Chapter 8

Using behavioural insights to increase compliance with environmental regulation and participation in voluntary schemes

This chapter presents behavioural interventions implemented to increase compliance with environmental regulation and participation in voluntary schemes, both on the side of individuals and firms. The behavioural biases at play are highlighted, together with the behavioural levers used by policy makers to tackle them. Behavioural interventions have been rolled out both to increase firm compliance with reporting requirements, such as those on the import of environmentally harmful substances, to promote individual compliance with the payment of environmentally related fines, such as those on littering, and to make the uptake of “soft” policy instruments such as voluntary certification more appealing.
Behavioural insights applications reported thus far targeted individual behaviour. However, the employees responsible for taking action within firms in order to e.g. ensure compliance with relevant environmental standards may also be subject to standard behavioural biases (see Reader’s Guide for definitions of all technical terms). For example, they may suffer from cognitive limitations preventing their full understanding of complex regulatory requirements. With limited information on the functioning of government monitoring and compliance check schemes, employees in regulated firms may be overconfident regarding the possibilities of their business being monitored, thus choosing to risk incurring a fine for non-compliance. Conversely, when it comes to the uptake of voluntary certifications, businesses may eschew it because of inertia, given such certifications may be perceived as not fully related to their core business. For these reasons, behavioural sciences can contribute to informing environmental policy making in order to increase firms’ compliance with regulations or to encourage their uptake of voluntary schemes.

Sifting through the complexity of bureaucratic steps needed for firms to comply with environmental regulation can result into information overload, ultimately hindering compliance itself. Simplifying and reframing regulatory procedures and reporting requirements could ease the way, increasing compliance rates. Alongside such changes to “hard”, mandatory environmental regulation, behavioural interventions could increase the uptake of “soft” environmental policy instruments such as voluntary certifications and standards. This could be achieved, for instance, by increasing the salience of the benefits associated with such decisions, framing the uptake of voluntary certifications and standards as an opportunity rather than a regulatory burden.

Increasing individual and business compliance with environmental regulation

Through its Design and Analytics Team, the Australian Government Department of the Environment has developed and run a field experiment aimed at increasing reporting compliance among regulated entities (see Annex 8.A1). The specific regulation under scrutiny requires entities with a licence to import equipment containing ozone-depleting substances and synthetic greenhouse gases to submit quarterly import reports to the Department of the Environment.

The objective of this randomised controlled trial was to increase the reporting compliance of licensed entities by incorporating behavioural insights techniques into reminder notification processes. This translated into changes in the design of reminder messages and their timing, rolled out throughout reporting periods between July 2014 and March 2015.

The experiment showed that the most effective intervention entailed i) a message with increased emphasis on reporting being mandatory, including a direct link to the online reporting system and three simple steps to get there, and ii) both an early and a last-minute reminder. This intervention delivered a 26% increase in compliance relative to the control group.

The same behavioural insights can be exploited to tackle the drivers of individual non-compliance with environmental regulation. For example, the behavioural insights team at the Israeli Minister of Environmental Protection is developing a before/after intervention by reframing fines for littering with the aim of increasing offenders’ payment of the fines. The letter communicating the infraction has been redesigned and rewritten following some of the best practices suggested by the UK Behavioural Insights Team (Behavioural Insights Team, 2015): personalising the message, simplifying the language, highlighting key actions to be taken in order to pay the fine, as well as the consequences of not paying
in time (leveraging loss aversion). The redesigned letter also tries to nudge altruistic reactions, by highlighting the fact that revenues from fines fund environmental protection and conservation.

This intervention is still ongoing, hence its results have not been empirically assessed yet. However, it is worth mentioning that this project has prompted the construction of a database allowing the systematic collection and analysis of data on fines issued and paid. This is an excellent example of the positive spill-overs that behavioural interventions can generate through their focus on impact evaluation: in this case, the introduction of systematic data analysis practices in procedures monitoring compliance with environmental regulation.

**Investigating businesses’ motivations in participating in voluntary schemes**

The objective of this field experiment, launched by the *Australian Government Department of the Environment*, was to understand *businesses’ motivations for becoming voluntarily certified as carbon neutral* (see also Annex 8.A2 for further information on the Carbon Neutral Program and on the experiment itself).

This randomised controlled trial tested the impact of priming messages on businesses’ interests in different marketing messages. Participants at a carbon emissions reduction summit were verbally primed with one of two messages before being asked if they would like to receive more information on the environmental benefits and/or competitive advantages of being certified as carbon neutral. The first priming message focused on intrinsic motivation, emphasising the environmental benefits of being certified as carbon neutral; the other message focused on extrinsic motivation, emphasising the competitive advantages for a business certified as carbon neutral.

Following the verbal priming, all participants were asked to complete a postcard with their details. The postcard prompted participants to signal whether they would like to receive further information on the Program, and if so, what information specifically they would like to receive (e.g. how a carbon neutral certification can give businesses a competitive edge, help them retain staff or lead the way towards a low carbon economy).

Overall findings indicated that summit participants were unwilling to request information on the competitive advantages of going carbon neutral if the marketing messages they had received only highlighted the intrinsic, environmental benefits of doing so.

**Conclusion on compliance with environmental regulation and participation in voluntary schemes**

Evidence from applications of behavioural insights to increase both environmental compliance with mandatory environmental regulation and uptake of voluntary environmental certification and standards comes entirely from field experiments based on the simplification and framing of information.

Emphasising the mandatory nature of reporting duties and simplifying and increasing the salience of required steps for compliance has been shown to increase firms’ regulatory compliance in Australia. Reminders sent out at key moments have also proven to be effective. The same insights are being leveraged in Israel in order to increase the payment of littering fines.
Evidence from Australia shows that, when approached with different priming messages regarding the uptake of carbon neutral voluntary certification, firms did not inquire about the potential competitive advantages connected to it unless prompted to do so. This may signal a lack of understanding of the concrete benefits connected to certification uptake, or a wish to focus on environmental consequences.
Annex 8.A1

Increasing compliance with reporting obligations – Australia

<table>
<thead>
<tr>
<th>Context</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Who?</strong></td>
</tr>
<tr>
<td><strong>Where?</strong></td>
</tr>
</tbody>
</table>
| **When?** | July to September 2014 (reporting period 1)  
October to December 2014 (reporting period 2)  
January 2015 to March 2015 (reporting period 3) |
| **Why?** | Entities with a licence to import equipment containing ozone-depleting substances and synthetic greenhouse gases must submit quarterly import reports to the Department of the Environment.  
Entities are required to report under the Ozone Protection and Synthetic Greenhouse Gas Management Act 1989. This legislation helps to ensure Australia meets its legal obligations under the Montreal Protocol on Substances that Deplete the Ozone Layer and the United Nations Framework Convention on Climate Change.  
The objective of the intervention was to increase the reporting compliance of licensed entities by incorporating behavioural insights into reminder notification processes. |

<table>
<thead>
<tr>
<th>Behavioural intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Environmental policy objective</strong></td>
</tr>
<tr>
<td><strong>Behavioural issue</strong></td>
</tr>
<tr>
<td><strong>Behavioural lever</strong></td>
</tr>
</tbody>
</table>

Evaluation of the intervention: methodology

**Relevant population:** Entities with a current licence to import equipment containing ozone-depleting substances and synthetic greenhouse gases into Australia.

**Sample size and sampling method(s):** The sample size was 667 licensed entities.

**Method:** Field experiment designed as randomised controlled trial.

Licensed entities were randomly assigned to one of 5 groups (one control group and 4 treatment groups, with around 133 members per group), ensuring that all entities in all groups had similar levels of experience with the reporting process.

To help ensure this, a “poor compliance” variable was created using data collected during the three reporting periods prior to the start of the trial. Entities that were late in reporting in two of the three periods were regarded to have a poor compliance record.

The different groups were exposed to the following interventions:

- *Control group:* standard e-mail reminder notification already in use by the Department.
• *E-mail redesign 1*: this treatment utilised bright colour, a large photo banner, simple language and simple instructions, and a big “Lodge your report here” button.

• *E-mail redesign 2*: this treatment replaced the photo with the Government crest and increased emphasis on reporting being mandatory. It also included a new hyperlink to a different web page fewer “clicks” away from the online reporting portal along with instructions guiding recipients to the reporting portal.

• *E-mail redesign 2 paired with an early reminder.*

• *E-mail redesign 2 paired with both an early and a last-minute reminder.*

**Units of measurement:** Percentage change in compliance (in-time reporting) compared to the control group.

**Findings**

The trial results indicated that entities with a poor compliance record were almost 50 per cent less likely to report on time than other entities.

Analysis of data over three reporting periods found the results reported in Table 8.A1.1.

**Table 8.A1.1. Results by treatment group**

<table>
<thead>
<tr>
<th>Treatment group</th>
<th>Description of treatment received</th>
<th>Reporting period in which treatment was received</th>
<th>Percentage increase in compliance (%)</th>
<th>Statistical significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>E-mail redesign 1</td>
<td>1, 2 and 3</td>
<td>6</td>
<td>Not significant</td>
</tr>
<tr>
<td>2</td>
<td>E-mail redesign 2</td>
<td>2 and 3</td>
<td>11</td>
<td>p&lt;0.01</td>
</tr>
<tr>
<td>3</td>
<td>E-mail redesign 2, paired with an early reminder</td>
<td>3</td>
<td>10</td>
<td>p&lt;0.03</td>
</tr>
<tr>
<td>4</td>
<td>E-mail redesign 2, paired with both an early and a last-minute reminder</td>
<td>3</td>
<td>26</td>
<td>p&lt;0.01</td>
</tr>
</tbody>
</table>

Treatment groups 3 and 4 were both exposed to multiple behavioural interventions. In addition, in the second reporting period, all groups received an early reminder in accordance with departmental practice prior to the combined Christmas and summer holiday period in Australia. There is evidence that the most effective intervention was e-mail redesign 2, paired with both an early and a last-minute reminder, leading to a 26% percentage increase in in-time reporting.

The cost of this intervention is minimal compared to the savings that result from increased compliance. A 26% increase in compliance means 180 fewer non-compliant entities to follow up each quarter. If half of these entities report immediately after receiving a late reminder e-mail and the Department makes a five-minute phone call to the other half, the Program would gain around 15 hours of staff time per quarter, or 60 hours per year. The Department would also save the telecommunications costs associated with making these calls.

**Source**

Information retrieved from e-mail exchanges with the Australian Government Department of the Environment.
Annex 8.A2

Investigating businesses’ motivations in becoming certified as carbon neutral – Australia

<table>
<thead>
<tr>
<th>Context</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Who?</strong></td>
</tr>
<tr>
<td><strong>Where?</strong></td>
</tr>
<tr>
<td><strong>When?</strong></td>
</tr>
<tr>
<td><strong>Why?</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Behavioural intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Environmental policy objective</strong></td>
</tr>
<tr>
<td><strong>Behavioural issue</strong></td>
</tr>
<tr>
<td><strong>Behavioural lever</strong></td>
</tr>
</tbody>
</table>

Evaluation of the intervention: methodology

**Relevant population:** Participants at the 3rd Annual Emissions Reduction Summit, Melbourne, Australia.

**Sample size and sampling method(s):** Convenience sample of N = 48.

**Method:** Field experiment designed as a randomised controlled trial.

Participants at a carbon emissions reduction summit were randomly assigned either to the control group or to one of the two treatment groups based on the time of day (motivating messages were changed hourly):

- **Priming message 1:** intrinsic motivation emphasising the environmental benefits of being certified carbon neutral.
- **Priming message 2:** extrinsic motivation emphasising the competitive advantages for a business certified as carbon neutral.
- **Control group:** default marketing message.
All participants were primed with one of the two messages, with roughly equal numbers of participants being exposed to each message. Following the verbal priming, all participants were asked to complete a postcard with their details. The postcard prompted participants to signal whether they would like to receive further information on the Program, and if so, what information specifically they would like to receive. The following four options were given:

“Yes, please send me information about how going carbon neutral can (please tick one):

• Give my business a competitive edge.
• Support my business to attract and retain the best staff.
• Showcase my business as leading the way towards a low carbon economy.
• Show that my business is certified carbon neutral with credible and robust standards.”

The order of the four options was randomised between participants.

Units of measurement: The number of instances that participants requested more information on specific marketing messages.

Findings

Participants that received priming messages emphasising the competitive advantages related to carbon neutral certification were more likely to request further written information on such advantages. Conversely, participants that received priming messages emphasising the environmental benefits of carbon neutrality did not show any preference for receiving one type of written information over another. The statistical significance was not assessed due to small samples sizes.

Source

Information retrieved from e-mail exchanges with the Australian Government Department of the Environment.
Reference

Reader’s guide

The objective of this report is twofold: first, to understand the extent to which behavioural insights are being incorporated in environmentally relevant policy making, as well as the outcomes of this process; and second, to provide policy makers with concrete examples of successful as well as unsuccessful applications of behavioural insights to the design and implementation of relevant policies.

This reader’s guide presents all definitions of terms related to behavioural biases, interventions and levers, as well as those related to the methods used to test and assess the impact of behavioural interventions. While the definitions of these terms are also presented in Chapters 1 and 2, this guide mainly aims to support the reading of the chapters reviewing applications of behavioural insights to various policy areas: energy consumption and energy efficiency, water consumption, food consumption, transport and car choice, waste management and resource efficiency, and compliance with environmental regulation. These chapters make frequent use of the terms defined here.

Which behavioural biases affect environmental policy outcomes?

Behavioural biases are the features of human behaviour that, if observed through the lens of standard economic theory, can be defined as deviations from rational decision-making. Following Mullainathan and Thaler (2000), behavioural biases can be grouped into three categories, depending on the behavioural deviation from the characteristics of homo economicus: bounded rationality, bounded willower and bounded self-interest. While behavioural sciences have provided evidence for many more behavioural biases, the focus here is on the biases which have the potential to impact environmental policy and its effectiveness.

Bounded rationality

“Bounded rationality reflects the limited cognitive abilities that constrain human problem solving.” (Mullainathan and Thaler, 2000)

- Framing effect: the way an option is presented (or framed) affects individual choice among alternatives. More specifically, individuals can draw different conclusions from the same amount of information, depending on how it is presented and the relative salience of its elements.

- Loss aversion arises when the cost associated with giving up something is perceived as greater than the benefit that would accrue to the acquisition of the same thing (Gsothbauer and van den Bergh, 2011). Loss aversion can help explain the endowment effect and the status-quo bias:

  - Endowment effect: “The value of a good to an individual appears to be higher when the good is viewed as something that could be lost or given up than when the same good is evaluated as a potential gain” (Kahneman, 2003)
- **Status-quo bias**: “Because the reference point is usually the status quo, the properties of alternative options are evaluated as advantages or disadvantages relative to the current situation, and the disadvantages of the alternatives loom larger than their advantages. This leads to inertia.” (Kahneman, 2003)

**Bounded willpower**

*“Bounded willpower* captures the fact that people sometimes make choices that are not in their long-run interest.” (Mullainathan and Thaler, 2000)

- Inconsistencies between individual beliefs and behaviours can be denoted as **cognitive dissonances**. This phenomenon leads to an attitude-behaviour gap, a mismatch between beliefs and concrete behaviours. Sometimes, people may react to this mismatch by aligning their beliefs to their behaviour instead of the opposite (Carlsson and Johansson-Stenman, 2012).

- **Myopia in intertemporal choices**: individuals tend to show time-inconsistent preferences when considering decisions characterised by time-varying discount rates. This means that they will apply discount rates that are higher in the short run than in the long run (hyperbolic discounting), rather than constant over time. In other words, individuals with this type of preferences would rather obtain one Euro today than one Euro tomorrow, but when presented with the choice between receiving one Euro in one year and the same amount in one year and one day, they will gladly wait for an extra day. This type of discounting drives short-sighted decisions, placing disproportionate weight on immediate costs and benefits relatively to long-term ones (Gsottbauer and van den Bergh, 2011).

**Bounded self-interest**

*“Bounded self-interest* incorporates the comforting fact that humans are often willing to sacrifice their own interests to help others.” (Mullainathan and Thaler, 2000)

- Individuals are not motivated exclusively by their own utility: altruism, fairness and social norms also affect individual decision-making. While altruism and fairness need not be defined, social norms and their impact on consumer behaviour deserve further scrutiny. People conform to behaviours which are perceived as the norm in society, and compare their own behaviour to these ideal benchmarks.

**What are behavioural interventions?**

A recent report from the European Commission (Sousa Lourenço et al., 2016) provides a typology of the extent to which behavioural insights have been taken into consideration and have informed the policy process:

- **Behaviourally tested interventions** are “initiatives based on an ad-hoc test, or scaled out after an initial experiment”;

- **Behaviourally informed interventions** are “initiatives designed explicitly on previously existing behavioural evidence”; and

- **Behaviourally aligned interventions** are “initiatives that, at least a posteriori, can be found to be aligned to behavioural evidence”.

TACKLING ENVIRONMENTAL PROBLEMS WITH THE HELP OF BEHAVIOURAL INSIGHTS – © OECD 2017
This report focuses solely on behaviourally informed and behaviourally tested interventions, as they are the outcomes of deliberate efforts of policy makers to draw upon behavioural insights when developing and implementing policies. Here, these two types of interventions are denoted as *behavioural interventions*. Conversely, while behaviourally aligned initiatives may be effective in delivering policy results, they are not based on a good understanding of the behavioural mechanisms upon which they act. This limits the possibilities to replicate them in the future or in other contexts.

**What types of behavioural levers can policy makers use?**

Policy makers can use a range of behavioural levers to design and roll out an appropriate policy intervention. These levers are, in fact, the building blocks of behavioural interventions and, as such, constitute concrete tools for policy makers. Extending the classification provided by Mont, Lehner and Heiskanen (2014), seven main types of *behavioural levers* can be distinguished:

- **Simplification and framing of information**: simplifying complex information can prevent information overload. Framing aims at representing information by consciously activating certain values and attitudes of individuals. The way information is framed can also affect how it is processed by its recipients. For example, energy efficiency labels can be framed to provide a sense of the relative ranking of an electric appliance with respect to the best-in-class one, and the savings that one could enjoy when switching to the latter.

- **Changes to the physical environment**: the physical environment can substantially affect individual decision-making, especially in contexts in which choices are made spontaneously, on the basis of automated mechanisms and habits. Examples of such interventions are changes in the location and appearance (e.g. colour) of recycling bins, or the installation of automatic (sensor-based) water taps to curb water consumption.

- **Changes to the default policy**: as individuals are prone to status-quo bias, they often postpone making decisions until or unless it becomes inevitable to do so. Defaults can, thus, have a great impact in contexts in which people are resistant to change. An example of such interventions is a change to the default setting of thermostats (i.e. to a lower baseline temperature in order to foster energy savings).

- **Use of social norms and comparisons**: as individuals are social beings, not solely driven by their own payoffs, they are affected by the way people surrounding them behave (social norms), by how they compare to their peers (social comparison) as well as by moral injunctions. An example of this type of intervention is the comparison of a household’s energy or water consumption to the consumption of a same-sized household in the same neighbourhood.

- **Use of feedback mechanisms**: several routine behaviours, such as energy consumption or waste disposal, have considerable environmental impacts. However, these impacts are often not sufficiently salient for consumers. Providing them with timely feedback can make such contexts more transparent, increasing awareness of environmental externalities stemming from daily consumption choices. For example, real-time in-home displays connected to smart energy meters can provide real time feedback on energy consumption and costs.

- **Reward and punishment schemes** can be used as “carrots and sticks”, associating a salient, material payoff to consumers’ achievements. For example, rewarding
households who have been particularly savvy with water consumption during scarcity periods may generate a positive norm for water conservation.

- **Goal setting and commitment devices**: as individuals are bound by status-quo bias and inertia, effortful behaviour changes can be encouraged by setting specific and measurable goals and using commitment devices to regularly follow up on progress. One such example involves pinning down an objective of energy savings and following up on the objective with regular feedback and tips.

Note that “hybrid” interventions can be designed by building upon several of these insights at once. For example, energy conservation can be prompted by reframing energy bills in order to make them more intuitive and by using social comparisons therein.

Price-based policies, instead, leverage the most traditional form of market-based tools, such as taxes, to induce economically rational changes in individual behaviour. They should, thus, not be confused with policies building upon behavioural insights, which aim at tackling behaviours that are not consistent with the model of rational economic behaviour.

What methods can be used to test and assess the impact of behavioural interventions?

*Experiments* enable the estimation of a policy’s causal effect. The cornerstone for credibly identifying the causal effect of a policy is the construction of the correct counterfactual (List and Price, 2016). The idea behind the establishment of a counterfactual is to compare the impact of the policy of interest on a group that is exposed to it (or, in the experimental jargon, “treated” with it), with its impact on a control group, which is unaffected by the policy intervention. The empirical findings of experiments can inform policy makers, motivating the launch of new policies or changes in existing ones.

Harrison and List (2004) argue that “[c]ontrolled” experiments, which include laboratory experiments and field experiments, represent the most convincing method of creating the counterfactual, since they directly construct a control group via randomization” (p. 1014). In fact, randomisation ensures that the individuals or groups of people exposed to the policy to be tested and those exposed to the control condition are truly comparable (Haynes et al., 2012). Experiments based on the randomised assignment of participants (individuals, households, firms…) to treatment or control groups (in short, randomised treatment allocation) are called randomised controlled trials or, in short, RCTs (see also Haynes et al., 2012; Gertler et al., 2016). According to the type of randomisation process, Charness, Gneezy and Kuhn (2012) distinguish two different types of design:

- “In a “within-subject” designed experiment, each individual is exposed to more than one of the treatments being tested, whether it be playing a game with two different parameter values, being treated and untreated, answering multiple questions, or performing tasks under more than one external stimulus. With such designs, as long as there is independence of the multiple exposures, causal estimates can be obtained by examining how individual behavior changed when the circumstances of the experiment changed.

- In a “between-subject” designed experiment, each individual is exposed to only one treatment. With these types of designs, as long as group assignment is random, causal estimates are obtained by comparing the behavior of those in one experimental condition with the behavior of those in another.” (Charness, Gneezy and Kuhn, 2012, p. 1)
Likewise, one can talk about *between-group* and *within-group* experimental design, if the randomisation is carried out at the level of *groups* of individuals (e.g. a village, a cohort of students…) rather than at the level of single individuals. According to the experimental context, one can distinguish between:

- **Laboratory (lab) experiments** are conducted with volunteer participants in a controlled laboratory facility (Levitt and List, 2009; Noussair and van Soest, 2014).

- **Field experiments** are carried out in naturally occurring settings, often with subjects that are unaware of being part of an experiment. Field experiments also include experiments carried out on real online platforms (e.g. e-commerce websites or social networking platforms), which are becoming increasingly popular. Such experiments are denoted in this report by the term *online field experiments* (Chen and Konstan, 2015). These should not be confused with experiments carried out on simulated online environments specifically designed for experimental purposes.

**How to assess policy impacts when treatment allocation is not randomised?** For some of the interventions described in this report, impact evaluation is not based on the randomised assignment of experiment subjects to a treatment or control group. In such cases, causally identifying the impact of the policy intervention requires different methodological approaches based on the analysis of what Levitt and List (2009) call “naturally-occurring data” or “uncontrolled data” (see e.g. Blundell and Costa Dias (2009) for a technical overview of such methods and Gertler et al. (2016) for a non-technical one). This approach to causal identification of policy impacts works as long as the policy is introduced as an “exogenous shock”, and randomly – in a statistical sense – allocates subjects to control (unaffected by the policy) and treatment (affected by the policy) groups.

**What about stated preference studies?** An entirely different category of policy interventions involves stated preference studies, such as *stated choice experiments*. In this type of experiments, subjects are presented with hypothetical choice scenarios where they have to select their preferred alternative among a menu of hypothetical options (see also Alpizar et al., 2003). This type of experiment can be carried out in the context of a survey (with the help of a questionnaire), or in simulated online environments. The aim of this type of studies is to elicit individual preferences and willingness to pay for specific goods or attributes – usually for those not yet available in the market or those for which no market exists.

**References**


