way – for example highlighting what people of a similar age, income, interest group are doing can induce others in the same groups to follow.

A German study showed that people are more influenced by same-age-group peers. Other studies in schools have shown that comparison among classmates/batchmates is a strong tool to reduce food waste.

Financial incentives

Where more subtle nudging such as peer pressure or framing may fail, financial incentives or penalties can prove helpful. When in 2001 in Chennai, South India, every house was required to implement rainwater harvesting to help revive water table levels, there was scepticism and disbelief. However, when it was made mandatory and non-compliance resulted in fines, implementation roadblocks were eased, and we see the improvements today in the ground water levels. It is common knowledge that penalties in the form of fines can improve conformity with rules.

Like penalties, the fear of or aversion to overspending also has proven to be a powerful tool. In some communities in Alaska, residents pay upfront for their energy bills and are constantly able to track how much of this has been used. In these cases, electricity consumption dropped by as much as 15% to avoid having to pay more than they already had.

Financial incentives can also help promote pro-climate behaviour. An experiment in a university cafeteria (Kaiser et al., 2020), which reimbursed meal costs to students choosing a vegetarian meal, showed an increase of 25% increase in students choosing a vegetarian meal. However, student meal choices may not necessarily be out of concern for the climate but purely for the refund or for experimentation.

Also, this doesn't guarantee a change to vegetarianism post the stimulus of the reimbursement being removed. It may also not work among more affluent groups than college students.

Financial incentives may not always be as straightforward as reimbursements or discounts. A number of countries are encouraging production and adoption of electric vehicles through subsidies and lower taxes.

However, production subsidies and lower taxation may not translate into actual increased purchase and use of electric vehicles among the general population for a variety of reasons, such as habits, beliefs, demography and other socio-economic factors.

Carbon taxes are confusing in the way they are designed. They sound like an additional levy on individuals' purses, and a number of countries rejected it. But carbon taxes could provide the much-required funding for governments to implement measures to build resilience.

Fuel taxes in France triggered protests and were also rejected in the USA and Switzerland. However, in Switzerland, only 12% of people knew how the carbon taxes worked. Part of this was paid back as a dividend, in the form of reduction in their mandatory health insurance premium. Among those who knew of this, the acceptance for carbon taxes was much higher than those who were unaware.

1 | Peer Comparisons Reduce Residential Energy Use | NBER

Gamification as a tool to promote sustainability

Contrary to popular belief that gamers are mostly urban male teenagers, a **study**[2] in 2013 by the Entertainment Software Association showed 45% women indulge in gaming and the average age of gamers is 30.

The widespread use of mobile phones and increasing internet coverage opens up a huge consumer base for mobile app-based games and thus makes gamification a good tool to promote sustainability.

Games can be of different types, target different groups and also be intended for specific outcomes such as spreading awareness, reducing waste, or a fun and easy way of promoting certain healthy and useful behaviours.

- **For creating awareness:**
  Studies have shown that board games have proved to be effective tools in increasing sustainability education. Graduate students involved in a study reported improved knowledge about sustainability in manufacturing.

  Board games[3] have been shown to improve pro-sustainability attitudes as well. However, these were pilot studies and not tested in large groups. Also, the user base for board games that promote sustainability would be very niche for this to be a replicable use case.

  In the digital world, there can be many apps that can help us visualise the impacts of both climate change and collective action. While these can provide information, creating awareness doesn't always translate to change in behaviours with measurable outcomes.

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- **Energy usage reduction:**
  Inducing people to reduce energy consumption using games has shown promising results. Simple habits such as turning off lights when not in use, and replacing old appliances with energy efficient alternatives may be easy to promote through gaming and rewards in the position on neighbourhood leader boards, and also by highlighting the financial impact on the monthly energy bills.

  Many apps, such PowerSaver Game, enCOMPASS, and Apolis Planeta, have shown long-term reduction in energy consumption. But there are several efforts that have shown no change in behaviours as well showing need to better design intervention programs.

- **Recycling and waste management:**
  A successful experiment showed tourists have been encouraged to look for recycling bins to dispose of plastic bottles when the bins could be located through an app.

2 | Gamification in theory and action: A survey - ScienceDirect

3 | Gamification to prevent climate change: a review of games and apps for sustainability - ScienceDirect

Challenges to successful behavioural interventions for climate change

Behavioural interventions targeted at inducing attitude and behaviour changes towards adopting more sustainable practices have given mixed results. Reasons for the muted responses and some of the barriers to successful intervention are differences in education, socio-economic factors, awareness, "psychological distance" from climate change and impacts, original beliefs about climate change, self-reporting behavioural/belief changes, and a lack of an objective method for quantification of impact resulting from this behaviour change.

Psychological distance

This is a concept that has its origins in construal level theory, which explains that *we are able to think about things/events/objects we do not experience directly by forming a mental construal, which becomes more abstract when these things/events/objects are more distant than the self.*

Psychological distance has four dimensions, and climate change perception and action are affected by all four of these dimensions:

- **Spatial** – of physical/geographic locations
- **Social** – events happening to or situations of others
- **Temporal** – separated by time, i.e. things that are in the future
- **Hypothetical** – events involving uncertainty.

Actions contributing to and exacerbating global warming and their impacts are separated by time and distance. Increasing mortality due to floods/heatwaves in developing or poorer countries may not immediately trigger the notion that climate change caused by running an air conditioner in a faraway country is making these events become more often and more severe.

Likewise, impacts are felt across generations, separated by years of cumulative impacts of environmental abuse. Warnings about the future can be easy to disregard as exaggerations with no available example to help visualise them.

There is a lot of information available to the public about ways in which they can act to minimise the climate and ecosystem degradation, and many articles highlight simple measures such as reducing detergent use, setting heating/cooling systems closer to ambient temperature. A lack of a clear discernible connection between these measures and the impact on wider weather phenomena, the abstraction in this case is clearly more distant and is probably the reason for lukewarm responses to calls for action.

Above all else, science can only predict that climate change is more likely than before, and that impacts could get more severe, and so can be discounted as mere predictions that may not fructify.

Socio-economic circumstances

The majority of all studies targeting climate action have historically been carried out in regions with higher literacy and affluence. The majority of all studies targeting climate action have historically been carried out in regions with higher literacy and affluence, meaning there is the ability to make lifestyle modifications even for short durations, such as moving to a plant-based diet, electric vehicles or public transport without impacting livelihoods.

Behavioural interventions that might have proven successful in these smaller pilots may not produce the same levels of adoption or success when implemented in larger, more heterogeneous, groups.

Warnings about the future can be easy to disregard as exaggerations with no available example to help visualise them.

Self-reporting pro-environment behaviours

Economically less well-off people live more climate-friendly lives than the well-educated urban elite. They are less likely to drive a vehicle or have central heating/air-conditioning, more likely to consume local produce and have minimal food wastage, and consequently, to have a lower environmental impact.

However, self-reporting of pro-environmental behaviour is more likely by the more well-educated/aware and economically well-off population. While they may report more understanding and more responsible lifestyles, that is not very reflective of reality.

Accuracy of the reports and individual biases can also impact results of studies. For example, if people report using less detergent, or using less water in their laundry, there is no clear method to assess by how much the consumption has actually reduced, or how many people over how many months need to reduce their use of detergent and water to be able to produce a tangible impact.

These are daily, routine practices that people hardly monitor, nor can they be reasonably expected to have the time to monitor and accurately report.

On the other end of the spectrum are apps and games that claim to promote healthy and sustainable lifestyles. They may require self-reporting on a number of aspects of daily life such as diets, carpooling, opting for fossil fuel free transportation, recycling and reusing food/household items. Reporting on these apps can be motivated simply by the urge to be on top of a leaderboard and cannot be verified, and therefore in many cases do not produce any real benefits.

Over centuries, humans have believed that climate and weather phenomena are not controllable. Gods in almost all major religions and cultures have unleashed floods, droughts and storms at will.

Identification and quantification challenges

With switching to "greener" options or adopting carpooling, reducing energy usage and improving efficiency, the key drivers in most cases could be non-climate linked, but more practical considerations such as age, health, income, convenience, weather, location, and other competing demands.

Likewise, the converse, where people adopt a more climate-friendly lifestyle more out of affordability and access is also true. This makes it difficult to identify which behaviours are actually driven by a climate-positive attitude or belief and which are out of necessity. This confounding can lead to studies either under- or over-estimating the effect of behavioural interventions.

If identification of whether behaviour changes are born out of a sense of climate/environment responsibility is difficult, quantifying is also a challenge. It may not be right to say that these behavioural interventions are not useful, because it is hard to quantify if an x% increase in pro-environment and sustainable behaviour could translate into an x% point reduction in emissions or warming. Also, there is no definitive answer to whether it is useful to pursue less impactful behavioural interventions that will only cumulatively, over time, add up to produce a tangible impact.

Other psychological barriers

Many common psychological, social and even religious factors can be formidable barriers to influencing pro-environmental behaviour changes. Capitalism, general mistrust of establishment/policies/policymakers, an unrealistic optimism, or a belief in the supernatural can all lead to climate inaction. Over centuries, humans have believed that climate and weather phenomena are not controllable. Gods in almost all major religions and cultures have unleashed floods, droughts and storms at will. Legends and lore that we grew up on have ingrained this in our psyche, sometimes evoking a feeling of helplessness with regard to nature. This makes it hard to both foster belief that climate is changing for the worse and that our actions can slow down the deterioration and even potentially reverse it.

Conclusion

In the recent Conference of Parties (COP), the IPCC has addressed the importance of behavioural, cultural and social factors in combating climate change. These measures involve strengthening climate literacy and citizen involvement, and innovations to promote carbon neutral lifestyles. This requires a concerted effort from governments, private sector and civil society.

A recent catastrophe has offered a number of valuable lessons that we may be able to extrapolate to the climate battle. During the pandemic, the WHO recommended large-scale monitoring of risk perceptions, acceptance or rejection of mitigation measures, self-reported behaviours, and levels of knowledge and trust in the local authority, in order to shape policy around Covid-19.

A similar exercise involving large-scale data collection and monitoring could help improve our understanding of adoption of pro-climate behaviours and can help shape climate policy.

Covid-19 required actionable insights to be obtained from data within incredibly short time spans of days and weeks, while impacts of pro-climate and sustainable behaviours can be observed over a slightly longer periods of time.

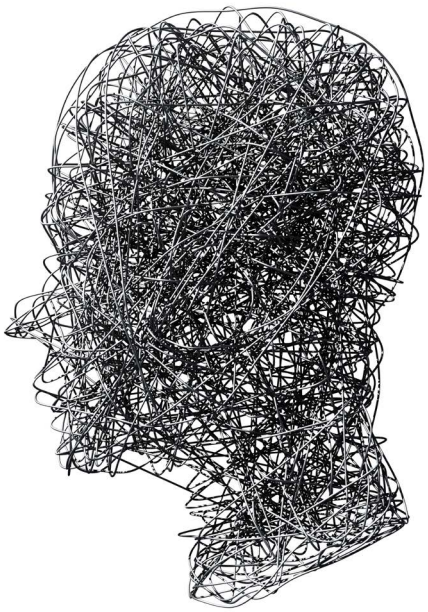
Another idea born out of the pandemic is what scientists are referring to as "the fresh start effect". Although behaviour and perspectives do not change over a short period of time, Covid-19 forced us to change our lifestyles almost overnight. Travel restrictions kicked in instantaneously and although different countries locked down and opened up at different times, travel for leisure ground to a halt, companies began to rethink business travel, and the shortages and supply shock led us to lead more minimalistic lives.

Two years after the pandemic, there is realisation that a lot of air travel can be replaced by virtual meetings and without compromising work quality. Although a number of things we considered normal before Covid-19 ceased or changed completely, we survived it and realised that change, though unpleasant, is not insurmountable. Not all events give us a chance to "reset" as Covid-19 did, hence behavioural scientists refer to a "fresh start".

What sort of 'reset' can be imagined for climate change is a challenging question. Maybe not something as drastic as grounding all aircraft, but it can certainly be imagined in smaller steps.

Pushing the reset button on small practices/habits where there are convenient alternatives can be a good starting point: for example, moving to plant-based diets. There are even plant-based, meat-like foods available now, making mandatory rainwater harvesting, or switching to solar power during summer months.

A number of these small resets can contribute cumulatively to a significant and sustained impact.



A number of small resets can contribute cumulatively to a significant and a sustained impact

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