

Article

Nudging and other behaviourally based policies as enablers for environmental sustainability

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Abstract: Recent years have shown that traditional regulatory techniques alone are not effective in achieving behaviour change in important fields such as environmental sustainability. Governments all over the world have been progressively including behaviourally informed considerations in policy and law making with the aim of improving the acceptance and impact of sustainability-oriented measures. This led to the arrival of alternative regulatory tools, such as nudges. The effectiveness of nudges for environmental sustainability (*green nudges*) has been largely reported but the practical and ethical implications are still largely neglected by academic research. In this contribution, “nudges” are conceptually distinguished from “boosts” and their ethical briefly explained. The analysis is made at the light of the current mostly European and US American academic literature.

Keywords: consumer behavior; green nudges; boosts; sustainability; libertarian paternalism; sustainable consumption; human bias; ethics; proportionality; autonomy.

1. Introduction: The rise of nudges in the policy making toolbox

Up to the rise of Behavioural Economics, policy and legal instruments focused exclusively on deliberative choice. It was believed that the ultimate motivation of people was money so in order to direct people to comply with rules they were given economic incentives (such as subsidies), and in order to discourage people from certain behaviours they were object to economic disincentives (such as taxes, penalties, and fines).

The behavioral revolution in law and economics showed that price-based mechanisms have limitations in achieving behavioral change (Yayun and Faure s.d.). Behavioural Economics brought the insight that money sometimes has a negative effect on behaviour and that market failures may be caused by biases of individual decision-making (Frey 1998). As for the former aspect, subsidies discourage the right action, as agents fear others will perceive them as motivates by money, instead of moral values (Ariely, Bracha and Meier 2009). As for the latter point, agents can perceive money as a “green light” to misbehave, or a price they may opt to pay, leading to a reinforcement of the behaviour we intend to change (Gneezy and Rustichini 2000).

This data led policymakers to start appealing to non-monetary incentives, which showed that humans display a tendency to inertia and procrastination, are very sensitive

to how information is framed and to the reputational damage that comes from not following social norms, and that they do not handle well probabilities (Alemanno and Sibony 2015).

Behavioural science is currently used or considered for use as a policy tool in the UN and in most of the 35 member countries of the OECD (Hertwig and Grüne-Yanoff 2017). Since 2010, the governments of The Netherlands, France, the United Kingdom, Denmark, Finland, the United States, Australia, New Zealand, Canada, Japan, Indonesia, India, Qatar, Saudi Arabia, and Singapore have set up national behavioural insights entities. In 2015 the World Bank launched GINI, the Global Insights Initiative, a team which incorporates behavioural and social insights into the World Bank Group and, in 2020, the World Health Organisation created a Behavioural Insights Unit (Thaler and Sunstein 2021).

These recent developments show the importance that insights from behavioural sciences have in assisting policymakers increase the efficiency of their directives.

2. The use of green nudges by EU policymakers

The use of behaviour insights has been particularly noteworthy in the field of environmental protection.

Private consumption is responsible for more than a quarter of all greenhouse gas emissions (Thorun et al 2017), so the change in consumption patterns has a significant potential for help fighting climate change and achieve environmental sustainability. Nevertheless, the use of behaviourally based approaches was not used parallelly to more traditional regulatory instruments until recent times.

Environmental regulation typically comprises a large set of regulatory techniques that range, among others, from command-and-control instruments relying upon criminal and administrative enforcement, market-related mechanisms such as environmental taxation, subsidies, tradable allowances and deposit schemes, participatory-based regulation, and self-regulatory schemes (Feldman and Perez 2009). It has long been thought these methods, sometimes named “anti-nudges” (Sunstein 2009), were the best way to reduce environmental harm (Vankatachalam 2008).

However, empirical studies have shown that traditional methods are partially ineffective (Sunstein and Reisch 2014) to pursue environmental protection. Conversely, other studies (Bruns et al 2018, Schubert 2017, Dworkin 2016) have shown the efficacy of “nudge-like” instruments, which comprise incentives that work based on information disclosure, warnings, uses of social norms and default rules (Sunstein 2021). Even though must be still studied and learned about when and how nudges work (Osman and Baddeley 2019), nudges have been proved to be efficient in altering people’s behaviours (Thaler and Sunstein 2021) particularly as far as waste management and resource efficiency are concerned (Nielsen 2016) and they allegedly generate less resistance from the target citizens than traditional regulation (UK Cabinet Office s.d.).

Green nudges have been used in several countries (OECD 2017; Schubert 2017) and also at the European Union level.

In the EU Green Agenda, a set of EU policy initiatives for achieving climate neutrality by 2050, consumer behaviour change is placed high. The EU Green Deal intends to reach

climate neutrality through the implementation of carbon pricing (a traditional, monetary incentive), and consumer empowerment to make sustainable choices for themselves and the environment. The access to reliable information on product repairability and durability, which may or not be behaviourally informed, is one of the measures aimed at empowering consumers.

At a more global level, the 2030 Agenda for Sustainable Development aims at reaching very ambitious goals in less than a decade, so there is a pressing need of maximising outcomes (United Nations 2017).

The reason why policymakers are turning to nudges lies in their strength for changing human behaviour, which will be explained in the subsequent section.

3. Nudge

3.1 Definition and typology

In their seminal work on nudging, Richard Thaler and Cass Sunstein defined “nudge” as “any aspect of the choice architecture”, “that alters people’s behaviour in a predictable way without forbidding any options or significantly changing their economic incentives” (Thaler and Sunstein 2021). This is a relatively broad definition, which has been coined in the first edition of “Nudge” and kept throughout the subsequent papers and books of its authors, including the “final version” of the Nudge book, dated of August 2021.

When deconstructed, the definition of nudge seems to imply four main aspects of nudge:

1. a change to the choice architecture;
2. the change to a behaviour;
3. an undisturbed choice set and
4. the absence of monetary incentives.

As for the first requirement, choice architecture may be defined as the context where agents take decisions (Tor 2016). Nudges provide for a change of this context according to insights of behavioural sciences to – second requirement – induce behavioural change. The third requirement consists of one of the *raison d'être* for which its founders and supporters swear for (Thaler & Sunstein 2021). Nudges imply both that no options are forbidden and that none of these are imposed (Sunstein 2009). Finally, nudges do not involve monetary incentives (Reijula and Hertwig 2020). If a store offers a discount in case shoppers buy earth-friendly products, this measure is a pure economic incentive and cannot be considered a nudge. For example, the conception of the deposit for plastic bottles has been a behaviourally based measure, which rightly considered that consumers are affected by loss aversion and are thus inclined to cooperate in the recycling of these bottles. However, because it does involve a monetary incentive for consumers (the return of the fee that they had paid for the bottle upon purchase of the good), the measure cannot be considered a nudge.

Several typologies of nudges can be found in the academic literature.

According to a classification (Di Porto and Rangone 2015) there are three categories of nudges: default rules, smart information nudging and exploiting/neutralising emotional responses. Default rules, i.e., the options that prevail when people do not engage in active choice (Sunstein and Reisch 2014), are highly effective. They exploit inertia,

implicitly create an endorsement of a given choice and, whenever potential gains or losses of making a choice are unclear to deciding agents, make the default's acceptance, almost invariably, the preferred option. Smart information nudges use knowledge about framing, salience, and social influence to provide data to consumers in a "relational" way (the "tell people what you are doing" strategy). Experiments with energy use where individual use between neighbours is compared and disclosed, and others that demonstrate that people recycle more and better when their recycled bins receive "golden stars", show the importance that consumers give to social recognition and reputation. Finally, another subset of nudges seeks to exploit, often in an undisclosed manner, the emotional responses of individuals. They co-opt the decision maker's cognitive processes, taking advantage of some pattern of irrationality (Bovens 2009) to rearrange preferences (Hertwig and Grüne-Yanoff 2017).

3.2 Libertarian paternalism and ethical objections

The authors of nudge claim that at the heart of nudging is a philosophy entitled "libertarian paternalism" (Thaler and Sunstein 2021). On the one hand, the nudge is paternalistic, as it stimulates choices that are perceived as welfare enhancing for the individual; on the other hand, the nudge is libertarian, because according to its supporters it is a "relatively weak" and "nonintrusive" type of paternalism (Thaler and Sunstein 2021): the agent remains free to decide on the course of action they ultimately will take (Cserne 2015).

Libertarian paternalism has been object of wide criticism (Thaler and Sunstein 2021). It has been famously classified of "oxymoron" (Mitchell 2004; cp. Sunstein and Thaler 2003) and accused of infringing the "autonomy-freedom" of the individual (Guala and Mittone 2015), as opposed to the "option-freedom" that it would respect (cp. Cserne 2015) by leaving the choice set of the deciding agent essentially unchanged (Hertwig and Grüne-Yanoff 2017, Nielsen et al 2016, Oliver 2015, van Aaken 2015). Additionally, by stating that libertarian paternalism is at the heart of nudges, Thaler and Sunstein seem to imply that nudges are always paternalistic. This is, however, not the case, even in the view of the authors themselves, who include several examples of socially oriented nudges, namely towards environmental protection (Thaler and Sunstein 2021).

4. Boost

4.1 Definition and distinction from nudge

Behavioural science is mainly associated with nudges (Oliver 2015), but there is another broad category of policies or interventions that, based on psychological insights (Schubert 2015a), structure choices in such a way that people are more prone to make a choice that is either in their interest or in a third party's interest (Bovens 2009). That is the case of "boosts" (Hertwig and Grüne-Yanoff 2017).

Nudges and boosts are both based on empirical evidence of substantial and diffused cognitive and behavioural limitations (Di Porto and Rangone 2015) and they both aim at modifying individual's behaviour. Neither implies a financial incentive, and both claim leaving freedom of choice untouched and being cheaper as compared to more traditional instruments.

They differ in the target of the intervention and the causal pathways taken to prompt behaviour change. On the one hand, nudges are cognitive-based regulatory strategies meant to exploit, often in an undisclosed manner, the emotional responses of individuals. They co-opt the decision maker's cognitive processes, so they target behaviour directly taking advantage of some pattern of irrationality (Bovens 2009) to rearrange preferences (Hertwig and Grüne-Yanoff 2017). On the other hand, boosts are rational-based regulatory strategies meant to enhance people's capacity to manage emotional responses by overcoming biased thinking and non-deliberative choice (Jolls and Sunstein 2005), as well as to adopt deliberately conscious and considerate decisions. Thereby, while nudge strategies are deemed as bias-preserving, boosts are considered de-biasing techniques (Di Porto and Rangone 2015, cp. Jung and Mellers 2016), aimed at improving people's competence to exercise their agency (Hertwig and Grüne-Yanoff 2017).

4.2 Taxonomy

Legal scholars provide for different classifications of boosts.

Hertwig & Grüne-Yanoff, for example, subdivide them according to: the competence to be boosted and to the target audience. As for the former, they can be further sub-classified into risk literacy boosts (that establish or foster competence to understand statistical information), uncertainty management boosts (that establish or foster procedural rules for making good decisions, predictions and assessments under uncertain conditions with the help of simple actuarial inferential methods, simple rules of collective intelligence, fast and frugal decision trees, simple heuristics and procedural routines) and motivational boosts (that foster the competence to autonomously adjust ones motivation, cognitive and self-control). As for the latter, boosts can affect the population at large or a subset thereof, people up to or after a certain age, etc. (Hertwig and Grüne-Yanoff 2017).

Di Porto and Rangone (Di Porto and Rangone 2015) distinguish between five types of boosts (*rectius*, in their expression "empowerment" techniques): simplification of information, framing of information and priming (Reijula and Hertwig 2020), targeted education, simplification of choices and overcoming emotional responses.

Simplification of information may be done through reducing information and selecting the "really informative" one (i.e., the data that would lead to a behaviour change); attention is a scarce resource and information overload might consume it. Due to the framing effect bias, the perception of the desirability of an option by individuals can change by the way the information is presented or framed (Feldman 2018). In the context of household appliance labelling "relative information" like scales, particularly when combined with colours is more intuitive and effective in facilitating choice about energy efficient products than information presented in technical or statistical format. Traditional information disclosure has proven insufficient to change one's habits so targeted education not only provides information but also educates individuals how to better process it.

Another boost consists of the simplification of choices, which can be done, for example, through "pro-choice" web applications required by impartial, public authorities to the private sector. This tool may prove effective in overcoming inertia and status quo biases, and in that measure increase the consumer's ability to make good choices. We can

expect Big Data to considerably widen the realm of applications in this domain soon (Schubert 2015a).

Yet another boost is to overcome emotional responses. The contractual “cooling off period” is one example of an externally implemented method. This strategy is intended to help people make considered choices and overcome emotional responses, based on a waiting period being imposed by the regulator before a final decision is made.

Most of these boosts can also be self-deployed. They are named “notes to self”, “self-nudges” (Reijula and Hertwig 2020) or “sophisticated choice” (Bovens 2009). Self-boots are (self-)paternalistic and empowering interventions that enable people to design and structure their own decision environments – that is, to act as citizen choice architects (Reijula and Hertwig 2020). Take the example of someone reducing the cow meat they consume to avoid contributing to greenhouse emissions. This person may decide to hang a picture depicting global warming in a fridge magnet together with the groceries store list, to discourage them from buying such meat (Moskin 2019), thereby using the biases of framing and priming to reinforce their self-control.

5. Classifying both nudges and boosts

5.1 Based upon the affected cognitive system

As it is well described in the best-selling book by Nobel in Economics laureate Daniel Kahneman (Kahneman 2011), people use two cognitive systems for collecting information and for making decisions: system 1 (automatic system), a quicker, intuitive, and more impulsive/emotional system; and system 2 (effortful system), a slower, non-emotional, rule-governed system, which demands more reflection (Hertwig and Grüne Yanoff 2017) and is therefore less relied upon in daily life for collecting information and making decisions.

The impact of the existence of these two systems in decision-making is that people quite commonly act as irrational agents, who take decisions while under influence of several cognitive and psychological biases (Busch 2016). So, instead of deciding rationally when given correct and sufficient information, as the “Econs” – a reference to *homo economicus* (Schubert 2015a) that Thaler and Sunstein mention in their “Nudge” best-seller book (Thaler and Sunstein 2021) – would, people are constrained by limitations of information and/or attention, cognitive capacity, and self-control (Hertwig and Grüne-Yanoff 2017, Cserne 2015).

Attempts to change behaviour can thus harness system 1 or foster system 2 routes. As has been referred, nudging predominantly takes the former approach (Hertwig and Grüne-Yanoff 2017), where boosts take the latter.

5.2 Based upon their paternalistic or welfarist goal

Paternalism has been defined as “the interference of a State or an individual with another person, against their will, and defended or motivated by a claim that the person interfered with will be better off or protected from harm” (Dworkin 2010).

Indeed, based on cognitive limits and biases, people tend to take decisions which do not serve their welfare (Baldwin 2014) or that of society. In the first case, we are before paternalistic “nudges”; in the second case, we are before non-paternalistic “nudges”.

Paternalistic “nudges” promote individuals’ well-being, while non-paternalistic “nudges” advance social goals, reducing third party externalities. Regarding non-paternalistic nudges, where some may consider that making allocative choices between the rights of ones and others is a core prerogative of states and thus needs no special justification (van Aaken 2015), an analysis of the legal impact of non-paternalistic “nudges” is required.

Some “nudges” may advance both individual and social welfare. As long as their primary target is social welfare, they shall be classified as non-paternalistic. For example, energy-saving nudges are not primarily paternalistic since they ultimately target protecting the environment and energy saving and not the consumer’s purse (van Aaken 2015). They should thus be considered non-paternalistic “nudges”.

5.3 *Based upon the agent*

“Nudges” can be developed and/or implemented by any actors, namely companies, NGOs, public entities, individuals, and ourselves.

All of them might be involved with both paternalistic and non-paternalistic “nudges”, the later involving also purely egotistical “nudges”, such as in the typical case of marketing industry “nudges”.

6. **Typology of green “nudges”**

A variety of nudges are given in the literature and some of which “lack consistency” (Hausman and Welch 2010).

As mentioned before, even though one can justify green nudges also on paternalistic grounds (save money with renewable energy or with more minimalistic consumption patterns), they shall be deemed non-paternalistic nudges (Schubert 2017).

An interesting and distinctive element of green nudges as compared to other non-paternalistic nudges is the fact that we can reasonably argue they are aimed at promoting the welfare of the current society, but also of future generations (Hage 2019). There are different typologies, but we consider below the one proposed by Schubert.

6.1 *Nudges that appeal to people’s self-image or self-identity*

By appealing to people’s self-image or self-identity as “pro-environmental consumers” people can be nudged into adopting environmentally benign behaviours.

This can be done either by: simplifying the way the information on a product’s characteristics is provided; increasing the salience of certain features, thereby making consumers more aware of them (for example, through eco-labels) or by harnessing people’s private sense of ‘social identity’. A good example of a nudge of this type was one which took place in the U.S.: the slogan “Don’t mess with Texas”, part of a social advertising campaign initiated in the 80s for reducing litter in highways that appealed to the sense of community of this US American state (Schubert 2017).

6.2 *Nudges that appeal to social conformism*

These nudges take advantage of people’s inclination to imitate the behaviour of their peers (‘follow the herd’ tendency). These nudges sometimes convey certain norms

through peer comparison. A study by Goldstein and others (Goldstein et al 2008b) showed that placing a note into the bathroom of a given hotel indicating the overall percentage of clients who reuse their towels ('Join your fellow guests in helping to save the environment') could increase rates of towels reuse in almost 10%.

Other nudges of this kind work by stimulating social status competition through, for example encouraging consumers to signal green behaviour to others (Schubert 2017). An example of these nudges is a program implemented in the UK which rewarded citizens in a community that would recycle more with golden stars, that would be placed in their rubbish bins. The study concluded that neighbours increase their recycling levels following that program.

6.3 Nudges involving the modification of defaults

Pro-environmental behaviour can be fostered by carefully setting the default (UK Cabinet Office s.d., Sunstein and Reisch 2014). Setting defaults (Pichert and Katsikopoulos, 2008), green defaults, has shown to be a particularly effective nudge (Sunstein 2021, Schubert 2017) because it seizes two biases: the power of inertia and that of suggestion. As for inertia, if, for example, people are automatically enrolled in green energy they are likely not to opt out (Sunstein 2021) because doing so would require the engagement of system 2. As for suggestion, default rules contain an informational signal which may motivate consumers to follow it (Sunstein 2021). An empirical study shows, for example, that consumers were more willing to pay for measures that compensate for the impact in their own consumption of CO₂ emissions if the default option was the opt-out (Araña and Léon 2013).

7. Ethical and practical problems of nudging and boosting

7.1 Impact on autonomy

7.1.1 Demand for transparency

Nudges and boosts are regulatory instruments that are expected to be legitimate and effective. However, a few reported consequences have been generating resistance to these tools, in other words, "nudge scepticism" (Cserne 2015). Such scepticism derives particularly from the fact that nudges are said to have a detrimental impact in the autonomy of those being nudged (Grüne-Yanoff and Hertwig 2015, Hausman and Welch 2010). Because nudges exploit cognitive limitations or biases, they shape behaviour in ways other than rational persuasion (Hausman and Welch 2010) that are not always transparent to the chooser (Reijula and Hertwig 2020).

Nudges are supposed to work in a transparent manner (Thaler and Sunstein 2021), but it is traditionally argued that the disclosure of the practice of nudging that transparency towards agents would require – and that would consist in informing consumers about the non-conscious processes by which the nudge intervention works –, would affect their effectiveness as they "typically work better in the dark" (Reisch, Sunstein and Gwozdz 2017, Bovens 2010).

Recent studies (e.g. Bruns, Kantorowicz-Reznichenko, Klement and Rahali 2018) have been showing that when made transparent they are still found to be acceptable by

the agents whose behaviour is being changed (Bruns, Kantorowicz-Reznichenko, Klement and Rahali, 2018, cp. Jung and Mellers 2016), even though surveys show some preference for nudges that affect system 2 rather than system 1.

Regarding specifically green “nudges”, a meta-study prepared for the European Commission concluded that direct appeals to consumers that explicitly mention the environment are relatively ineffective and should therefore be avoided when designing green nudges (Schubert 2017).

The lack of transparency (Cserne 2015) raises one main concern: the fact the nudge is not being disclosed to the nudgee bypasses its reflective or deliberative processes and can be seen to undermine autonomy (Reijula and Hertwig 2020). Nudging, in particular paternalistic nudging, faces a lot of objections within this domain, such as the violation of consumer sovereignty and the condescendence that comes with it (Schubert 2017).

7.1.2 Doctrinal spectrum of autonomy

There seems to be a spectrum as far as the importance of autonomy is concerned. On the one hand of the spectrum, we have those who minimise the detrimental effects of behaviourally informed interventions on autonomy, sometimes even arguing that these contribute positively to it. On the other hand of the spectrum, we have those who consider autonomy an absolute value.

Autonomy is a quintessential domain of liberal thinking, that Stuart Mill stressed in his pioneer work “on liberty” and according to which individuals have the authority “to demand, within certain limits, that they be allowed to make their own choices for themselves”.

In line with this harder approach to autonomy, contemporary authors Hausman and Welch and Bovens demand a level of self-knowledge or self-transparency on the part of the individual that “cannot be found in a behavioral world” (Hausman and Welch 2010, Bovens 2009). There are, however, more nuanced approaches. Buss argues that either acting in accordance with one’s character or else in accordance with conditions of ‘minimal human flourishing’, objectively defined, makes an individual act autonomously (Buss 2012). Some other authors consider that nudges have several degrees and that only nudges of a certain degree would affect the autonomy of the consumer (Baldwin 2014). That is the case of Baldwin.

In the framework he proposes, there are three degrees of impact in the autonomy of the “nudgee”, that raise different, and identifiable, concerns, some of which can be responded to in positive terms (Baldwin 2014). “First degree nudges” respect the decision-making autonomy of the individual and enhance reflective decision-making. Typical first-degree nudges involve the supply of simple information to individuals or the imparting of reminders (such as ‘there are three weeks left to complete your tax return.’). Such nudges can be distinguished from “second degree nudges” and “third degree nudges”. A “second degree nudge” typically builds on behavioural or volitional limitations to bias a decision in the desired direction. Finally, a “third degree nudge” offers a yet more serious intrusion on autonomy because it involves behavioural manipulation to an extent that other nudges do not.’ (Baldwin 2014).

On the most optimistic, less critical end of the spectrum, Sunstein, one of the creators of “nudge”, argues that autonomy is a mere “heuristic” (Sunstein 2014) and even that “nudges” promote autonomy (Sunstein 2015) because they are specifically designed to ensure that choices are informed, and “autonomy requires informed choices” (Sunstein 2015). According to this argument, nudges seek to influence people’s choices to make them better off as judged by themselves. By doing so, they improve the authenticity of a person’s behaviour and thus provide a practicable method of empowerment (Grüne-Yanoff and Hertwig 2015).

In an attempt to address criticism to “nudges” based upon their detrimental impact on autonomy, Sunstein speaks of a “thin” and a “thick” versions of autonomy. The former suggests that “freedom of choice is an ingredient of welfare” and so we must consider the impact of public interference with such freedom. (Sunstein 2012). Concerning this, on the one hand, individuals themselves might know better what is best for them than public officials; on the other hand, they might prefer to delegate some choices to them (Sunstein 2012). The thick version stresses that freedom of choice is an end in itself and thus should be overridden only for the most compelling reasons (Sunstein 2012).

7.1.3 Autonomy within self-nudging and boosts

As for self-nudging specifically, like other policy tools, it has its limitations. Self-nudges require active participation from the, simultaneously, developer and recipient of the nudge. Additionally, it is still unclear how can efficient self-nudging interventions be designed. Nevertheless, because people are educated to nudge themselves, self-nudging does not give rise to concerns about individual autonomy. Making one’s own mistakes and learning from them may play an important role in personal growth (Rebonato 2012) but self-nudging can even be understood as enhancing rather than undermining autonomy (Reijula and Hertwig 2020).

As for boosts, because they do not explore cognitive limitations or biases, they also do not seem to raise concerns about individual autonomy.

Boosts require the individual’s active cooperation. They therefore need to be explicit, visible, and transparent. This leads to the fact that boosts are more respectful of autonomy than nudges (Hertwig and Grüne-Yanoff 2017, Sunstein 2015). Indeed, boosts have the goal of preserving personal agency and enable individuals to exercise that agency. Thus, if people endorse the objectives of a boost, they can choose to adopt it; otherwise, they can reject it (Hertwig and Grüne-Yanoff 2017).

Some interventions such as “cooling off periods” and “mandated choice” merely counteract foibles in decision-making without in any way pushing individuals to choose one alternative rather than another. In this way, shaping apparently enhances rather than threatens an individual’s ability to choose rationally. Allowing people voluntarily to place themselves on a list that bans them from casinos shifts the decision about whether to gamble to a moment when temptation is weaker and thereby shapes the choice that results, but it does not threaten people’s control over their own choices” (Hausman and Welch 2010).

7.2 Reversibility and sustainability

Concerns about autonomy are amplified by related worries about reversibility. One defining condition of a nudge is that its effects must be easy for the targeted individual to reverse. Reversibility in principle, however, is not the same as reversibility in practice. Self-nudges escape this reversibility–effectivity dilemma to a large extent, as even self-nudges that are difficult to reverse do not involve the power asymmetry characteristic of nudges in which an assumedly naive chooser faces a knowledgeable policymaker. (Reijula and Hertwig 2020). Boosts do not explore system 1 and thus options are much more real and approachable.

The choice architecture approach neglects the behavioural implications for long-term perceptions and sustainability of policy" (Feldman and Lobel 2015).

Nudges are, by design, local solutions restricted to particular choice settings and thus hardly scalable (Feldman and Lobel 2015). Consequently, policymakers are typically only able to influence *public* choice contexts by nudging. In private, individuals' self-control may be weakened (Reijula and Hertwig 2020), which makes some authors argue that when the values we aim to protect are as important as health or the environment, harder tools might need to be used. For example, Stern and others (Stern, Kietz, Gardner and Gilligan 2010) compute that utility grant programs have the potential to reduce carbon emissions by 123 Mt per annum, compared to 12,7 Mt savings generated through peer comparison measures (Alcott & Mullainathan 2010).

Self-nudging brings previously inaccessible personal choice contexts into the realm of benevolent design and permits also to focus on repeated rather than one-off behaviours, which are often the target of nudging interventions (Reijula and Hertwig 2020). Repetition may lead to a steady, progressive change towards the desired behaviour. By deploying system 2, boosts are likely to lead to sustainable choice change (Hertwig 2017) by the deciding agents.

As far as sustainable behaviour is concerned, change through nudges is only effective where individuals exhibit limited mental resources (Slovic 1995, Ariely and Loewenstein 2006): they might be ineffective regards "bad people", those who know what they are doing and why. Nudges are also reported to lose effectiveness if agents feel manipulated (Rebonato 2012): fairness is a dominant factor in human motivation (Feldman 2018).

As for boosts, sustainable behaviour can only be reached if people (Feldman 2018) are motivated to comply with "change for good" (their own or that of society as a whole). People's willingness to engage in social enforcement depends on their moral profile and the perception of efficiency of the regulatory instrument use (Feldman and Perez 2009). As for the first, it is those who see themselves as "good people", individuals that are naturally inclined to pro-social behaviour due namely to genuine empathy-altruism (Batsch 1987), or by egotistical motivations (Cialdini 1991) that should have the attention of *ex ante* both traditional and non-traditional, behaviour-based legal intervention (Feldman 2018).

From the perspective of behavioural economics (different from behavioural morals) this is not relevant, as in both cases they are propense to the same goal.

These are, in a classification by Feldman, both the "authentic good people", the "erroneous wrongdoers" (Feldman 2018) who unknowingly understand reality in a biased

way and thereby behave in an undesired way, and “situational wrongdoers” who use various justifications to justify sporadic bad actions to avoid feeling immoral (Feldman 2018). “Calculative wrongdoers” should be dealt with *ex ante* with disincentives for acting and *ex post* through sanction. Behaviour intervention would here be likely to fail and/or to be considered illegitimate, for going against the will of the individual.

7.3 Impact on self-legislation

One of the claimed risks of “green nudges”, particularly if they were to be used exclusively, is that they might deprive the society of the chance to engage in self-legislation (Lepenies and Malecka 2015) or self-command (Bovens 2009), meaning the control a social collective has over its evaluation, deliberation, and choice of social institutions.

Indeed, some claim that nudges can lead to “corrosion and ultimately corruption of public life” (Furedi 2011) to “long-term infantilisation” (Sunstein 2012, Bovens 2009), a situation where people become incapable of being master of their fates and make changes in their agency to compensate for the intention/action gap.

Irrespectively from how well-intentioned government efforts to shape choices may be, there is a real concern with the risk that exploiting decision-making foibles will ultimately diminish people’s autonomous decision-making capacities (Hausman and Welch 2010). In such measure, it has been considered that a constitutional framework should be agreed upon, that monitors the way policymakers and bureaucrats use nudges in general and green nudges in particular (Schubert 2014, Schnellenbach 2016).

7.4 Fairness of green nudges

This argument respects the political feasibility of implementing these tools. This analysis shall be bipartite.

First, we must ask ourselves to what extent nudges redistribute either well-being or freedom among the heterogeneous population exposed to its effects (Schubert 2017). Some authors (Lehner, Mont and Heiskanen 2016) argue that “it is democratically worrying to use nudging to influence the behavior of those not able to identify it (and thus avoid it) escape the costs while benefitting from the gains” (Schubert 2017, Engel and Kurschilgen 2020).

Second, green nudges may give rise to a problem with the way that the roots of society’s problems are perceived. The widespread implementation of these nudges could lead to a culture where the mindsets of individuals take the blame for all society’s ill (Schubert 2017). Green nudges thus risk promoting an individualistic approach that overlooks the deeper socio-cultural roots of the environmental problems that are to be addressed (Schubert 2017).

7.6 Preference identification

A necessary condition for a nudge to be successful (not just harmless) is that the policymaker knows what makes choosers better off, namely by their own standards. In the impossibility of the policymaker obtaining reliable information about the chooser’s true preferences, it is not safe to assume that policymakers know them (Guala and Mittone 2015, Schubert 2017) and/or know to adequately process them: public officials

developing these interventions are, like the objects of these measures, traditionally prone to biases and heuristics (Cserne 2015). This is particularly so when the targeted population of choosers has heterogeneous preferences (Grüne-Yanoff and Hertwig, 2015), as short-term impulsive desires compete with long-term goals (Reijula and Hertwig 2020), preferences that are inconsistent (Sugden 2008, Angner 2016, Schubert and Cordes 2013, Schubert 2015b) over time, incoherent or incomplete (Schubert 2017) or when the behaviour that is to be changed is the result of collective processes and policies (Furedi 2011): it is argued that the way individuals answer to nudges depends on the cultural, economic, social, institutional context of the agent and that they can easily “counter-nudge” (Baldwin 2014). This argument seems to be less relevant regarding non-paternalistic nudges. When citizens adopt environmentally malign behaviours, they are inflicting damages on others, so their judgements about their welfare are not complete (Sunstein 2009). Additionally, the choice-architectural default norms seem to be detrimental to the environment.

It is unknown how self-nudging could help to tackle the problem of preference identification: how (and when) does a person know what they ultimately want or need? Behavioural science research suggests some methods for clarifying one’s goals, but self-nudge can be perfectly neutral with respect to the internal process of bargaining between conflicting desires. As for boosts, they would usually present the same problems as nudges in this context.

3. Discussion and conclusions

The considerations mentioned above lead us to conclude this paper with the following three theses:

1. Ensuring transparency is of ultimate importance to ensure that nudges are legitimate, a key step any behaviourally informed environmental policy should make in the future to make green nudges ethical, even when doing so undercuts their effectiveness. We suggest implementing the criterion of “token transparency”, proposed by Bovens (Bovens 2009): nudges should only be deemed ethically legitimate to the extent that they are devised in a way that it’s possible, in principle, for everyone who is watchful to “unmask the manipulation”. This would protect individuals who wish to resist the nudge and keep government in check.
2. As for boosts, the moral predisposition of individuals should be considered before such (often expensive) tools are deployed, as for only individuals that are not immoral these can be effective.
3. We follow the academic stream (Dietz, Gardner, Giligan, Stern and Vandenbergh 2009, Ferraro and Miranda 2013, Lehner, Mont and Heiskanen 2016) in considering that green nudges should be seen in principle as complements, rather than substitutes, for traditional incentive-based measures, aiding the regulator in expanding the regulatory toolbox through collaborative regulation (Feldman 2018). The choice of a regulatory strategy should rather be done on a case-by-case basis and boosting should ideally precede nudging.

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