USING BEHAVIOURAL INSIGHTS TO REDUCE LITTERING IN THE UK

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Introduction

It is easy to imagine a world inhabited by rational people, who act in a way that serves the common good, whose preferences are stable and whose decisions are based on pure logic. But this is not the world we live in. People are guided by emotions and beliefs; their preferences depend greatly on decision context and arbitrary cues; they have weak wills and put too much weight on present gratification. These all too human characteristics result in problems such as obesity, debt, global warming and littering. These issues are also at the heart of behavioural science, a field of social science that aims to understand how people make decisions and to develop behavioural change tools, to help people and societies achieve long-term, pro-social and pro-environmental goals. In this report we draw on such behavioural insights and apply them to the problem of littering.

We begin the report by describing the problem of littering, as an example of a widely-known commons dilemma, and outline solutions to overcome such dilemmas. In the second part of the report, we suggest interventions, approaches and nudges, based on behavioural science research and theory, which can be used to change the behaviour and attitudes of litterers in the UK.

This report was written for Clean Up Britain – a group of people who grew tired of seeing litter on the streets and decided to do something about it. Yet we encourage everyone to use the insights and recommendations from the report to help clean up the country, one nudge at a time.

Why Tackle Litter?

Litter, apart from being aesthetically unappealing, has direct financial, environmental and health consequences, to individuals, organisations and societies alike. The annual cost of picking up litter across the UK is close to £1 billion (Keep Britain Tidy, 2014), an amount which would be much higher if one were to clean up the country entirely, and which underestimates social and ecological costs.

Recently, countries have been shifting from assessing the prosperity of their nations in financial terms only to incorporating measures of national well-being – on which litter has a negative impact as well. Eighty-one percent of British people say that seeing litter on the streets makes them frustrated and angry (Populus, 2015). More generally, spending time in places that appear uncared for may result in damage to community spirit, well-being and health, while appealing landscapes increase positive emotions and encourage physical activity and social integration (Abraham, Sommerhalder & Abel, 2010; Humpel, Owen, & Leslie, 2002). We can therefore expect that the more littered the environment, the lower well-being will be, especially if litter is a permanent part of the surrounding.

Litter is, at the same time, a financial burden on corporations whose litter is being dropped. Many organisations do not consider themselves responsible for social issues unless they can directly link their CSR activities to profit. In the case of litter, many organisations put all liability on consumers, undermining their own role on its production (see Meikle, 2009, for example). Yet, as a study conducted at Bradford University showed, companies should expect to see impact of litter on brand image, sales and revenues. Specifically, seeing branded litter significantly lowered attitudes towards a brand and consumers' intention to buy products of the brand. Research participants who saw litter around the studied location were willing to pay 4p less for a product than those who did not see litter (£1.92 and £1.96, respectively). This decrease could mean a 2% drop in yearly turnover of a company (and potentially an even higher drop in profit) – a significant amount for most companies in the fast-food industry (Roper & Parker, 2013).

Finally, we can't forget the natural environment itself. A part of litter ends up in seas and oceans and is then re-distributed and trapped by currents so that is ends up in floating gyres. The biggest of these gyres – the Great Pacific Garbage Patch – covers a region three times the size of the UK, with some of the areas containing as much as 200,000 pieces of litter per square kilometre (Law, et al., 2010). To give a better idea of what this amount means – a recent analysis estimated that, by 2050, plastic will outweigh fish in oceans (Williams, 2016). The immediate threat to marine animals is straightforward – they get tangled in the litter, ingest it, can suffocate on it; all this while the plastics decomposes in the salty water, polluting it and creating further problems, including becoming a global hazard to shipping and fishing industries (Gregory, 2009; Laist, 1987; Roper & Parker, 2013) and a potential threat to human health (Seltenrich, 2015).

Littering and Other Commons Dilemmas

If littering has so many negative consequences, why do people do it in the first place? The decision to litter is a classic *commons dilemma*. The first key feature of a commons dilemma is that there is a shared resource, such as a park or streets, which people can choose to maintain, at a cost, or exploit. Because putting litter in a bin is costly in time and effort, unless one is highly civic minded, the cost will exceed the benefit and people will choose to litter. The second characteristic of a commons dilemma is that the individual effects of exploitation are small and so people will typically choose to exploit the resource. If a typical litterer drops just a few, usually small, pieces of litter in a day, the impact may not even be noticeable to that person. The problem arises when these small pieces add up; but people don't appreciate the effect of these small increments on the overall outcome. Just like few people understand the effect of compound interest rates on their retirement savings, few acknowledge that throwing out small pieces of litter adds up to piles of litter lying on the streets at a later time. In other words, in commons dilemmas individual and collective interests are at odds: each individual is better off littering than not, even if society is worse off if people litter. Robert Frank (2010) calls this "smart for one, but dumb for all".

There is no single solution to common's dilemmas. The "classic solution" is based on property rights – people don't want to litter in their own gardens. But most of the littering is done in "other people's gardens" and so the personal benefit (not having to carry litter around) exceeds the cost of littering (an unsightly environment that one will probably never see). However, as experience shows, sometimes public goods problems can be successfully overcome without the need to assign property rights. A recent example is dog owners picking up after their pets. In a relatively short period of time, the public perception and expectations have changed enough so that nowadays most dog owners clean up streets and lawns after their pets, even when they know no one can see them. This change can be traced back to "pooper scooper" law (officially known as the Canine Waste Law) passed in New York City in 1978, imposing a $50 fine on dog owners who don't clean up after their pets. As Dubner and Levitt (2005) point

out, however, due to limited enforcement, a simple law introduction wouldn't be as effective if it wasn't supported by *social* incentives – the hard glares of passers-bys and the offenders' feelings of guilt (e.g., Grasmick, Bursik & Kinsey, 1991). We can therefore hope that, with proper effort and engagement of public and private sectors, of policy-makers and citizens concerned about their environment, similar effects can be attained in the domain of littering.

The *What* of Solving Commons Dilemmas

If littering is a pure commons dilemma and arises simply from an unfavourable cost-benefit analysis, there are two approaches to reducing littering:

1. Reduce the *perceived* ratio of costs between not littering and littering, i.e. make it easier to use a bin, or harder not to.
2. Increase the *perceived* ratio of benefits between not littering and littering, i.e. reward not littering and/or charge for littering.

The word "perceived" is important. Because of limited cognitive resources, impulsivity and the influence of emotions, people don't always do careful cost-benefit analyses when deciding. They often choose based on personal rules, norms or arbitrary clues that come from the situation context. Consequently, minor alterations in choice design can result in significant changes in behaviour and can help solve the commons dilemma.

Situation context.

People are often influenced by small changes to the environment, even ones that appear innocuous. One of the main lines of *nudge* proposed by Thaler and Sunstein (2008) involves changes to the physical environment, designed to bring behaviour in line with personal or social goals. It is no coincidence, for example, that supermarkets place high profit items in highly noticeable and easy to reach places on their shelves. These, often minor, alterations to the way the environment is arranged, result in significant behavioural changes. In fact, nudging is so effective that it became a widely used method by policy-makers to promote social change (e.g. Behavioural Insights

Team, 2015; Martin, Goldstein & Cialdini, 2014; Thaler & Sunstein, 2014). It is therefore important to assess and address the impact and role the physical environment – such as the availability and accessibility of litter bins – have on littering behaviour.

Social context.

The other key component of decision-making is *social context*. Just as the physical environment influences what we do, what those around us do, or even the mere perception of what is expected or appreciated, can have a great impact on our choices.

Social proof.

The term *social proof* is used to refer to the fact that people infer what they should do from what others do (Kallgren, Reno & Cialdini, 2000). In short, rather than conducting careful cost-benefit analyses, people follow the crowd. If you see lots of people littering, you will often be more inclined to do so yourself, because what you have observed makes littering more normal.

One way social proof manifests itself is through observing the results of past behaviour. If there is a lot of litter on the ground it means that littering is a normal and accepted behaviour. Therefore, environments that are clean will nudge people to use bins, whereas environments that are unclean will nudge them to litter more (Dur & Vollaard, 2013; Finnie, 1973; Geller, Witmer, & Tuso, 1977; Krauss, Freedman, & Whitcup, 1978; Reiter & Samfuel, 1980). Cialdini, Reno and Kallgren (1990) conducted a series of studies in which they explored the role of social norms on littering behaviour. Among other things, they confirmed the importance of clean environment in promoting anti-littering behaviour. As long as there were just one or two pieces of litter in an area, most people did not litter (78% and 90% of people, respectively, used bins). However, as soon as there were three of more pieces visible, the number of litterers increased to 41%.

The importance of removing any signs of vandalism was described by Wilson and Kelling (1982) in the *broken windows theory*, later verified in research by Keizer,

Lindenberg and Steg (2008). The study showed that as certain norm-violating behaviours became more common, they negatively influenced conformity to other norms and rules. Put simply, not only does littering encourage more littering, but it also influences other anti-social behaviours, such as painting graffiti or trespassing.

Many of the heaviest litterers are teenagers, who, on the one hand, want to express their independence and nonconformity; and on the other hand have a strong need of belonging and being a part of a group. In this context, social proof can work on a cultural level, as a mechanism of building in-group identity. By littering, young people can express their disregard for rules while, at the same time, building an *us-vs-them* identity, clearly separating themselves from the rest of the society ("the majority", grown-ups, the government, etc.).

Other social factors.

Robert Cialdini, an authority in social influence, distinguishes two additional social factors that encourage (non)compliance: *liking* and *authority* (Cialdini, 2009). People like to say "yes" to those they like. Interestingly, this behavioural mechanism is so strong that it tends to work even when people don't necessarily want to agree (to do or buy something), when are aware of the fact that it's liking or friendship that pressures them to conform or when the influences (i.e. the person they like) is not physically present at the time of decision-making. We believe this force to be at play in the context of littering and to explain why (young) people litter more when together or why increasing the number of available bins doesn't seem to reduce littering when young people are in groups (The Hunting Dynasty, n.d.). Since littering is accepted, sometimes even desired, by youth, other behavioural guidelines or nudges can lose their impact when young people are out, in groups, having fun.

Luckily for the issue at hand, not all young people litter and even those who do don't spend all their time together, making space for interactions with influencers who may convey the anti-littering message. Social scientists have identified several factors that cause liking, which can be used in the design and delivery of anti-littering communication. People tend to like those who are physically attractive, similar to them,

who compliment them, are familiar to them and whom they associate with positive things (Cialdini, 2009).

Quite obviously, people also tend to listen to those who they perceive to be in charge. Cialdini argues that people have a deep-seated sense of duty to authority, that can be traced back to childhood and the influence parents and teachers had on us. The tremendous, even frightening, impact authority has on obedience has been explored by Stanley Milgram in his famous obedience experiments, showing that normal, emotionally and psychologically stable people are willing to go as far as potentially killing an innocent person, by administering high levels of electric shocks, when asked to do so by an experimenter whom they perceive to be in charge (Milgram, 1963).

Together, these two factors – authority and liking – show the importance of choosing the right person to deliver a message. We can expect that identifying the right anti-littering messengers, be it celebrities, authorities or influential friends, will drastically improve the effectiveness of communication campaign.

The *How* of Solving Commons Dilemmas

Promoting cooperation.

One way of approaching public goods problems is to look at what promotes cooperation. Based on a meta-analysis of 30 research studies, Gifford & Hine (1997) identified 14 factors that promote cooperation. Among the most influential ones were *communication* between group members, *territorialisation of resources* and *social values*. First, when group members talked to each other, cooperation dramatically increased. Communication between community members allowed for education, sharing of common values and the establishment and enforcement of policies aimed at bringing backing order.

Second, approaching the problems from a local, territorialized perspective, was helpful. When land is divided into small, distinct segments, people are more likely to feel responsible for it. At the same time, in such a divided space, public institutions can better perform their roles – collect litter, manage its disposal or implement and enforce

fines. Likewise, territorialisation can help to engage the private sector, holding business organisations responsible for the cleanliness of their premises. In summary, the smaller the communities and the lands they operate in, the easier it is to manage public goods, because it is undisputable who is responsible for what and stakeholders' commitment to keeping order can be monitored and enforced. Research actually shows that the smaller the group, the more likely it is to overcome a social dilemma. Some studies suggest that groups of less than 150 members perform best in these situations, even without law enforcement (Edney, 1981).

Finally, social values play an important role in community cooperation. Groups that share ideals, in which members are well-connected and close, are more likely to achieve common goals that go against each person's individual interest. Studies show that groups with positive interpersonal characteristics, such as a strong feeling of group identity (Dawes & Messick, 2000), similar values (Smith, Bell, & Fusco, 1988) and better interpersonal relations (Grzelak & Tyszka, 1974) are more likely to overcome social dilemmas.

Forming new paths of least resistance.

From the perspective of a self-interested individual, the best way to overcome the commons dilemma is to create a new *path of least resistance*, which guide the person towards socially desirable actions when she is reluctant to engage in mental effort and think about what should or should not be done.

This reluctance to engage in mental effort is a key feature of the human mind. Daniel Kahneman's (2011) *Thinking Fast and Slow* summarized much of what we know about decision-making by using the metaphor of two information-processing systems. System 1 is fast, impulsive, emotional and automatic. Spontaneous and intuitive decisions are the workings of System 1. System 2, on the other hand, is rational and takes into consideration long-term well-being. Yet System 2 is lazy and is often not engaged in the decision-making processes.

The laziness of System 2 is one way of explaining the discrepancy between people's explicitly held preferences and their actual behaviour. When asked about

littering, people answer using System 2 and say they disapprove of it and wouldn't do it (assuming they even admit to littering; many people may simply lie when confronted by an interviewer). Yet when in a hurry or acting spontaneously, people only engage System 1 in the decision-making process and they litter, forgetting about what *should* be done. This mechanism also helps to explain why rational arguments will often not be effective behavioural change tools: to successfully change people's behaviours, their System 1 needs to be influenced and not only, or not even necessarily, System 2. In other words, to change behaviour, a new path of least resistance needs to be created.

The first way to do this is to remove barriers of the new, desired behaviour. What these barriers are will depend on the context. It can mean dropping cigarette butts on the ground because there is no ash tray nearby; not wanting to put the butt in a bin and start a fire; or throwing a soft drink bottle on underground tracks because there are no bins at the station due to security reasons. These different contexts highlight the importance of precise problem definition.

One way of thinking of paths of least resistance to to think of them as habits that people have. And as habit formation research suggests, the only effective way to change a habit is to *replace it* with a new one (Duhiugg, 2013). Initially the new behaviour may require conscious and deliberate effort (the engagement of System 2), so a key aspect of habit change is to get people to undertake the new, desired behaviour often enough so that it becomes habitual. This can be achieved by *incentives* – monetary or otherwise.

While monetary incentives can be costly and awkward to implement on a mass scale, sometimes relatively low cost and tangible rewards can be just as rewarding. Heyman and Ariely (2004), for example, showed that people are willing to exert as much effort on a task for a chocolate candy bar as for a much higher monetary reward. Receiving a chocolate candy bar implies the person is participating in a *social market* (a market with no money, where personal relationships dominate and altruism is of importance), while receiving money frames the situation as a *monetary market*. As the study showed, monetary markets were highly sensitive to the magnitude of compensation – the higher the incentive, the more effort a person exerted. Social markets, on the other hand, were influenced by altruism, rather than reciprocity, resulting in people exerting higher effort, no matter how big the (non-monetary) payment was. Perhaps the most rewarding type of non-monetary incentives of all are

social rewards. People respond well to positive feedback from others, such as social recognition, status or praise. Social incentives are, at the same time, often cheap, making them a practical tool in behaviour change.

Finally, to effectively use incentives in creating new paths of least resistance, they need to be delivered immediately (after the desired behaviour is manifested). Learning theory tells us that when rewards are delivered immediately they are much more likely to be deeply associated with the action that preceded them. Moreover, delayed incentives are much less effective because people considerably devalue even slightly delayed benefits.

Designing interventions.

Selecting target groups.

Diffusion models of collective behaviours (e.g. Granovetter, 1978; Granovetter & Soong, 1983; Schelling, 1971) describe circumstances under which new behaviours spread. Different people have different thresholds for changing their actions as a result of new information or social pressure. Some people will freely change upon hearing a single argument in favour of a new idea or approach, whereas others won't move until presented with overwhelming arguments or until most others change. Segmentations of litterers in the UK (e.g. Beaufort Research, 2010) apply this approach to differentiating groups of litterers based on their *thresholds* and frequency of littering. On one end, there are people who litter only occasionally, when circumstances force them to do so, and who may be embarrassed or ashamed of doing so. In between are people who litter habitually, because they do not think about what they are doing. Closer to the far end are those for whom littering is a conscious decision based on cost-benefit analysis and who drop litter whenever convenient or even fly-tip; and finally there are those for whom littering is a conscious "anti-social" act.

The most high-threshold groups will require a greater amount of information and/or stronger social pressure and higher incentives to change. And even under significant social pressure, they may change their behaviour or attitudes only slightly.

Therefore, while it might be tempting to assume that "heavy users" should be the main target group of intervention, since they offer the greatest potential reduction in litter, focusing on these groups may be doomed to failure. To use smoking as an example: it is easy to imagine convincing an occasional smoker who only lights a cigarette several times a month at a party to quit smoking; it's a whole other story to get a heavy smoker who smokes two packs a day to change.

Targeting interventions and marketing campaigns at the groups with lower thresholds actually maximises the chance of reaching a *tipping point*, a change in society around those with higher thresholds that can lead to them becoming tired of being in the small minority and "tipping" into the majority. In other words, to design an effective behavioural change intervention or campaign among litterers, it is best to start with the "low hanging fruit", i.e. people who litter only occasionally and who are ready to change. With time, as these people stop littering, the heavier users will see their behaviour becoming more unacceptable and abnormal and, most importantly, will be ready to change, as their threshold for change (i.e. the minimal required number of people around them not littering and disapproving of it) will be reached as well.

Four components of intervention design.

Now that we know what promotes cooperation in communities and how behavioural change happens, we can move on to see what tools are available to design such interventions. Van Vugt (2009) names four necessary components that should be addressed in the design of effective behavioural interventions.

1. Information

People like to understand the environment they are in and to be able to predict what will happen. When unawareness or uncertainty come in to play, such as the lack of information related to the consequences of littering, people may fall victim to *optimism bias*. Instead of assuming the worst, people will tend to *under*estimate the environmental or social damage being done (Opotow & Weiss, 2000). Instead

of looking for facts, the majority will ignore the issue and assume their actions have no negative consequences. It is therefore important to provide enough information, in a clear, explicit and graphic way.

From the business and private sector points of view, information is also necessary to track changes and to evaluate the effectiveness of activities. Only by providing and requiring to gather reliable and good-quality data, is it possible to know if and how much progress in reducing littering has been made. As Lord Kelvin, the man in whose honour absolute temperatures are stated in units of kelvin said, "If you cannot measure it, you cannot improve it".

2. Institutions

The commons dilemma will be difficult to solve without the engagement of public institutions and implementing specific policies guiding and restricting anti-social behaviours. Probably the quickest and surest way to solve a public goods problem is to make the behaviour illegal. Of course it would be unrealistic to expect that people go to prison for littering[1]; but less drastic measures, such as the introduction and enforcement of fines or help in promoting socially responsible practices of the business sector, are advised.

3. Incentives

Since commons dilemmas are caused by an unattractive cost-benefit analysis, it is obvious that the introduction of incentives can be an effective way to solve these problems. If people were immediately paid for disposing every single piece of litter in a bin, most people would do it. Of course, it is quite easy to see that while this might in theory solve the problem of littering, it would do so at very high cost and would produce perverse incentives such as the tendency to produce more litter, or to subdivide litter into smaller components to maximize reward. However, as we have already mentioned, non-monetary and social incentives can play a crucial role in reducing littering.

[1] Littering already is an illegal behaviour under section 87 of the Environmental Protection Act 1990.

4. Identity

The last key component to address when designing solutions to social dilemmas is identity, which has a two-fold role. First, promoting group identity can increase pro-social behaviour – the more attached to a group a person feels, the more likely she is to do what's good for the community. Research shows that forces such as in-group reputation can promote pro-environmental action (Hardy & Van Vogt, 2006; Milinski et al., 2006); that high-identifying group members tend to compensate for resource overuse of their fellow group members (Brewer & Kramer, 1986); and that households that identify strongly with their communities don't need financial incentives to behave more pro-environmentally (e.g. consume less water; Van Vugt, 2009).

Because each person belongs to multiple social groups, the influence of different groups and group identities will be varied. To effectively reduce littering, therefore, one needs to identify to which groups litterers feel they belong and which of those group identities may be used to nudge people to litter less.

Second, self-perception, i.e. the type of person one thinks she is, influences people's choices. People like to feel good about themselves and to think of themselves as good people, therefore using appropriate language to provoke certain identities in people will have an influence on how people behave (an approach, which is further addressed in the next section of the report).

Behavioural Interventions to Reduce Littering

A question remains: do people litter because of the way the environment is designed or because of their personal characteristics? Wesley Schultz and colleagues attempted to answer this question. In a study of littering behaviour, the researchers estimated that 15% of littering acts resulted from contextual variables, such as the lack of, or distance to, litter bins and the amount of litter already present; and 85% resulted from personal qualities (Schultz et al., 2013). While it might be tempting to therefore conclude that personal qualities should be the focus of any behavioural interventions aimed at reducing littering, this is not what the analysis showed. The only personal quality variable that had a significant influence on littering was age – young people littered more. Since, obviously, changing a person's age is not something we can do, we have created the following ideas for interventions to tackle all other important personal and environmental variables that influence littering.

Clean Up the Country

First and foremost, before one can hope to see a significant change in the attitudes and behaviour of British people to littering, existing litter needs to be removed from streets, highways, parks and other public locations. Otherwise the strong motivating force that is social proof will work against the goal of cleaning up Great Britain, rather than in support of it. Therefore, help from local councils and the government is required, to ensure that a new social norm of cleanliness is established.

Behavioural Interventions

Below we outline intervention recommendations, which can be used by companies and policymakers to reduce littering in the UK. These suggestions are divided into two categories, depending on whether their objective is to change the perceived cost or the perceived benefit. Most of these interventions are based on decreasing the cost of using bins or on increasing the cost of *not* using them. We believe

this approach to be most successful because is targets the "low hanging fruit". Specifically, these interventions re-design the choice environment in a way that makes using bins automatic – something System 1 does spontaneously, or at least more often.

Our goal was to make these recommendations universal, so that they could be applied in many settings. However, littering, like all human behaviour, is *context specific* and the surrounding and social environment play key roles. Consequently, it is important to remember that each intervention should address the individuality of the target group and the situation. We therefore suggest spending some time before implementing a chosen intervention to see if and how it could be adapted to better address the specifics of the setting it is being applied to.

Changes in personal cost.

Litter bins.

Availability, accessibility and visibility.

Litter bins need to be available, accessible and visible. They should be placed in key locations – along the most congested pedestrian pathways and in places where people litter the most. Areas with many fast food restaurants or sites where people smoke, such as bus stops, are the obvious choices. Local authorities responsible for picking up litter may be of help in determining the best locations for placing additional bins.

Bin accessibility means not only the right location but also the right design. Bins should be convenient, appealing and easy to use. Litter may be associated with the feeling of disgust so the less contact with the bin one needs to have, the more likely the person is to use it. Open-top bins that don't require much effort or precision to be used; clean, well-kept bins; more visible bins in bright, contrasting colours are all more likely to be used than overfilled, dirty bins with small holes on the sides.

Attractiveness.

Fun bins are fun to use. Depending on the location and the target group – pupils around schools or football fans around stadiums – "fun" will mean different things. In all circumstances, however, the goal is to make putting litter in bins more enjoyable. Bins that resemble sharks, bins that can be used for voting or bins that burp when someone puts a piece of litter in them are all great examples of nudges that use fun and positive emotions to encourage pro-social and pro-environmental behaviour.

1. 

2. 

3. 

4. 

Figure 1. Voting with cigarettes (Hubbub, n.d.).
Figure 2. Shark bin (Mouldman, 2005).
Figure 3. Hopscotch bin (Scott, 2011).
Figure 4. Recycling basketball (University of California Merced, n.d.).

Monetary penalties.

The most direct way to increase the personal cost of littering is to impose fines on those who do it. *Loss aversion* is a strong motivating force – people don't like losing what they already have. Actually, they don't even like the *risk* of losing money. If people knew that there was a real chance of getting a fine when they dropped litter, they would not do it as often.

The size of the fine can serve as a nudge on its own, by signalling the frequency and severity of the act. A fine of £20 will imply that the act is common and relatively inconsequential, while a fine of £200 implies it is rare and severe. Considering the importance of social proof in guiding human behaviour, a fine suggesting the behaviour is *rare* will be better.

Social penalties.

Monetary cost is just one type of cost. Social rewards and penalties are a form of currency too and so *social shaming* may encourage people to litter less (Grasmick et al., 1991). We suggest setting up a Facebook Page and coming up with a unique hashtag (a funny one to encourage people to get involved) that people can use to post pictures and videos of litterers. Many people will think twice before dropping an unwanted piece of wrapping on the ground if they know there is a big chance their face may end up on social media with an unflattering comment.

Such social shaming initiatives have already been undertaken, especially in the domain of car parking. In Poland, for example, there is an initiative called *Karny kutas* (*Penalty dick*), in which people put stickers on the windshields of cars that have parked in an illegal way or in a manner that is especially problematic for others (used more than one parking space, parked on a pavement, blocked an entrance, etc.). The stickers are *very* difficult to remove (see https://www.youtube.com/watch?v=NTtZmGDRito for an attempt). Pictures and videos of cars with the stickers are then uploaded to a dedicated Facebook Page (https://www.facebook.com/KarnyKutasZaChujoweParkowanie/) and to YouTube (see https://www.youtube.com/watch?v=QASvNqNMuiE, for example).

Similar examples include the *Parking Douche* app (see https://vimeo.com/42188610), or *Bad Parking Ireland* (https://www.facebook.com/BadParkingIreland). Singaporeans went a step further and have set up a website, called *Caught in the act*, where people can post pictures and videos of others wrongdoing in any area of their lives, e.g. stealing newspapers, peeking under women's skirts or mistreating their children (http://singaporeseen.stomp.com.sg/category/caught-in-the-act).

To keep things on a more positive note, a similar approach, one of *social encouragement*, can be applied to promote good behaviour. Those who pick up litter, organize Clean Up Days or help reduce littering in any other way could be praised for their initiative. Positive incidents that are a result of picking up litter can be communicated via such a page as well. For example, one of the authors of this report picked up an old envelope that was left behind, lying on the grass, in a local park. As she was about to throw it into a bin, she opened it and found a £20 note inside. Now that's a nice reward, and a good social encouragement message, for picking up litter[2].

Figure 5. A £20 found inside a picked-up envelope (Kolodko, 2015).

[2] There was no address nor a full name on the envelope so unfortunately there was no way to return the money to its owner.

Re-designed packaging.

Reducing the amount of packaging.

Defaults have a powerful effect on encouraging positive behaviour, as they take away any effort required from the decision-maker. Put simply, the less paper and plastic is used to package food items, the less litter will end up on the streets. We encourage companies, especially fast-food restaurants, to limit the amount of packaging used. Packing a hamburger in a paper wrapping, then putting it in a paper box and then putting the box in a take-away paper bag means that three pieces of litter may end up on the street. If the default is changed into using just one type of packaging and any additional wrapping is made available upon request, most people will leave the restaurant with much less potential litter.

Other solutions, such as a "carrier" for *Subway* sandwiches, created in Canada, aim to produce packaging made of more biodegradable materials, such as paper, to reduce the amount of plastic bags used, which have a much longer degradation time (2-5 months for paper vs. 500 years for plastic; Science Learning, 2008).

Figure 6. A paper "carrier" for *Subway* sandwiches, which uses 95% less paper than regular paper bags (Garcia, 2013).

A similar, now familiar, example of establishing new defaults is the plastic bag levy that has been introduced in many countries. The overall effect of the levy has been a considerable reduction in plastic bag use (although the size of the reduction varies considerably from place to place, depending on how the levy was implemented). One interesting study is from Homonoff (2013), who showed that while a plastic bag levy was highly effective, the use of a no plastic bag bonus (with shoppers being paid for not using plastic bags provided at a store) was much less effective.

Making retaining a litter easier until proper disposal is possible.

People sometimes litter because there is no convenient alternative. Discarding a chewing gum, one of the most commonly littered items, can be problematic when most producers changed packaging from packing each gum in a separate foil paper to putting all pieces in one package. If there is no bin around when a person finishes chewing a gum and she has no spare foil paper, there is little left to do but to discard the gum on the ground. Those who use drive-through fast-food restaurants face a similar problem. Once a person has finished eating in her car, there is nothing one can do to reduce the odour of the leftovers except to throw everything out the window. Redesigning packaging in ways that make it easier to keep litter until bins are available, including ways of reducing the odour of food left-overs, or even encouraging people to re-use the packaging, should reduce littering.

Second lives.

Yet another way to encourage people to not litter is to show them ways in which empty packaging can be (re)used. A great example of such an approach is Coca-Cola's *2nd lives* initiative (see https://www.youtube.com/watch?v=46WX59wDB4E), in which the company designed 16 different caps that turned empty Coca-Cola bottles into water guns, painting "pens", rattles, soap bubble makers, spray bottles or lamps.

Figure 7. Sixteen Coca-Cola *2nd lives* bottle caps (Designboom, 2014).

Clean Up Days.

One characteristic of habit-formation is that the longer a person engages in a new behaviour, the less costly it becomes. Actually, as many people whose New Year's resolution was to exercise more know, the first step is usually the hardest. Therefore, Clean Up Days, apart from helping to set a new social norm that is a clean environment, can help reduce littering behaviour. Previous studies have shown that involving community residents in clean up activities can increase people's motivation not to litter and promote a long-term reduction in litter (Roales-Nieto, 1988). If people are asked to clean up their neighbourhoods on a specific day, even if it's just once a year, they will have taken on the first step in reducing littering, using bins and even picking up others' litter. Moreover, if such Clean Up Days were organized in schools and companies, all these activities would be done with friends, making it a community activity, using the strength of social networks as a motivating force to promote pro-social and pro-environmental behaviours. Clean Up Days at schools would also help set a desired social norm in children who, when they grow up to be teenagers, should be less likely to litter. If such cleaning up (just as the cleaning up done by local councils) takes place during the day, it will help even further to set a new social norm, as seeing other people pick up litter is a strong anti-littering nudge (Cialdini, Reno and Kallgren, 1990).

Timely prompts.

People often don't make any effort to think about their actions. A simple verbal prompt from the sales personnel, at the time of purchase, may therefore nudge people to keep on to litter until they can use a bin – they will hear a request to bin the litter and will automatically follow it, without giving it much thought. Making the prompt personal (e.g. by using the customer's name) and specific will make it more powerful.

Much litter comes from drive-through restaurants. People who eat in their cars, on the roads, often don't want to keep the empty packaging once they finish eating. An analysis conducted by Clean Up Britain (J. Read, personal information, January 12, 2016) found that most fast-food litter is disposed in a six-to-11-mile-radius area from the restaurant. Installing signs, which will encourage people to keep litter until the next stop and to use bins, at the right distance from fast-food restaurants, should reduce littering along highways.

Personalized wrappers.

People's attention is drawn to what is relevant to them. Putting customers' names on take-away packaging is likely to draw people's attention and create a sense of ownership and responsibility and should, therefore, deter people from mindlessly throwing rubbish on the ground.

Being watched.

People behave better when they are being watched and this mechanism seems to work also when it's just a pair of eyes placed on a litter bin or a wall and not real people watching us. A study conducted by Francey and Bergmuller (2012) examined how individuals reacted to litter left at a bus stop bench, depending on the design of litter bins. The researchers provided separate bins for each of the two types of litter used in the study (paper and plastic) and investigated whether people would deposit more items if a bin had a picture of eyes on it. While the presence of eyes on a bin had no effect

on the likelihood that individuals present at the bus stop would remove garbage, it did have a positive impact on those who did choose to dispose of the litter. Those people who engaged in cleaning up the bench spent more time doing so in the presence of eyes.

Start small.

Foot-in-the-door is a social influence technique, in which a person who complies with an initial, small request is more likely to fulfil a larger request at a later time. Often getting people to agree to a small favour leads them to become more engaged in an issue or less likely to resist a subsequent, bigger request. We encourage businesses and policymakers to think of such small foot-in-the-door interventions rather than "going big" all the time. Sometimes starting small leads to greater long-term benefits than trying to change too much at once – another manifestation of the "low hanging fruit" approach.

One a day.

Just like other foot-in-the-door approaches, a "one a day" campaign, which would encourage people to throw (just) one piece of litter a day in the bin, should have a positive long-term effect on littering behaviour. Such a "start small" approach will help form a new, desirable habit. At the same time, it focuses on just one, concrete behaviour, making the intervention more likely to be a measurable success.

One type of litter.

Similarly, we propose launching a campaign, in which people are asked to bin only one type of litter, e.g. cigarette butts or chewing gum. Again, while at first it may seem that such a message limits the potential impact of the campaign, the specificity and simplicity of the message, together with the lowered threshold required to do what one is asked for, should have a greater long-term impact on behaviour change than an initially more complex approach.

Changes in personal benefit.

Another way to approach social dilemmas is to change the perceived benefit a person gets from doing what is best for the society. The following recommendations should help achieve this goal by designing effective communication messages.

Communicating identity.

Local pride identity.

Litter is most prevalent in poor and working class neighbourhoods (Beaufort Research, 2010). Those who live there view litter as a relatively minor issue in the generally disheartening environment they live in, when it is found amongst such things as low salaries, unemployment, crime, drugs and poorly kept roads. The state should undertake to address all these social problems, but it may be that removing litter, a symbolic and highly visible sign of problems, may serve as a morale builder and a stepping stone to something bigger.

Qualitative studies done in Wales suggest that people who live in such run-down areas feel neglected, but that this feeling, in turn, creates a strong connection with where one comes from. We suggest turning this feeling of belonging to a feeling of local pride. Litter is the one component of the aesthetics of the environment that can be improved almost immediately and by the people themselves. Positioning anti-littering behaviour as an indicator of local pride and community strength could both help to reduce anti-social behaviour and to boost the morale of the most disadvantaged.

In fact, the approach based on promoting group identity is one of the more effective solutions to the commons dilemmas. Studies show that people often make self-sacrificial choices when they are made aware of the fact that the benefits will go to members of their group (see Dawes & Messick, 2000 for review). When people are reminded that they are a part of a community, they care more about the group's well-being than their own, either automatically or to behave "in an appropriate manner".

Don't be a litterbug.

We suggest framing communication in terms of the person one *is* when one litters, rather than just focusing on the act of littering. A series of studies conducted by Christopher Bryan (e.g. Bryan, Adams & Monin, 2013) showed that framing a choice in terms of the type of person one is (e.g. "I am a cheater") rather than what one does (e.g. "I cheat") made people behave better. Because people care about their reputation, they never want to feel like they *are* a bad person (and a litterbug is just that). Secondly, people also have a need to feel good about *themselves*. Being "called names" provokes negative feelings and these feelings, then, guide behaviour towards positive action, making the person feel better about herself again.

Do it for your future self.

People are social animals more than they are self-interested ones. We've already talked about the importance of social proof, social pressure and liking, but as studies show, some people are just as likely to do something for others as for themselves, especially if those others are their *future selves*. Bryan and Hershfield (2012) showed that when people felt a strong connection to their future selves, giving them messages that emphasized their responsibility to these future selves made them more likely to increase future oriented choices. Following on from this, we recommend using a responsibility-based message to nudge the more connected-to-self individuals to behave responsibly, e.g.:

> *We urge you to consider the responsibility you have to yourself in keeping the environment clean. After all, your "future self" is completely dependent on you. Your decisions now determine what your hometown and the streets your future self will live in will look like.*

Communicating consequences.

While it is true that people often act automatically and follow the design of the environment they are in, in some cases understanding *why* a certain behaviour is preferred or undesired can help people understand the broader context and may increase their motivation to change behaviour. Based on insights from marketing research, we can see that the understanding of negative consequences of littering may indeed be an effective way to encourage people to use the bins.

For this approach to be effective, communication needs to be *concrete*. It is difficult for individuals to be motivated by abstractions and statistics. People respond in a stronger manner to specific images and individual cases, a phenomenon called the *identifiable victim effect* (Jenni & Loewenstein, 1997). As Stalin famously said, "The death of a single Russian soldier is a tragedy. A million deaths is a statistic" (TIME, 1943). When designing communication, convey the concreteness of the message by using photographs and concrete phrases; emphasize the *specific and personal* aspects of the impact litter has on the environment and health. Showing concrete examples of people harmed by litter will be more effective than using general statistics. The more a person can relate to the message, the more effective it will be. Language should engage emotions and paint a clear picture in the litterers' minds.

People also react strongly to easily understandable, clear problems. Based on this insight, the UK government started adding labels on home appliances that display the lifetime cost of energy usage of each appliance, for example. By re-framing an abstract concept of "energy-efficiency" to concrete costs, they have shown a positive effect in people's washer-dryer purchases, resulting in an estimated 6.6% reduction in annual energy consumption (Behavioural Insights Team, 2015). Instructions to use the bins should be specific. For example, instead of saying "Use the bin." say "Put your cigarette butt in the bin once you finish smoking". With time such messages should create new, desired habits.

Showing desired behaviour.

People are social animals and mimic what others do, especially what those they like, aspire to or respect, do. This is especially true of young people, who are still shaping their identities and figuring out who they are. Since young people are among the heaviest litterset in the UK, using appropriate ambassadors to show the desired behaviour is important. Nowadays, social media is where life happens. We therefore recommend designing a "behaviour placement" (rather than product placement) campaign on social media, with the focus on YouTube, Periscope, Vine and other video-based platforms. Rather than recruiting celebrities who are relevant to 40 and 50-years olds, YouTube stars, who have channels devoted to sports (e.g. football) or gaming, who have hundreds of thousands or even millions of followers, should be involved in the campaign. By having these celebrities show the desired behaviour, the message will become personally relevant and will be conveyed in a manner that is aspirational to youth.

A Final Word of Advice

The proposed solutions to littering are based on behavioural science research and theory, which provide grounds to why and how these recommendations should help to reduce littering in the UK. However, as we mentioned earlier, a key component of a good intervention is its fit to a specific context. We recommend that those using this report take time to analyse the nuances of the problem they want to target, thinking of aspects such as location, timing, target group, specific behaviour that needs to be changed and what behaviour should it be substituted with (remembering that to get rid of a bad habit, it needs to be replaced with a new habit; it can't be just eliminated). These characteristics should be identified and described in as much detail as possible. Such approach will help not only to properly design and execute an intervention, but will also make it possible to reliably measure its effects.

Finally, we encourage all those who want to tackle the problem of littering to be patient and persistent in their efforts and to work together, on all fronts, to achieve the goal of cleaning up Britain. Social dilemmas, because of their innate characteristics, are difficult to overcome. Littering, with its complex socio-economic roots, is no exception. In situations like this, cooperation between stakeholders is of fundamental importance. Much more can be achieved if policy-makers, public and business parties, individuals and marketing experts work together to tackle the problem in multiple ways – with environmental re-design and communication; nudging people gently and using law to encourage people to behave pro-socially; involving public and private institutions; big organisations and individuals; tackling the problem directly, while simultaneously working on improving the living conditions of the lowest social classes, where littering is most prevalent. If we expect citizens to cooperate and help clean up the country, all those who wish to reduce littering and have the resources to help achieve this goal need to cooperate as well.

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