

Game human nature

Finding ways to adapt natural tendencies and nudge collective action is central to the well-being of future generations, say **Helga Fehr-Duda** and **Ernst Fehr**.

Hundreds of studies in behavioural economics and other social sciences, conducted over the past few decades, have established that people often make choices that take into account the well-being of others. This contradicts an assumption held over centuries that people exclusively pursue their own material well-being. It also offers hope for the prospect of developing public goods (see ‘Glossary: behavioural economics’) that will benefit future generations.

However, another body of evidence, gathered over the past two or three decades, indicates that people display an array of other tendencies, such as giving excessive weight to current benefits over future ones. These could hamper policies and initiatives aimed at building or sustaining public goods.

The message emerging is that sustainable

development will require the design of policies and schemes that specifically take advantage of some of our natural tendencies, and mitigate others.

SIX TENDENCIES

What does it mean to care about future generations? We posit that, by and large, future generations should be able to live as comfortably as do current generations in the developed world. This goal requires economic growth, at least in developing countries. It also requires current generations to hand down high-quality ‘capital stock’ — natural resources, scientific knowledge, infrastructure and sophisticated economic, legal and educational institutions. All of these types of stock are effectively public goods: everyone can enjoy them without necessarily having paid directly for them.

When it comes to the likelihood that investments in public goods will materialize, six behavioural tendencies come into play.

Other-regarding preferences. Public-goods experiments generally involve giving individuals in a group small sums of money that they can either keep for themselves or spend for the benefit of the group. Numerous such experiments, as well as field studies in real-world settings, have shown that many people have ‘other-regarding preferences’: their choices indicate that they care about things besides themselves, including the well-being of other people and the environment.

People with other-regarding preferences are often willing to share the burden of providing public goods as long as others do the same: they are ‘conditional cooperators’¹. Such people often care about social norms

and are willing to punish those who violate them². They also tend to be concerned about what others might think of them. For instance, often the threat of being named publicly (within the group) as a defector is enough to keep such people cooperating in experiments.

There is considerable potential to leverage these tendencies for the benefit of future generations. The effect of social norms and conditional cooperation has been demonstrated by one of the largest-scale field experiments ever conducted. Since 2008, a US company called Opower has sent letters to customers of energy utilities, showing them how their electricity use compares with that of their neighbours. (Currently, 15 million households in 9 countries receive such letters.) This intervention generated a 2% reduction in energy consumption. A study of the company's three longest-running programmes shows persisting effects after mailings stop, but the energy savings decrease by 10–20% per year³.

The emergence of smoking bans similarly provides a powerful example of what can be achieved through norm-altering collective action. Fifty years ago, smoking in public places was ubiquitous in Western countries. When it became clear that smoking causes

serious cardiovascular and respiratory diseases in non-smokers as well as smokers, a new social norm emerged. About 20 years ago, many countries began to prohibit smoking in indoor public spaces, and even in outdoor ones.

Self-regarding preferences. Studies have also shown that there will always be some people who free-ride on the contributions of others. In public-goods experiments, for instance, some participants will stop contributing to the public good, but continue to reap the rewards from everyone else's contributions. Ultimately, the cooperation seen in these experiments tends to break down unless defectors can be punished by being made to pay money back to the experimenter².

Such detrimental effects of free-riding on the common good are demonstrated by the frequently frustrated attempts of individual political activists to overcome dictatorships. In these cases, free-riders might refrain from joining the opposition because (if the activists are successful), they stand to benefit without bearing the costs of fighting for political freedom.

Thus, although other-regarding preferences are a prerequisite for achieving sustainable development, uncoordinated changes to individuals' behaviours will not be sufficient. Political activists, for instance, will succeed only if they are able to turn their protests into a coordinated mass movement — as occurred in Tunisia in 2010 when civil resistance eventually led to the ousting of the country's president.

Delay-dependent risk tolerance. Other experiments have revealed that when evaluating the costs and benefits of a decision, people tend to be more tolerant of risk if their decision affects the future rather than the present⁴ (see 'Time warp'). For instance, if people are given the choice of receiving \$100, or either \$0 or \$200 (with a 50% chance of receiving either), many will select the \$100 if they are told that they will receive the money immediately, but the more risky option if they will receive the money in a year's time.

Delay-dependent risk tolerance can account for why, globally, insurance coverage for natural disasters — perceived to occur in the distant future — is low relative to what is needed to prevent serious damage to a country or region's future economic growth. Between 1960 and 2011, nearly 60% of 'major natural catastrophes', those causing at least 100 fatalities and/or US\$250 million in direct losses (in 2011 dollars), were uninsured⁵. Even in high-income countries, only 50% of the damage resulting from catastrophes, such as earthquakes, tsunamis, floods and so on, were

covered by insurance contracts⁵.

These findings contrast sharply with the popularity of short-term accidental-death insurance policies sold at airports, which cover flight-related accidents, with the policy typically ending on completion of the flight. In the late 1950s and early 1960s, when such policies were still available at US airports, one group of underwriters insured

“Many people tend to be excessively impatient in the short term.”

potential losses of roughly \$651 billion (in 2015 dollars) from selling such policies, with a profit margin of almost 60%.

This high tolerance of future risks and adversity to short-term risk suggests that investment in public goods that are relevant to climate change — such as tax increases to finance a shift to green-energy sources — will meet strong opposition from voters because the impact of such efforts is likely to be invisible for a long time, and the precise benefits are uncertain.

Feedback-dependent risk aversion. Experiments also indicate that people become more averse to risk if they expect to observe the outcomes of their decisions over the course of time. For instance, in one classic study⁶, participants were asked to allocate 100 shares to two assets, one more risky than the other. Different groups of participants — informed about the performance of their shares either often or infrequently — could reallocate their shares on the basis of the feedback they had received.

Participants who received information more frequently invested nearly 60% of their shares in the less risky asset in the final round of reallocation, whereas those receiving information less often invested only about 30% of their shares in the lower-risk asset. In this case, the people following asset prices more closely are more likely to observe losses, and so tend to shy away from the riskier investments.

Such findings indicate that information that makes the costs of inaction visible — for instance, that global warming increases the occurrence of extreme weather events and the likelihood of wars — could significantly influence people's behaviour.

Short-term impatience. Numerous studies in behavioural economics and psychology have demonstrated that many people tend to be excessively impatient in the short term and give disproportionate weight to current benefits compared with future ones. For instance, if people are given the choice of receiving \$10 today but \$11 tomorrow, or \$10 in 100 days versus \$11 in 101 days, many will choose the smaller reward for the more immediate payment, but wait an extra

GLOSSARY: BEHAVIOURAL ECONOMICS

- A **public good** is a resource such as the atmosphere that individuals cannot be effectively excluded from using, and for which use by one person doesn't reduce the availability of the good to others.

- People who care about the well-being of others have **other-regarding preferences**.

- People who care only about their own material well-being have **self-regarding preferences**.

- **Conditional cooperators** will share the burden of providing public goods or comply with social norms that benefit the group as long as others do the same.

- People whose tolerance of risk depends on when in the future the consequences of their decisions will materialize show **delay-dependent risk tolerance**.

- People who become more cautious as a result of observing the outcomes of their decisions over time show **feedback-dependent risk aversion**.

- **Short-term impatience** is giving disproportionate weight to current benefits compared to future ones.

day for the larger reward in the second scenario. People also tend to be more averse to losses in the short term: current costs loom large, whereas future potential benefits have little bearing on today's decisions. Such behavioural tendencies explain why nearly one-third of people working in the United States have no retirement savings or pension, as found by a 2013 survey by the Federal Reserve's governors (see go.nature.com/kozp8q).

One way to deal with this bias is to shift benefits and costs across time. In the case of pensions, 'save more tomorrow'⁷ or 'automatic escalation' plans commit employees to save a percentage of their incomes in the future. The pioneers of these schemes, economists Richard Thaler and Shlomo Benartzi, have reported that about 4.1 million people were participating in such plans in 2011, saving an extra \$7.6 billion per year by 2014.

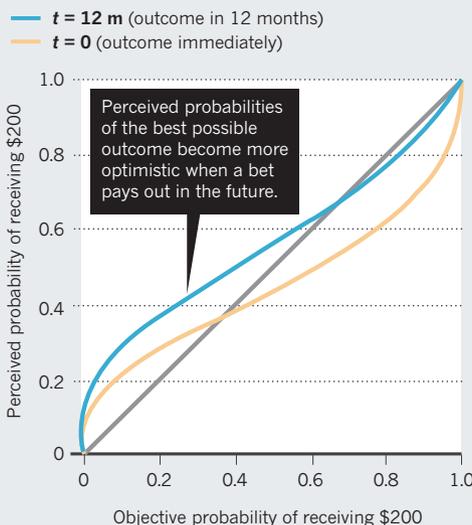
The basic principle of committing to a policy today but delaying the consequences is routinely used by politicians, for instance to increase retirement age without losing voters. This idea could be transferred to other arenas. For instance, policymakers and governments could commit some percentage of future increases in gross domestic product — and the associated tax hikes — to investments that benefit future generations. Although dependent on future economic growth, this would potentially increase the political acceptability of such investments by reducing the immediate burdens on the current generation.

The feasibility of this idea in relation to climate change has already been demonstrated. In 2008, people in Zurich, Switzerland, voted overwhelmingly to restrict their energy use to the levels of the 1960s by 2050 (a concept known as the 2,000-watt society). Today, Zurich residents use less energy than the average person in Switzerland, who in turn uses only about half of that used by most US residents.

Failure to carry through on intentions. A final insight from behavioural experiments and psychology studies is that people often fail to act on their intentions, be it because of inertia, inattention or the complexity of the task at hand. Take, for example, investments in energy-efficient appliances. Often, such investments provide net benefits to consumers because reduced operating costs more than offset higher purchase prices. However, worldwide, there is still a considerable gap between people's actual energy use and what it could be if they relied on the most

TIME WARP

When people are told that they could get \$0 (worst possible outcome) or \$200 (best possible outcome) with varying probabilities now (yellow) or in a year's time (blue), they overestimate the likelihood of the best future outcome and underestimate the probability of the worst.



efficient technology available to them — probably because people undervalue future cost savings. The consulting firm McKinsey estimates that, in the United States, \$1.2 trillion could be saved by 2020 through use of more efficient technologies.

One way to address this 'resistance to switch' would be to convey information in a form that motivates people to change their behaviours. In most developed nations, energy labels showing information on running costs and efficiency are now provided on household appliances. Several small-scale field experiments suggest that labelling products with such information increases the likelihood that people will purchase a more efficient product. However, effects are small and may depend on the format of the information disclosed.

People's inertia could prove advantageous if, in a set of choices, the option favouring the public good requires no action. In many countries, the uptake of green-energy contracts has been 1% or less, even though in opinion polls, typically 50–90% of respondents say that they would use green energy if presented with a choice. A different picture has emerged in certain areas of Germany supplied by the utility company Energie-dienst. In the Black Forest town of Schönau and in several communities in the south, green electricity is offered as the default option. And this is what customers use unless they take active steps to find a new supplier or choose a different contract. A 2008 study revealed that, in these communities, more than 90% of people were using energy from renewable sources such as solar

or wind⁸, even though in the short-term this is more costly than using electricity from coal, oil or gas.

In other words, people's unwillingness or inability to find and evaluate different options can be harnessed for the public good, while still protecting their freedom of choice.

NURTURE OUR NATURE

The picture from behavioural and social science is clear. Nudges — such as commitments to save or invest future income increases — will be crucial to changing behaviour, and should complement conventional policies.

In the case of climate change, there are three principal take-home messages. First, conventional policy tools — such as taxing greenhouse-gas emissions — will be essential. Second, because people cooperate over the long term only if most others do as well, all key nations must be on board in international agreements¹. Third, institutions for measuring and enforcing compliance — such as measures to monitor emissions and to verify national reports — will be needed⁹.

Self-interest is a powerful force in human behaviour. But it is also part of our nature to care for others, including people who have not yet been born. Many examples in human history — from the abolition of slavery and the removal of dictatorships to the historical decline in violence and enforcement of human rights — demonstrate that it is possible to mobilize the better angels of our nature¹⁰ to improve the human condition. ■

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