Using behavioural science to reduce littering: Understanding, addressing and solving the problem of litter using a commons dilemma approach *

***commons dilemma jargon**

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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 predictable and whose decisions are based on pure logic.

But this is not the world we live in. People are guided by emotions; they rely on their often inaccurate perceptions; their preferences depend greatly on decision context and arbitrary cues; they put too much weight on present gratification, which results in weak will. These all too human characteristics are some of the reasons why, as a society, we are obese, in debt, struggle with global warming and have litter.

The article is divided into two parts.
We begin by describing the impact of littering in the UK and the importance of tackling this issue. We then move on to describe 'commons dilemmas' and explain how littering is an example of this class of behaviour.

We provide an overview of some behavioural science research showing what can promote cooperation in commons dilemmas, and explain how these insights from laboratory experiments are applicable to littering.

Next, we provide an overview of relevant models and frameworks, including the dual processing systems analogy and diffusion models of collective behaviour, which explains decision-making on an individual level.

We finish the first part of the article by describing the stages and elements of behavioural change intervention design.

In the second part, we suggest some anti-littering interventions, approaches and nudges.

A recent example is dog owners picking up after their pets. In a relatively short period, the public perception and expectations have changed enough so that nowadays many dog owners clean up streets and lawns after their pets, even when they know no one can see them.
A report by the BBC (2015) states that complaints about dog fouling dropped from approximately 83,000 in 2013/2014 to fewer than 74,000 in 2014/2015, suggesting a visible drop in dog fouling rates.
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. Yet, as Dubner and Levitt (2005) point out, due to limited enforcement, a simple law introduction wouldn't have been as effective if it wasn't supported by social incentives – the hard glares of passers-bys and the offenders' feelings of guilt (Grasmick et al.,1991).

THE "WHAT" OF SOLVING COMMONS DILEMMAS

If littering arises simply from an unfavourable cost– benefit analysis, there are two approaches to reducing it: increase the perceived costs of littering or increase the perceived benefits of not littering. The word "perceived" is important here. Because of limited cognitive resources, impulsivity and the influence of emotions, people typically will not conduct an explicit cost–benefit analysis when deciding whether to litter. They will choose based on personal rules, norms or arbitrary clues that come from the situation context, through which they perceive a benefit, or a cost, to themselves.

SITUATION CONTEXT

Small changes to the environment, even ones that appear innocuous, can have a big effect on behaviour. These small changes are often called nudges (Thaler and Sunstein, 2008). It is no coincidence, for example, that supermarkets place high-profit items in highly noticeable and easy-to-reach places on their shelves. Nudging has become a widely used method by which policy-makers promote social change. It is, therefore, important to assess and address the impact and role the physical environment – such as the availability and accessibility of litter bins – has on littering behaviour.

SOCIAL CONTEXT

Just as the physical environment influences what we do, so do those around us. Mostly, people want to do what others do, and look to the behaviour of others for cues about what they should do. If you see lots of people littering, you will (likely) be more inclined to do so yourself, because what you have observed makes littering more normal. One way this manifests itself is through observing the results of past behaviour of others.

A lot of litter on the ground means littering is a normal and accepted behaviour; no litter means it is abnormal. Unclean environments will nudge people to be relaxed about littering; clean environments will nudge them to use the bin. In a classic series of studies, Cialdini et al., (1990) explored the role of social norms on littering.

Among other things, they confirmed the importance of a clean environment in promoting anti-littering behaviour. When there were no more than two pieces of litter in an area, the great majority did not litter. However, as soon as there were three of more pieces visible, the number of litterers more than doubled.

The importance of seeing what others do forms an important part of the broken windows theory (Wilson and Kelling, 1982). Following up this theory, Keizer et al. (2008) showed that as certain norm-violating behaviours such as littering became more common, they negatively influenced conformity to other norms and rules. Not only does littering encourage more littering, it also influences other anti-social behaviours such as painting graffiti or trespassing. Many of the heaviest litterers are teenagers (Campbell 2007 and Keep Britain Tidy 2014), 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 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 (2009) distinguishes two additional social factors that encourage (non) compliance: liking and authority.

Liking

The first factor is that people want to say "yes" to those they like. Interestingly, this mechanism is so strong it can work even when people would not necessarily agree (as individuals) with what they are saying yes to.

We believe this force explains why (young) people litter more when together; or why increasing the number of available bins doesn't reduce littering when young people are in groups.

Since littering is accepted, sometimes even desired, by young people, other behavioural guidelines or nudges can lose their impact when young people are out, in groups, having fun or trying to impress one another. Luckily, not all young people litter and even those who do don't spend all of 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 communications. People tend to like those who are physically attractive, who are similar to them, who compliment them, who are familiar to them, and who they associate with positive things.

Authority

Quite obviously, people also listen to those who they perceive to be in charge. Cialdini argues that people have a deep-seated sense of duty to authority, which can be traced back to childhood and the influence of parents and teachers. The tremendous 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 administer high levels of electric shocks to others, when asked to do so by an authority figure (Milgram, 1963).

Together, the effect of 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, whether they are celebrities, authorities or influential friends, will drastically improve the effectiveness of communication campaign.

THE 'HOW' OF SOLVING COMMONS DILEMMAS

Promoting cooperation

One way to approach commons dilemmas is to look at what promotes cooperation. Based on a meta-analysis of 30 studies, Gifford & Hine (1997) identified 14 factors that promote cooperation. Among the most influential 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 allows for education, sharing of common values and the establishment and enforcement of policies aimed at bringing back order.

Second, approaching commons dilemmas from a local, territorialised perspective can help. When land is divided into small, identifiable 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. It's not uncommon that, for example, roads in between two districts of neighbourhoods, which don't clearly belong to anyone, are the most littered ones.

Territorialisation can also help to engage private sector, holding business organisations responsible for the cleanliness of their premises. An example there could be fast-food restaurants taking care of the parking lots outside of their premises, which reflect on their image.   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 shows that the smaller the group, the more likely it is to overcome a commons 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. In fact, work by Common Cause Foundation suggests that a common set of values underpins social and environmental concerns and that most people share these values. They are also a key ingredient of behaviour change. The foundation's work suggests that, to effectively influence pro-social and pro-environmental behaviour, one should appeal to intrinsic values, such as broadmindedness, social justice, community feeling and creativity; and avoid appealing to extrinsic values, such as social status, prestige, popularity and wealth. The foundation suggests that strengthening these internal values and creating opportunities for them to be communicated and shared may help to create responses to a wide range of environmental challenges.

 Linking this back to commons dilemmas, groups that share ideals and values, in which members are well-connected and close, are more likely to achieve common goals, even when doing so involves each individual foregoing personal advantages.

Research shows that groups with positive interpersonal characteristics, such as a strong feeling of group identity, similar valueand better

interpersonal relations are more likely to overcome commons dilemmas. While these findings on how to solve social dilemmas come primarily from laboratory experiments, it is easy to imagine how they could be applied to the problem of littering, providing opportunities for people to get together and talk; to focus on litter in their small neighbourhoods; and to build and openly communicate community values.

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 will guide the person towards socially desirable actions when she is reluctant to engage in mental effort. This reluctance to engage in mental effort is a key feature of the human mind.

Daniel Kahneman's (2011) summarised 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 said to be one reason for 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. Yet when in a hurry or acting spontaneously, people only engage their automatic and fast System 1, and they litter, forgetting about what should be done.

This mechanism also helps to explain why rational arguments will often not be an effective behavioural change tool: to successfully change people's behaviours, their System 1 needs to be influenced and not only, or not even necessarily, their System 2.

In other words, to change behaviour, a new path of least resistance needs to be created that will guide System 1 to behave in a desired way. When new paths of least resistance are created new behaviours become habitual. The only effective way to change a habit is to replace it with a new one (Duhigg, 2013), and changing habits is hard.

By changing the easy path, this difficulty can be reduced or eliminated.

Incentives
Another way to get people to undertake initially difficult new behaviours is by means of 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 candy bar as for a much higher monetary reward. Receiving a 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 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). 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
When selecting target groups for behavioural change interventions, it is good to think of people's willingness to change and their reasons for not doing so.

Some people litter only occasionally, when circumstances force them to do so, and may be embarrassed or ashamed when they do.

- Some litter based on a conscious cost–benefit analysis;
- There are some for whom littering is a conscious "antisocial" act and;
- Some litter habitually and unthinkingly.

It's easy to assume we should target those who litter the most. Yet people for whom littering is a conscious act will require a greater amount of information, stronger social pressure and higher incentives to change. Even under significant social pressure, they may change their behaviour or attitudes only slightly, only occasionally or not at all.
Therefore, while it might be tempting to assume that heavy litterers, such as teenagers, should be the main target group of an intervention, focusing on these groups may be doomed to fail.
To use smoking as an example: it might be easy to change the behaviour of an occasional smoker, who only lights a cigarette at the odd party, to quit smoking; than to change that of a two-pack-a-day smoker.

Targeting interventions at groups with lower barriers to change not only increases the chance of the intervention being a success, but also maximises the chance of reaching a tipping point (Grodzins, 1958), at which a social change spreads on its own.

If enough occasional litterers stop littering, those who litter more will eventually become a visible minority. This can "tip" them to join the majority, who by this point no longer litter. In short, to design an effective behavioural change intervention, 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 litterers will see their behaviour becoming more unacceptable and abnormal, and will be ready to change.   This phenomenon is captured in diffusion models of collective behaviours and the transtheoretical model. The transtheoretical model is a useful exemplar of these approaches.

It describes "stages of change" people undergo on their paths to new, desired behaviours, and tasks necessary to move a person from one stage to another. The first stage is pre-contemplation, in which a person is not ready to change or is actively resistant to change. People in this group will not change their behaviour in the next six months so it's not advisable to target an intervention at them. The next stage is contemplation, with people intending to change their behaviour but in the relatively distant future (often defined as "within six months"). Contemplators are aware of the pros and cons of the desired and undesired behaviours, and often engage in an active contemplation of the two sides. This is a good group to target with communication, aimed at explaining the benefits of the desired behaviour, such as using bins to dispose of litter and the downsides of the undesired behaviour. Next there are those in the preparation stage who are ready to make a change in the very near future. Only a small trigger is necessary at this point to make the change happen. In other words, these are the "low-hanging fruit". Finally, there are action and maintenance phases, in which people have already changed their behaviours and are taking specific steps not to go back to the old, undesired habits.

Four components of intervention design
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 into 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 underestimate 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 behavioural interventions and marketing initiatives. Only by providing and requiring the gathering of reliable and good-quality data is it possible to know if and how much progress in reducing littering has been made.

2. **Institutions:** The commons dilemma will be difficult to solve without the engagement of public or private institutions that form the context in which behaviours take place. Perhaps the quickest and surest way to solve a public goods problem is to change policies and laws. Littering already is illegal but since penalties are rarely imposed on litterers, who may not even know it is illegal, this law has little effect. It is necessary to impose reliable sanctions on those who break the law, and to enforce them.

3. **Incentives:** The introduction of incentives can be an effective way to solve the problem of littering. 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 maximise reward.

However, as we have already mentioned, non-monetary and social incentives can play a crucial role in reducing littering.

4. **Identity:** Identity has a two-fold role. First, promoting group identity can increase prosocial 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 .
• high-identifying group members tend to compensate for resource overuse of their fellow group members (.
• 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. For example, a teenager may litter more when she's with her school friends (when her "peer identity" is active) but not litter at all when she's with her family (and her "family identity" is active).

Likewise, a younger child may not litter at all when she's with her school friends but may litter when she's with her parents, who themselves litter.

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.

By strengthening the link between social group identity and positive behaviour (in this case, not littering), the decision-maker may build new habits which, then have a chance to spill over to other parts – social contexts and group identities – of her life.

Second, self-perception (Bem, 1967), i.e. the type of person one thinks she is, can influence 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 can have an influence on how people behave (an approach which is further addressed in more detail below).

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 (2013) 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.

 While it might be tempting to, therefore, conclude that personal qualities should be the focus of any behavioural intervention 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 changing a person's age is not something one can do, we propose the following intervention ideas to tackle all other important personal and environmental qualities that influence littering.

Behavioural interventions

Below we outline behavioural intervention recommendations which can be used by companies and policy-makers to reduce littering in the UK.

These suggestions are based on all the theories, models and frameworks we have presented in the first part of the article.

Our objective here is to suggest solutions that, based on behavioural science insights, should help reduce littering and have a visible impact on litterers' behaviours. These recommendations are described in a way to make them universal, so that they can be applied in many settings.

However, littering, like all human behaviour, is context specific. Consequently, it is important to remember that each intervention should be modified in such a way that it addresses the individuality of the target group and the situation. Most importantly, our ideas are merely suggestions and should be tested, ideally evaluated through randomised controlled trials (Haynes et al., 2013), before being rolled-out on a mass scale.

 Our 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 it 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.

Changes in personal cost

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 and; 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.

 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 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.

For fines to work, they need to be enforced. If people know there is zero chance to be penalised, fines are not going to have the desired impact. Therefore, while the recent decision to double littering fines in the UK, and to allow local authorities to apply these penalties to vehicle owners, if it can be proved litter was thrown from their car – even if by somebody else (Department for Environment, Food & Rural Affairs, 2017) – is a step in the right direction, it needs to be enforced enough so that people know the cost can become real to them personally.

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 that people can use to post pictures and videos of litterers. People may think twice before dropping an unwanted piece of wrapping on the ground if they know there is a chance their face may end up on social media with an unflattering comment.

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, organise clean-up days, or help reduce littering in any other way, could be praised for their initiative. Positive incidents that result from picking up litter could 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.

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 unnecessary paper and plastic is used to package food items, the less litter will end up on the streets. We encourage companies, especially fast-food chains, to limit the amount of unnecessary 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 a street. If the default is changed into using less packaging, and any additional wrapping is made available upon request, most people will leave the restaurant with much less potential litter.

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 bags plastic provided at a store) was much less effective.

Making retaining litter easier until proper disposal is possible.

People sometimes litter because there is no seemingly convenient alternative. Discarding a chewing gum, one of the most commonly found items when surveyed (INCPEN, 2014), 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, then she may be more likely to discard the gum on the ground.

Those who use drive-through fast-food restaurants face a similar problem. Once a person is done eating in her car, in order to reduce the odour of the leftovers, she may throw everything out the window. Redesigning packaging in ways that make it easier to keep litter until bins are available, including ways of reducing odour of food left-overs, or even encouraging people to reuse the packaging, could reduce littering.

Multi-use packaging.
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 approach is Coca-Cola's "2nd lives" initiative 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.

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 of a clean environment, can help reduce littering behaviour. Previous studies show that involving community residents in clean-up activities can increase people's motivation not to litter and to 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 the first step in

reducing littering, using bins and even picking up others' litter.

Moreover, if such clean-up days were organised 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 et al., 1990). Clean-up days might be an important precursor to all other initiatives. Before one can hope to see a significant change in the attitudes and behaviours of litterers, 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 litter, rather than in support of it.

Timely prompts.
People often don't think about their actions. A simple verbal prompt from sales personnel, at the time of purchase, may therefore nudge people to hold 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 can be generated from customers who use 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; implying that much of fast-food litter may be disposed in a several-mile-radius area from the restaurant. Installing signs around that radius will encourage people to keep litter until the next stop and using bins should reduce littering along highways.

Personalised 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, even when the watcher is a picture of staring eyes placed on a litter bin or a wall. 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 rubbish, it did have a positive impact on those who did choose to dispose the litter. Those people who engaged in cleaning up the bench spent more time doing so in the presence of eyes. In a similar study, Keep Britain Tidy (2015) showed that placing poster with glow-in-the-dark eyes nudges dog owners to pick up after their pets, reducing dog fouling rates, on average, by 46% and as much as up to 90% in some areas.

Start small.
The foot-in-the-door technique involves obtaining compliance for a small initial request, which increases the likelihood of complying with a much larger request later.
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 rather than trying to change too much at once – another manifestation of the "low-hanging fruit" approach. 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.

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.

Local pride identity.

Litter is most prevalent in more deprived neighbourhoods (Beaufort Research, 2010). Those who live in these neighbourhoods might not view litter as a relatively major issue when found among 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 and agency. 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 (Dawes & Messick, 2000).

When people are reminded that they are a part of a community, they care more about the group's wellbeing than their own, either automatically or to behave "in an appropriate manner''.

Do it for your future self.

Studies show that 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 emphasised 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. 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; emphasise 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. By re-framing an abstract concept of "energy-efficiency" to concrete costs, it has shown a positive effect on 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."

Showing desired behaviour.

People are social animals and mimic what others do, especial what those they like, aspire to or

==respect, do. This is especially true of young people==, who are still shaping their identities. Since young people are among the heaviest litterers 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, Snapchat, 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.

CONCLUSIONS

In this article, our aim was to provide an overview of the commons dilemmas and to explain how littering is an example of this class of problems, and how policymakers, organisations and individuals can, therefore, approach this issue. By drawing on behavioural science research and theory, we outlined the behavioural underpinnings of littering behaviours and provided a framework one can use to tackle these issues. Finally, we suggested some ideas, which – based on our knowledge – can become effective in nudging people to not litter or to pick up litter. While we believe behavioural science can be of great benefit to anyone wanting to address litter and littering, it is important to remember that a key component of a good behavioural change intervention is its fit to a specific context.

We recommend that those using this article take time to analyse the nuances of the problem they want to address, thinking of aspects such as location, timing, target group, specific behaviour that needs to be changed and what it 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 an 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 litter. Commons dilemmas, because of their innate characteristics, are difficult to overcome. Littering, with its complex socioeconomic 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 tackle the problem in multiple ways – with environmental redesign and communication; nudging people gently and using law to encourage people 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.