

Using Behavioural Insights to Reduce Recreation Impacts on Wildlife:

Guidance and Case Studies from Thames Basin Heath and the Solent

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Foreword

Natural England commission a range of reports from external contractors to provide evidence and advice to assist us in delivering our duties. We would like to thank the teams at Bird Aware Solent and the Thames Basin Heaths Partnership for their contributions to this research. The views in this report are those of the authors and do not necessarily represent those of Natural England or our partners.

Background

This report is intended for any practitioners working to promote responsible recreation behaviour, whether rangers collecting data in the field or policy-makers interested in incorporating behavioural insights. It provides the tools to run a behavioural insights project, using the Behavioural Insights Team's TESTS methodology (Target, Explore, Solution, Trial, Scale).

This report also serves as a summary of a project run by the Behavioural Insights Team (BIT) for Natural England, aiming to promote responsible behaviour by dog-walkers, working in partnership with Bird Aware Solent and the Thames Basin Heaths Partnership. As the project followed the TESTS methodology, we use it here as a case study to illustrate the activities within each TESTS phase (given in a blue box at the end of each section).

The sections on the case study are intended to give sufficient detail to help understand each TESTS phase, but not to be comprehensive summaries of the project. For more detail, please consult the three standalone reports produced alongside the main report:

- a report of the Explore phase which presents the results of research with visitors and expert practitioners
- a rapid review of the literature on behavioural interventions to promote responsible recreation (part of the Explore phase)
- a report of the online randomised controlled trial run to test the impact of leaflet designs and messages on people's comprehension of wildlife disturbance (Solution and Trial phases)

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Further information

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Using Behavioural Insights to Reduce Recreation Impacts on Wildlife:

Guidance & Case Studies from Thames Basin Heaths and the Solent

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This report is one of four final deliverables from a project undertaken by the Behavioural Insights Team for Natural England, promoting responsible recreation by dog-walkers at two pilot sites. The four deliverables are:

1. **Using Behavioural Insights to Reduce Recreation Impacts on Wildlife: Guidance and Case Studies from Thames Basin Heath and the Solent** (this report). This is the main project report. It summarises each phase of the project (Target, Explore, Solution, Trial and Scale), and establishes guidelines for running similar projects in the future.
2. **'Explore phase' report.** This details the findings from field research including an online survey, visitor interviews, and expert interviews.
3. **Literature review.** This synthesises existing evidence on the use of behavioural interventions to promote responsible recreation by visitors to nature areas.
4. **'Trial phase' report.** This details the findings from an online experiment testing the impact of behaviourally-informed communications materials on dog walkers' awareness of wildlife disturbance issues, and recommends how to use these findings in the field.

Executive summary

This report is intended for any practitioners working to promote responsible recreation behaviour, whether rangers collecting data in the field or policy-makers interested in incorporating behavioural insights. It gives you the tools you need to run your own behavioural insights project, using the Behavioural Insights Team's 'TESTS' methodology (Target, Explore, Solution, Trial, Scale). To illustrate the TESTS phases, it uses the methodology and findings from a project undertaken by the Behavioural Insights Team (BIT) to reduce wildlife disturbance by dog-walkers.

The TESTS methodology details the tools and steps that should be taken to design, implement and evaluate evidence-based behavioural interventions. We start by identifying a specific **Target** behaviour that is feasible and impactful to focus on, and then carry out desk and field research to **Explore** the context. We use this research and findings from the behavioural science literature to generate **Solution** ideas, and choose the most promising ideas to evaluate in a **Trial**. Finally, we assess whether the intervention worked and could be rolled out at **Scale**.

The project we use as a case study for TESTS was commissioned by Natural England in September 2019, in partnership with two sites in the south of England: Thames Basin Heaths and Bird Aware Solent. The broad goal of the project was to test how behavioural insights can be used to promote responsible recreation, with particular focus on reducing bird disturbance by dog-walkers in the two pilot sites. The key challenge of responsible recreation is to ensure protection of the natural environment without restricting people's access to and enjoyment of the outdoors. Behavioural insights are a promising solution to this challenge, as this approach typically avoids limiting people's options, but instead makes changes to the

context in which people make decisions in order to make it easier or more attractive to adopt the desirable behaviour.

For the case study project, the TESTS phases were as follows:

Target: Define the problem and determine the measurable behavioural outcomes.

We first aimed to identify the behaviours that it would be most feasible and impactful to change. Reducing disturbance to wildlife could include a number of different behaviours. We discussed the priority objectives with rangers at the two field sites in our project, and collectively agreed that the specific target was to encourage dog-walkers to choose paths through non-sensitive areas. We also included an intermediate outcome that is further from the target behaviour but more amenable to rigorous evaluation: raising awareness of what wildlife disturbance looks like.

Explore: Map relevant behaviours and the wider context.

Next, we carried out research to understand the target audience's perspective and the potential influences on their behaviour, both drivers of the target behaviour and barriers to behaviour change. We did this by conducting interviews and an online survey with dog-walkers, and found that visitation patterns were highly influenced by convenience and habit, and that although many dog-walkers considered themselves to be nature lovers, they were often unaware when they or others caused disturbance to birds. We also carried out a literature review and interviews with experts to find out what interventions had been tried elsewhere. Though a wide range of interventions has been tried, the evidence is often sparse or low quality. The category of intervention identified as most promising were 'affordance cues' (subtle signage and directional cues) to nudge walkers into following certain routes.

Solution: Use the Explore findings to design behaviourally-informed interventions.

We complemented our Explore phase research with principles from the behavioural science literature, and generated ideas for two separate interventions. We used BIT's 'EAST' principles as guidance: to change a behaviour, make it Easy, Attractive, Social and Timely. For the first intervention, we re-designed an existing leaflet to attempt to improve comprehension of wildlife disturbance, appealing to dog owners' identity and using positive images, social norms, and an action-oriented checklist. Second, we created a shortlist of ideas for a physical intervention designed to change behaviour in the field. After assessing potential feasibility and impact, we decided on a pawprint signage intervention to encourage dog-walkers to choose paths through non-sensitive areas.

Trial: Develop and implement an evaluation strategy to measure impact.

Having identified our Solutions, we designed a trial for each one to determine its effectiveness. For the leaflet intervention, we ran an online randomised controlled trial (RCT) to test the impact of our behaviourally-informed leaflet on participants' comprehension of wildlife disturbance. Participants were randomly allocated to see either our 'treatment' leaflet, a control (business as usual) version, or no leaflet, which allows us to say with confidence whether any differences in comprehension were caused by the leaflet. We also outlined a protocol for a field trial to test the impact of pawprint signage, using a pre-post evaluation. This involves collecting baseline data before the intervention is in place, and comparing it with data collected from the same sites immediately after the intervention has been installed.

The field trial has not yet been undertaken, and will be completed by site staff and Natural England in the appropriate field seasons.

Scale: Report our findings and identify next steps.

In the final phase of the project, we considered our results from the online RCT and their implications for changing behaviour in the field. We found that both the control and treatment leaflets had the same effect on comprehension, and resulted in higher comprehension than in participants who had not seen a leaflet. Participants were slightly more likely to pick up and have positive perceptions of the treatment leaflet with more dog emphasis on the front cover. We recommend that leaflets emphasise the relevance to dog-owners, and make this visually prominent. We conclude that leaflets are likely to be a useful tool for promoting responsible recreation, if used in combination with physical interventions to change behaviour directly. Behavioural insights can also be used to optimise leaflet delivery.

1. Introduction

1.1 Goals of this report

This report is intended for any practitioners working to promote responsible recreation behaviour, whether rangers collecting data in the field or policy-makers interested in incorporating behavioural insights. It gives you the tools you need to run your own behavioural insights project, using the Behavioural Insights Team's TESTS methodology (Target, Explore, Solution, Trial, Scale).

This report also serves as a summary of a project run by the Behavioural Insights Team (BIT) for Natural England, aiming to promote responsible behaviour by dog-walkers. As the project followed the TESTS methodology, we use it here as a **case study** to illustrate the activities within each TESTS phase (given in a blue box at the end of each section). The sections on the case study are intended to give sufficient detail to help you understand each TESTS phase, but not to be comprehensive summaries of the project. If you would like more detail, please consult the three standalone reports we produced:

- A report of our Explore phase research, presenting the results of interviews and a survey with visitors, and interviews with expert practitioners
- A rapid review of the literature on behavioural interventions to promote responsible recreation (part of the Explore phase)
- A report of the online randomised controlled trial we ran to test the impact of leaflet designs and messages on people's comprehension of wildlife disturbance (Solution and Trial phases)

1.2 Behavioural insights in responsible recreation

1.2.1 What are behavioural insights?

Behavioural insights use research from the behavioural sciences (including aspects of psychology, economics and anthropology, among other fields) to improve public policies, programmes and services. Behavioural science research has shown us that people are complex and their behaviour is susceptible to many influencing factors, both internal to the individual (such as attitudes, habits, know-how and cognitive biases), and external (contextual factors, social influence, and the physical environment). There are often non-conscious cognitive processes at play, and our behaviour can often manifest in a way which can seem irrational or not in line with our own best interests. However, policies, communications and services are generally designed based on a more traditional view of economics that does not take into account how people actually make decisions or behave in practice. Behavioural insights can therefore improve outcomes by incorporating a more realistic understanding of human behaviour into policy-making.

There are many different approaches to behaviour change, from enforcing regulation to providing information or incentives. While behavioural insights are often associated with 'nudges' - small changes in the way that options are presented or the 'choice environment' is

designed in order to influence people's decisions - behavioural insights can in fact be applied to any of the existing levers of behaviour change, for example by optimising the way information is presented or financial incentives are designed. Behavioural insights can often make small changes to existing systems to deliver results at a low cost.

1.2.2 Why use behavioural insights in responsible recreation?

Behavioural insights can provide fresh ideas to complement or replace existing processes. Firstly, many practitioners working on responsible recreation rely on raising people's awareness in order to increase visitors' motivation to protect wildlife. This approach often (although not exclusively) involves using messages that take a conservation perspective. However, studies of motivation and identity tell us that this perspective may not be the most effective (see section 4.1.1 below), and more importantly, while raising awareness can be valuable, a large body of behavioural science research tells us that it is often more effective to focus on changing behaviour directly (see section 2.1.1 below).

Secondly, responsible recreation often involves two competing goals: promoting both enjoyment of and protection of the natural environment.¹ Recreation by dog walkers is an example of this tension. Dog-walking is an important motivator for people to access nature in England, second only to health and exercise.² However, there is also evidence that dog-walking has a negative impact on wildlife, for example reducing the diversity and abundance of birds.³ The key challenge of responsible recreation, then, is to shift behaviour so that people can continue to enjoy the natural environment without harming it. Behavioural insights are a promising solution to this challenge, as this approach typically avoids restricting people's options, but instead makes changes to the context in which people make decisions in order to make it easier or more attractive to adopt the desirable behaviour.

1.3 TESTS: how to run a behavioural insights project

It is important to note that behavioural insights don't just inform a broader understanding of policy, but are also used as the basis of carefully targeted and rigorously evaluated projects, to help us understand whether our behaviourally-informed interventions work as we expect them to. This means that a behavioural insights project not only involves intervention design and implementation, but also evaluation.

This report takes you through the five steps of the methodology that BIT uses to run our own behavioural insights projects. Each of the chapters of this guide covers one of the stages in detail:

Target		Define the problem and determine the measurable target outcomes.
Explore		Map relevant behaviours and the wider context.
Solution		Consider and design the intervention(s).

Trial		Design and launch a trial; evaluate, learn and adapt.
Scale		Increase adoption of effective interventions.

While we present this as a linear process, in practice you will often find yourself going back and forth between the steps. For example, you might identify a promising Target behaviour, but realise during the Explore phase that the barriers to this behaviour are mostly structural and can't be addressed through behavioural interventions. In addition, the TESTS methodology can also be useful even if you do not complete the entire process. For example, using just Target and Explore to understand a policy problem and an individual's behaviour can allow you to draft reports to inform wider policy making.

Case study: background

Natural England commissioned BIT to test how behavioural insights can be used to promote responsible recreation, and in particular to reduce wildlife disturbance by dog-walkers. The project ran from September 2019 to May 2020 in partnership with Bird Aware Solent and Thames Basin Heaths, which served as pilot sites for our field work.

The main goals of this project were to: 1) develop an understanding of the current impact on wildlife of recreation, particularly by dog-walkers, and the behavioural drivers of and barriers to responsible recreation, especially in the project's two pilot sites; 2) use this understanding, and BIT's expertise in behavioural science, to generate behaviourally-informed intervention ideas; 3) develop and implement a robust evaluation strategy to test these ideas; 4) reflect on the findings to build a transferable knowledge base for behaviour change in responsible recreation to help Natural England promote responsible recreation in other sites; and 5) enhance Natural England's and partners' capability in running and evaluating behaviour change interventions.

As noted in section 1.2.2, the TESTS process is not always linear. In this project, we carried out initial Explore work and considered potential Solution ideas and Trial designs while we were still defining the Target behaviours. This helped us assess the feasibility and impact of our potential targets and interventions. For instance, it became apparent that the intervention ideas expected to have the greatest impact (signage and new facilities on site to nudge dog-walkers towards certain path choices) were the most difficult to robustly evaluate due to sample-size and data collection constraints. Conversely, an intermediate target of raising visitors' understanding of wildlife disturbance was less likely to be impactful, but still considered valuable (due to our Explore work highlighting this as a barrier) and much amenable to a robust trial. We therefore split the project into two parallel components, each of which struck a different trade-off between potential impact and rigour of evaluation:

1. An **online randomised controlled trial** to rigorously test the content of a messaging intervention and optimise its impact on visitors' awareness, comprehension and intentions. This approach allows us to generate a set of evidence-based communications materials, which could be deployed across a range of sites, and is thus inherently scalable.
2. A **pilot trial in the field** to test the impact of a physical intervention on visitors' path choice when out walking dogs on-site.

2. Target

Purpose: The first step in conducting a successful behavioural insights project is to clearly define the behaviour you would like to change and how you will measure it. This is neither easy nor obvious, but it is key to a well-designed project. The more complex the area of focus, the more important this stage is. This involves breaking down the broader goal (e.g. 'encourage responsible use of natural areas') into a number of discrete behaviours (e.g. 'avoid areas that are sensitive for wildlife' and 'keep dogs within sight'). We then assess this list of target behaviours to see which would have the most impact on our overarching objectives, and be the most feasible to change and to measure.

Output: A shortlist of potential target behaviours that are specific and measurable, and balance feasibility and impact. We recommend taking no more than one or two target behaviours through to the Explore phase, since the interventions ought to be tailored to specific outcomes (although it is also possible to measure the impact of an intervention on other outcomes of secondary interest).

2.1 Identify the specific behaviours

2.1.1 Focus on behaviours rather than attitudes

Many interventions to change behaviour attempt to do so indirectly, by changing people's attitudes or awareness, with the assumption that behaviour change will follow. However, simply being aware of what we should do does not necessarily mean we will actually do that in practice. For example, many of us have intentions to eat more healthily or sustainably⁴ that we don't follow through with. This is partly because we prioritize short-term desires over our long-term aspirations. It's also partly because our behaviour is affected by many factors beyond mere awareness: conflicting motivations, convenience, ingrained habit, social influence, unconscious cues in the physical environment, and cognitive biases to name a few (see section 3.2 below).

This gap between what we are aware of and intend to do, and what we actually do, means that it is often more effective to focus on changing behaviour directly, rather than simply raising awareness. Awareness and intentions still matter, as they make behaviour change easier. It is also reasonable to focus on awareness-raising if your Explore research identifies that lack of awareness truly is a limiting factor. But the evidence suggests that awareness is rarely enough alone. This means that while a leaflet campaign about wildlife disturbance might be informative, an intervention on-site that encourages people to (unconsciously or otherwise) choose a path through an area that is not sensitive for wildlife has a higher likelihood of reducing wildlife disturbance.

2.1.2 Break down your broader goal

To determine which behaviour to focus on in your behavioural insights project, you need to break down your broader strategic goals into discrete, specific target behaviours.

Interventions should generally focus on one specific target behaviour, which may seem like a small step in a long process. However, the advantage of taking this approach is that you can better tailor your intervention to the behaviour in question, making it more likely to be successful. And by breaking down large problems into well-defined parts, you can improve each one incrementally, and ultimately see real and attributable progress towards your high-level goal.

In this step of the Target phase, you should generate a list of as many specific behaviours as possible that contribute to the broader goal. The following procedure helps you do this systematically:

- First, state the broader goal: what problem are you trying to solve?
- Then list the different actors involved: who are all the people who contribute to the success or failure of this goal?
- Finally, consider actions: for each actor, list as many specific behaviours as possible that influence the success or failure of this goal.



One of the authors leads a Target brainstorming exercise with a group from the Department for Environment, Food & Rural Affairs.

2.2 Determine how you will measure them

To evaluate whether you achieved your Target, you will need a way to measure people's behaviour. A behaviour is measurable if you can tell whether a person did (or did not do) what you wanted them to do, and you can express this in numbers.

2.2.1 *Intermediate versus ultimate outcomes*

Often, multiple steps are required to get from an initial action to the final (ultimate) outcome we wish to achieve. These steps are intermediate outcomes or mechanisms. For example, the desired ultimate outcome may be that more dog-walkers keep their dogs under control. An intermediate outcome could be that more people join responsible dog-walkers' groups, with the assumption that they get tips from other dog-owners on training their dogs, or that more people sign up to a free training class to be certified as a responsible dog-walker.

It can often be easier to measure intermediate outcomes than ultimate outcomes: in the example above, counting the followers of a social media group or sign-ups to a class is more straightforward than measuring dogs on-site that are 'under control'. However, it is important to be clear which kind of outcome you are considering, as intermediate outcomes may rely

on assumptions to be translated into final outcomes. It may be useful to write out the steps and assumptions as a simple theory of change.⁵

2.2.2 Proxy versus direct measures

Where possible we emphasise behaviours that are observable. However, in some cases this is not possible, as the behaviour may just be difficult to observe, or occur too far into the future. In this case, we would have to rely on a proxy for the outcome of interest. This is a measure that you expect to be correlated with your outcome of interest and that you can observe.

Examples of proxy measures are people's intentions to adopt a certain behaviour, or people's reports of adopting that behaviour recently. However, as explained in section 2.1.1 above, people's intentions do not necessarily reflect what they will do in practice. Similarly, people often do not remember accurately what they have done. This means that proxy measures can be much less reliable than direct measures of behaviour, so should only be used when necessary. If you do use a proxy measure, it is a good idea to carry out qualitative research to improve your understanding of how your intervention is having an effect (see section 5.4 below).

2.2.3 Available data

When considering outcome measures, it is helpful to think about what sources of data already exist, to make your job easier and reduce the risk of human error when collecting new data:

- Data that are already collected on a routine basis. This is the ideal situation, but you will still need to make sure that you have access to the data at the right level for your analysis (e.g. you may need data for individuals, not just averages for a whole group).
- Data that can be collected automatically with a new system or changes to the existing system.
- Data collected specifically for your trial. This is the least preferred option as it is less likely to be sustainable in the long term, and may be prone to error.

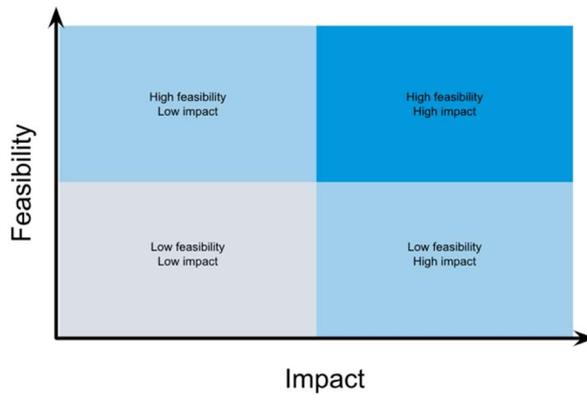
2.3 Assess impact and feasibility

Now you should have a list of many target behaviours of interest, and an idea of how you could measure them. The last step in the Target phase is to assess these behaviours and choose your priority target behaviour to take forward into the Explore phase. Measurability is one aspect that it is important to assess; more broadly, you should consider the feasibility of changing each behaviour, and how impactful it might be.

For each potential target in your list, think about the following questions:

- Will you be able to tell if the behaviour changed (i.e. can you measure it)?
- Do you expect to be able to shift this behaviour? Be realistic - many behaviours are deeply ingrained habits and may be difficult to change.
- Is the target population a large group, or a smaller subsection?
- How closely is this specific target behaviour related to your broader strategic goals (i.e. is it an intermediate or an ultimate outcome)?

- What is the potential impact of this behaviour for encouraging responsible recreation, or the impact that achieving this behaviour will have on the natural environment?



Sometimes you may find a single priority target behaviour that balances impact and feasibility, but it is often more complicated, as the behaviours that are most impactful may not be feasible to change, and vice versa. In this case, you will have to make a trade-off, for example choosing a behaviour that is easier to measure but is further from the ultimate outcome. The case study below gives an example of how we did this.

Case study: Target

The broad goal of the project was to apply behavioural insights 'to changing behaviours of dog walkers to ensure that wildlife is better protected from dog disturbance at key times of the year'. This could include a number of different behaviours, such as putting dogs on a lead in areas where birds are nesting, or visiting less vulnerable areas when walking with dogs. We carried out a Target workshop with rangers and other staff from Bird Aware Solent and Thames Basin Heaths, our two field sites for the project, to identify specific, measurable behaviours that we could focus on.

The main behaviours that rangers would like to see are:

- Dog-walkers keeping their dogs 'under control' (this is difficult to define, though is unlikely to mean strictly 'on leads')
- Visitors and their dogs keeping to paths (where they exist)
- Visitors with dogs avoiding sensitive areas within a given site (e.g. where birds are feeding or nesting), particularly at certain times of year
- Visitors using alternative sites that are less sensitive (e.g. SANGs: suitable alternative natural greenspaces)

In addition, rangers highlighted desirable outcomes such as 'increasing awareness of wildlife sensitivities' and 'shifting attitudes among dog-walkers'. Although in behavioural insights projects we always seek primarily to change behaviour rather than attitudes or awareness (see section 2.1.1 above), we noted that in this instance it would be valuable to include some attitudinal and awareness measures within our target objectives for three reasons:

- Our Explore work (described in Section 3) highlighted a common lack of understanding of what constitutes wildlife disturbance. Though correcting this understanding may not be sufficient to significantly shift behaviour, it would likely help, and may even be necessary,
- The main behaviours in question are themselves not easy to measure or evaluate in the field. Thus tracking visitors' attitudes and awareness, in addition to their behaviours on site, provides a useful secondary set of outcomes.
- Some rangers expressed concern that if we simply address the particular behaviours on site (e.g. by making it easier for dog walkers to use less sensitive locations), without changing underlying attitudes, this does not address wider social norms associated with irresponsible dog ownership. In other words, engendering better attitudes among dog-walkers might be an important long-term outcome in itself, even if (potentially) insufficient on its own to drive significant behaviour change.

After assessing impact and feasibility (including the public acceptability of pursuing certain objectives) we collectively agreed that the primary objective was to:

Ultimate outcome: Encourage dog-walkers to avoid sensitive areas, specifically by choosing to take paths at a given site that go through areas where birds will not be disturbed.

Intermediate outcome: Increase awareness of what wildlife disturbance looks like. By including both the ultimate behavioural target and the intermediate outcome of awareness, we have two sets of data, each of which strikes a different balance between rigour, measurability, and real-world relevance. Combined, this allows us to build up a more complete body of evidence within the limits of what is practical.

3. Explore

Purpose: Now we have identified a specific target behaviour, we need to understand the audience's perspective and the context in which the behaviour occurs. We identify what factors may influence the target behaviour, where we might be able to intervene, and what is already known in related contexts. In particular, we seek to understand the barriers to that behaviour, and the drivers or motivators we may be able to harness. We do this through a variety of methods, making sure to LEAD: Listen to people, Experience the system, Ask questions, and explore the Data. This lays the groundwork for developing a realistic, impactful intervention.

Output: (i) An assessment of the drivers of and barriers to the target behaviour, and potential touchpoints for intervention (optionally presented as a user journey map). (ii) An evidence review of what has been learned in contexts similar to yours.

3.1 Understand your target audience

The key part of the Explore phase is to take the perspective of your target audience, by finding out information directly from users rather than simply imagining what process they may be going through. We can do this with four main activities, summarised by 'LEAD'. When you carry out these activities, bear in mind that you will be using the information to identify the barriers to and drivers of people's behaviour, described in section 3.2 below.

Listen

Speak to people with personal experience of the behaviour (e.g. dog-owners and other recreational users of a site, not just conservation practitioners), to investigate their views, experiences, values, emotions, and motivations. 5-10 interviews can be enough to discover important themes. You might want more if the project looks at diverse target groups and each group is likely to have very different experience, although probing and prompting during an interview often matters more than the number of interviews. Ask open questions (i.e. questions that allow people to tell a story), rather than closed questions (i.e. questions that can be answered with yes/no, a number etc.) and be willing to divert from your list of planned questions when an interviewee brings up something interesting.

Experience

Try to adopt the target behaviour yourself, or if not possible, observe people with as little interference as possible. This allows you to understand much more than if you just ask people their opinion, as our behaviour is highly influenced by factors beyond our conscious awareness (see sections 3.2.1 and 4.1.1 below).

Ask

Survey people to get a broad understanding of an issue (usually at least 50 to capture main themes, and more if wishing to quantify findings or capture representative responses). Surveys allow you to reach a wide range of people in a short amount of time, and understand how prevalent different opinions, behaviours and attitudes are. Make sure that the questions

are mostly quantitative (i.e. have a number as an answer) or multiple-choice (i.e. you give respondents a number of possible answers). This will make it easier to analyse the responses. Think about how you can gather information in a cost-effective way, e.g. add questions to an existing survey rather than launching your own survey, or run a survey online rather than posting paper copies.

Data

Look at any existing data to find relationships, patterns, and trends surrounding your behaviour of interest. This can help confirm or disconfirm findings from the Listen and Ask steps.

3.2 Identify the behavioural barriers and drivers

Now that you have information about your target audience, we need to identify the factors influencing their behaviour. First we want to know why people are not adopting the desired target behaviour, i.e. to determine possible barriers to behaviour change that we will need to overcome with our intervention. We also want to find out if there are any positive influences that we could harness, i.e. potential drivers of the target behaviour. It is often also helpful to consider the drivers of the behaviour you wish to *discourage*: for example, as well considering the factors that make dog-owners more likely to use a lead, think about what factors may make them keep dogs off-lead.

There are many different conceptual models of human behaviour that can help you think through the different behavioural factors more systematically. We outline two below - the ISM model and the COM-B model - that we find particularly useful, but you can choose whichever one you find most helpful for your own project.

3.2.1 The ISM model

ISM stands for the Individual, Social and Material influences on our behaviour (Figure 1).⁶ This model is a description of how behaviour is a product of three levels of influence:

- Individual: What conscious motivations, attitudes and knowledge do individuals have? How do non-conscious biases, habits and emotions influence them?
- Social: How is our behaviour shaped by cultural norms, identities, relationships and interactions with other people?
- Material: What is the wider context of the behaviour? What are the constraints or incentives set by economic factors, infrastructure, technology and availability of options?

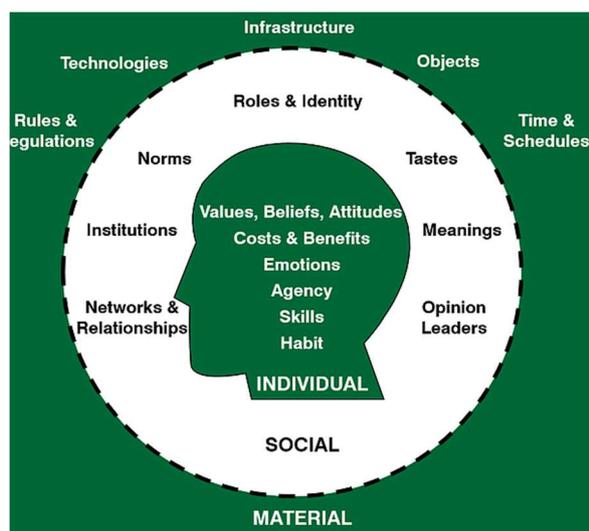


Figure 1. The individual, social and material (ISM) influences on our behaviour (reproduced from ismtool.org).

The ISM model is useful for uncovering the possible reasons why people behave the way they do (and not as we would like them to). By thinking through each of the ISM levels in turn, you will often be prompted to think of influences on people's behaviour that you otherwise would have overlooked.

3.2.2 The COM-B model

The COM-B model describes how behaviour change emerges when three factors are in place. Specifically, Capability, Opportunity and Motivation together produce a change in Behaviour (Figure 2).⁷

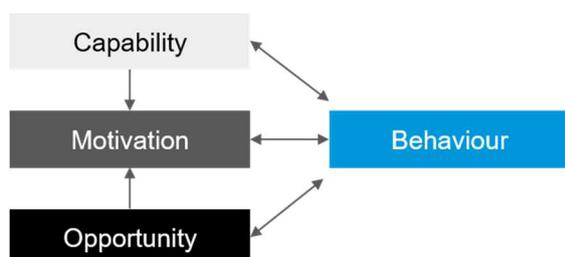


Figure 2. The COM-B model: (i) capability, opportunity and motivation together produce behaviour change, (ii) behaviour change feeds back to affect capability, opportunity and motivation, and (iii) motivation is affected by capability and opportunity.

Capability is defined as the individual's psychological and physical capacity to engage in the behaviour in question. It includes having the necessary knowledge and skills (see case study section below for examples in each of these categories).

- *Physical capability* can include strength, skill or mobility.
- *Psychological capability* can include knowledge and access to information.

Opportunity is defined as all the factors that lie outside the individual that make the behaviour possible or prompt it.

- *Physical opportunity* can be afforded by the local environment, time-availability, accessibility and resources.
- *Social opportunity* can be afforded by cultural norms, identities and social cues.

Motivation is defined as all the brain processes that energize and direct behaviour, not just goals and conscious decision-making. It includes habitual processes, emotional responding, and analytical decision-making, all of which may be shaped or distorted by cognitive biases

- *Reflective motivation* can include assessments of trade-offs, plans and evaluations.
- *Automatic motivation* can include desires, impulses, inhibitions and habits.

At BIT we find the COM-B model particularly useful for uncovering the possible barriers to behaviour change. Think through each category in turn: what aspects of capability, opportunity and motivation may be lacking, making it difficult for people to adopt the target behaviour? Go into as much detail as possible: documenting these barriers will provide you with a good basis for identifying interventions during the Solution stage. In the case study section below, we give an example of how we used COM-B to identify both barriers and drivers.

3.3 Determine the touchpoints for intervention

Now it's time to identify where we might be able to intervene to change behaviour. Look for:

- Moments of decision: when is your target audience making a choice that directly affects the target behaviour? For example, this could be when a dog-walker is leaving their house and deciding whether or not to bring a lead.
- Points of contact: at which steps on the user journey can you contact your target audience, and how? These could include leaflets at a car park, or messages on social media.
- Points of influence: where do you have leverage over your target audience's behaviour? For example, you may be able to influence people's walking routes by which paths you maintain on-site.

It's often helpful to develop a user journey map to help you find opportunities for intervention. A user journey map is a sequence showing the steps a person must follow to complete the target behaviour. When mapping the user journey, you should break it into as many stages as possible and be as detailed as possible about each step. You can highlight the stages where you might be able to intervene, and it can be helpful too to note the barriers and drivers (section 3.2 above) that affect whether people move along the journey to the next stage.

In some cases, you may find that you have very little influence over or contact with the target audience. If this is so, consider returning to the Target phase and choosing a different target behaviour.

3.4 Investigate relevant work in similar contexts

In addition to carrying out Explore work with your specific target population and in your target location, it is helpful to find out what others have learned. This could include related interventions that have been tested elsewhere, or qualitative research that has uncovered

behavioural drivers and barriers that are relevant to your target. Again, use the COM-B categories to help you identify the drivers and barriers systematically.

An easy way to do this is in a literature review, which could include published research from academia, government, NGOs and charities. You can also speak to people directly: setting up informal interviews with experts in the area can be an effective way to build your knowledge, and can help direct your literature review.

Case study: Explore

Our Explore phase had two main components, each of which is reported in full in a standalone document: a rapid targeted search of the published evidence on responsible recreation interventions (details in our literature review), and 'LEAD' activities at our two pilot sites and with responsible recreation experts (details in our Explore Report).

1. Literature review

We reviewed relevant government agency reports, independent reports and published peer-reviewed literature related to recreation management or mitigation efforts in the UK and international conservation contexts. From these sources, we compiled a list of different intervention types, drawing upon a pre-existing categorisation for behavioural interventions in conservation: physical, cognitive, incentives, enforcement and engagement (though there is some overlap, and some interventions blend elements of more than one). Alongside each intervention type, we highlighted the barriers which the intervention aims to overcome, using the COM-B model. Finally, for each intervention type we indicated the relevant behaviours it could feasibility target and assessed the strength of evidence.

The key findings are:

- Many different types of interventions have been used but they have not all been informed by behavioural science, and have rarely been rigorously evaluated;
- Those with the strongest evidence base involve modifying the physical environment, including changing the layout of paths, or including affordance cues (where design of objects and the environment can unconsciously provide instructions on how to act, e.g. flat surfaces on doors indicate 'push' while a handle indicates 'pull'); providing training; patrols by staff; and social marketing. This echoes the more general finding that our behaviour is often rooted in automatic responses to our physical and social surroundings;
- Social marketing and other approaches that depend on changing attitudes and awareness need to be designed carefully to ensure intention translates into action;
- The specific messages that work most effectively in signage, education and social marketing approaches is an open question; and
- A combined approach may be the most effective, such as combining awareness-raising with physical prompts at the moment of decision on site to nudge that ambient awareness into action.

2a. LEAD: expert interviews

We spoke with five experts in responsible recreation, from Natural England, the RSPB, Brecon Beacons National Park, and Cardiff University. The findings corroborated those from the literature review: many interventions have been attempted in the field but there has been little rigorous evaluation, and while suggested ideas are abundant, there is not a strong evidence base on what works. Promising interventions include modifications to the physical environment, such as by using paths or natural barriers to direct people away from sensitive areas, and messages that harness dog-owners' identity, needs and sense of responsibility, rather than the more typical approach of conservation framing.

The table below summarises the interventions that have been tried, the behaviours they target, and the accompanying evidence.

Intervention type	Target behaviour	Evidence
Physical		
Alternative space	 Site choice	 Unknown
Path and habitat	 Route choice	 Effective
Affordance cues	  Route choice Dog fouling	 Effective
Amenities and maintenance	   Site choice Route choice Dog fouling	 Unknown
Cognitive		
Education	     Site choice Route choice Dog fouling Dog control Wildlife avoidance	 Mixed
Training	  Dog control Wildlife avoidance	 Effective
Signage	   Route choice Dog fouling Wildlife avoidance	 Promising
Incentives		
Financial	    Site choice Dog fouling Dog control Wildlife avoidance	 Mixed
Non-financial	    Site choice Dog fouling Dog control Wildlife avoidance	 Promising
Enforcement		
Regulation	     Site choice Route choice Dog fouling Dog control Wildlife avoidance	 Mixed
Patrols	    Route choice Dog fouling Dog control Wildlife avoidance	 Effective
Engagement		
Social marketing	    Route choice Dog fouling Dog control Wildlife avoidance	 Effective
Stakeholder engagement	    Route choice Dog fouling Dog control Wildlife avoidance	 Promising
Citizen science	    Route choice Dog fouling Dog control Wildlife avoidance	 Unknown

2b. LEAD: visitor interviews

We conducted a series of short interviews (~5 minutes) with dog walkers and other visitors at a sensitive and non-sensitive site in each of the Thames Basin Heaths and Solent areas. We identified a range of barriers to and drivers of responsible recreation behaviour at both sites. These include factors related to individuals' awareness about sensitive birds and birds' sensitivity to seemingly 'normal' dog behaviour, but also the physical characteristics of each site and visitors' non-conservation-related motivations. In particular, we found low levels of awareness about what constitutes bird disturbance or personal acknowledgement of individuals' own possible impacts. We also found that dog-walking at each site is often a highly habitual and social activity, and the behaviours of other visitors are highly visible.

We also found that visitors were generally quite receptive to messages about bird conservation, and supportive of bird-related information signs. However, an important caveat to note is that people often do not do what they say they will do, as discussed in the Target section above. Furthermore, from interviewing visitors and watching dog behaviour at each site, it is clear that owners rarely have sufficient off-lead control over their dogs to prevent bird disturbances, even though visitors tend to think their own dogs are under sufficient control. Given visitors' strong motivation to visit these sites specifically for off-lead access, we suggest it may prove difficult to encourage visitors to either change site or use the lead for conservation purposes alone. Encouraging dog-walkers to choose certain routes and keep dogs in close proximity and 'under control' is likely to be more feasible.

3c. LEAD: visitor survey

We surveyed 64 people in dog-focused social media groups in the Thames Basin Heaths area (using Google Forms to create the survey). We targeted these groups because we wanted to get responses from dog-owners specifically. However, we note that this is not a representative sample of dog-owners, as we would expect those who belong to the social media groups and completed the survey to be more engaged than average.

The main findings are:

- People's primary motivation for choosing somewhere to walk their dog was having somewhere to let the dog off-lead; convenience and cost are also important;
- People identified as nature lovers and think dog-walkers have a responsibility to look after natural areas they use, and although they agreed that visitors can have a negative impact, they did not often see dogs disturb wildlife;
- People got information about the area from social media, wardens and leaflets, and they were most interested in finding out about amenities, where the different areas are and where to walk their dog.

The table on the next page uses the COM-B model to summarise the barriers and drivers that we identified from the visitor interviews and survey. These findings suggest that raising awareness could be valuable if supported with other interventions, such as modifications to the physical environment, that help bridge the gap between intention and action.

Influencing factor	Barriers	Drivers
Physical capability	<ul style="list-style-type: none"> • Owners lack the ability to keep dogs under control • Some birds are hard to see 	<ul style="list-style-type: none"> • Dogs can be trained, some dogs are easier to keep under control than others
Psychological capability	<ul style="list-style-type: none"> • Many people don't realise when their own dog disturbs birds, or the impact of visitors on wildlife • Some people are not aware of sensitive areas/seasons • Many people don't know where to find more information • Some people don't know about/how to get to other sites 	<ul style="list-style-type: none"> • Many people are aware of sensitive areas or times of year • Signs appear effective at conveying information • Advertising alternative sites appears to be effective
Physical opportunity	<ul style="list-style-type: none"> • Lack of time to go to alternative sites • Some sites have no natural 'zones' or barriers to indicate sensitive areas 	<ul style="list-style-type: none"> • People tend to follow paths or signs when available • Car parks are focal points where people could be reached • Car park spaces limit visitation • Site access may be environment-dependent (e.g. tide, mud) • Some sites have naturally demarcated 'zones' and barriers (e.g. via habitat type or waterways)
Social opportunity	<ul style="list-style-type: none"> • Visitors easily see other visitors with dogs off lead • Lack of social pressure to not use lead • Some visitors direct the need for behaviour change towards others rather than themselves 	<ul style="list-style-type: none"> • Many people have interacted with wardens • Dog-walking is a social activity, and many regulars chat to each other
Reflective motivation	<ul style="list-style-type: none"> • Desire to be on the beach/in the heather rather than in a less 'wild' area • Desire to be away from roads • Visitors do not always pay much attention to signs • Owners more motivated by giving their dog somewhere to run around than by protecting wildlife 	<ul style="list-style-type: none"> • Owners care about their dog's safety • Many people consider themselves to be nature-lovers and think dog-owners have a responsibility to look after natural areas
Automatic motivation	<ul style="list-style-type: none"> • Strongly entrenched routines make behaviour hard to shift • Visitors often do not notice wildlife • People who use a site daily may be wary of interventions that seem intrusive 	<ul style="list-style-type: none"> • Harness moments to create new routines, such as moving house or buying a dog

4. Solution

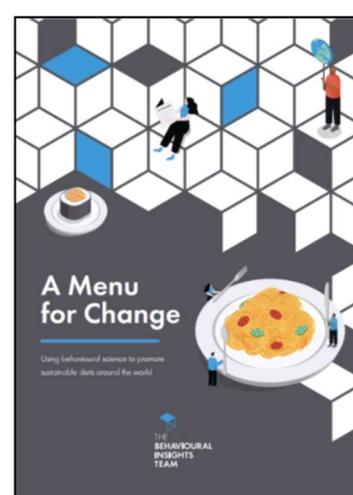
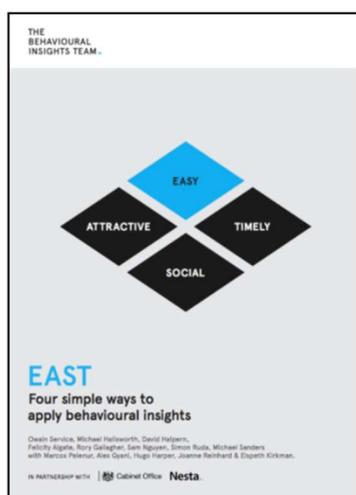
Purpose: We design an intervention to change the Target behaviour using our Explore findings and insights from the behavioural science literature. A simple way to apply behavioural insights is to use the EAST framework: interventions to change behaviour should make it Easy, Attractive, Social and Timely. As in the Target phase, we then consider feasibility and impact, assessing each intervention idea to see how well we could implement it and how successful it is likely to be.

Output: A shortlist of intervention ideas that balance impact and feasibility. One idea should be chosen to take forward into the Trial phase, with a detailed plan for how you will implement it.

4.1 Develop intervention ideas

As a first step in developing intervention ideas, consider any existing interventions that you identified in the Explore phase that could be adapted for your context, or any existing ideas you may have that could be developed further.

The next step is to generate new ideas based on behavioural science. The most successful interventions will generally achieve two things. First, they will address the key barriers identified in your Explore research. Second, they will align with the wider science of behaviour change. Much of that wider research is summarised in BIT's 'EAST' framework, though many other resources are available, including BIT's reports 'Behaviour Change for Nature' and 'A Menu for Change', and Defra's '4-Es' framework.⁸



4.1.1 EAST: four simple ways to apply behavioural insights

The EAST framework distils the behavioural science literature into four principles to make them easier to use in practice: make the desired behaviour Easy, Attractive, Social and Timely. We give an overview and examples of each principle in Table 1 below, and intervention ideas from our own responsible recreation project in the case study at the end of this section. Please note that Table 1 is not an exhaustive list: for more examples, we recommend you read the full EAST report.

Table 1. Behavioural insights to make behaviour Easy, Attractive, Social and Timely.

Principle	Behavioural insight	Example
Easy One of the most important lessons from the behavioural science literature is that even when people want to do something, they often take the path of least resistance. Very small and seemingly trivial ‘frictions’ can have a large influence on behaviour.	Friction costs. Our behaviour is disproportionately impacted by small points of hassle. Removing these frictions can help people act on their intentions, while introducing frictions can discourage undesirable actions.	The recycling rate at a university increased after the introduction of bins with specialized lids, which made it easier to see which items should go where (removing friction). ⁹ Less food was wasted when a cafeteria did not provide trays, as people had to make an effort to get more food (adding friction). ¹⁰
	Choice architecture. Our subconscious decision-making is influenced by the availability and positioning of options: we’re more likely to choose what is more available, easier to reach or first on a list. We also evaluate choices relative to the other options that are present, so a large cup of coffee would seem small compared to an extra-large one, but not compared to a small one.	Diners were more likely to choose sustainable food options when these options were listed at the top of the menu, made more visible, or made more available relative to other options. ¹¹
	Defaults. People tend to stick with the default choice or the status quo. This is because we don’t engage consciously with many of our daily decisions, or we lack the motivation to take a different course of action. Defaults are also often perceived as a ‘safe bet’ or an implicit recommendation.	Defaulting customers into a renewable electricity tariff led to a tenfold increase in the number of people on that tariff. ¹²
	Substitutes. Behaviour change is easier when people are provided with an alternative course of action that is	Switching from smoking to using e-cigarettes can be more effective than trying to quit cold turkey. ¹³

	more similar to the undesirable behaviour they are shifting away from.	
<p>Attractive We are constantly exposed to more information than our brains can process, meaning that we have developed strategies for filtering out all but the most salient parts. We are more likely to adopt a behaviour when it captures our attention or is in line with our motivation and beliefs.</p>	<p>Framing. People tend to find messages based on pride, fun and humour more compelling than those based on guilt. People are also driven by desires to save money, have fun and be social.</p>	<p>A survey of UK citizens who had adopted lower-carbon lifestyles found that concern for ‘the environment’ was often not their primary motivation.¹⁴ People in a study who were asked to imagine the positive emotion of pride expressed more pro-environmental intentions than people asked to imagine guilt.¹⁵</p>
	<p>Incentives. The way rewards are offered and framed influences how attractive they are even when their actual value remains constant. Lotteries can be effective motivators because people often focus on a large prize, even if their chance of winning it is small. Non-financial incentives can work because social approval or recognition can be just as motivating as money (see Social section below). Also, if there is a risk of payment displacing people’s intrinsic motivation to do the right thing, non-monetary rewards and social recognition can be more effective.</p>	<p>People who played a game competing with others to be more sustainable consumed less energy for several months after playing the game.¹⁶</p>
	<p>Salience. We have finite attention and mental capacity, so we’re drawn to stimuli that stand out, are engaging and are relevant to us. You can draw attention with visual cues that are particularly noticeable (such as bright and contrasting colours, or using people’s names) or with communications that are tailored to people’s interests.</p>	<p>Study participants who read messages about the local effects of climate change (making it more personally relevant) reported higher engagement than those who read about global effects.¹⁷ Painting green footsteps on the ground leading up to bins (an eye-catching cue) resulted in less litter on the street around the bins in a Danish city.¹⁸</p>
<p>Social Humans are social beings and we are heavily influenced by what those around us do and say, especially those we identify with.</p>	<p>Social norms. People are highly influenced by what others are doing, so we’re more likely to adopt a behaviour when we think that the majority of people do it or an increasing number of people are shifting towards it.</p>	<p>High-consuming electricity customers decreased their usage after receiving reports comparing them to their more efficient neighbours (and low-consuming customers stayed low when given positive feedback in the form of a smiley face).¹⁹ People were more interested in cutting down their meat consumption when they were informed that a growing number of people had recently started eating less meat.²⁰</p>

	<p>Messengers. Social influences are particularly powerful when they come from ‘people like us’, or people we find likeable, credible or authoritative.</p>	<p>Students from disadvantaged backgrounds in the UK were more likely to apply to university when they received a letter of encouragement from a former student with a similar background.²¹</p>
	<p>Observability. Making behaviour public can be a strong motivator to avoid the social cost of not following through, and to behave in a way that we (often unconsciously) wish to be seen by others.</p>	<p>Donations to a Costa Rican national park made in public in the presence of a solicitor were 25% higher than those made in private.²²</p>
	<p>Identity. People attach a lot of value to their sense of identity and to social groups they belong to or want to belong to.</p>	<p>A campaign to reduce illegal wildlife trade among men in Vietnam highlighted the desirable identity of internal character strength (“chi”), contrasted with obtaining strength from rhino horn consumption.²³</p>
<p>Timely People react very differently to the same information depending on when they receive it. In addition, we have a deep tendency to value the present more than the future.</p>	<p>Key moments. Humans are creatures of habit and it can be difficult to change our behaviour once we've got into a routine, but you can capitalize on or generate moments of disruption to help people start new habits. For example, encourage changes when someone moves house, or get people to try something new during a dedicated day, week or month.</p>	<p>People were four times more likely to sign up to a new bike-sharing scheme when they had recently moved into the area (because they were forming new routines in their lives) compared to when existing residents just had a bike docking station installed near their home.²⁴</p>
	<p>Planning. We're more likely to act on our intentions when we have a specific plan with concrete actions and steps to overcome potential barriers. Simple guidelines and rules of thumb can also keep us on track, as can prompts or reminders at key moments and feedback on the positive effects of our behaviour.</p>	<p>When employees planned their recycling intentions, a company produced less waste going to landfill.²⁵</p>
	<p>Pre-commitments. The complexities of life and our limited willpower often get in the way of our good intentions. We are therefore more likely to act on those intentions if we lock ourselves into a commitment in advance, such as signing up to run a marathon.</p>	<p>Hotel guests were more likely to reuse towels when they committed to do so at check-in.²⁶</p>

4.1.2 How to use EAST

First, consider the behavioural drivers and barriers that you identified during the Explore phase. How could the behavioural insights in EAST help you harness the drivers and overcome the barriers? Brainstorm a list of intervention ideas. For example, a barrier to people putting their dog on a lead while walking through a sensitive area is that they see most other dog-owners with dogs off-lead (social norms). An intervention idea would be to make it more visible when dog-owners do use leads: for example, you could use photos of dogs on leads in photos in any communications materials.

Next, consider the touchpoints for intervention that you identified during the Explore phase: when could your intervention idea be implemented? For example, photos of dogs on leads could be featured in leaflets and posters on-site, as well as on social media.

4.2 Prioritise impact and feasibility

The previous step will give you a longlist of intervention ideas. It is unlikely that you will be able to test all of them, although sometimes it may be possible to bundle together more than one idea into a broader 'suite' of interventions. In any case, the next step is to narrow down your list by considering the two criteria we used in the Target phase: impact and feasibility. Whereas previously we assessed the impact of changing the target behaviour on our broader goal, now we need to assess the impact of the intervention on changing the target behaviour. We also previously assessed how feasible it would be to shift the target behaviour; now we need to assess how feasible it would be to implement the intervention.

As in the Target phase, you may have to trade off feasibility and impact when choosing your highest priority Solution idea. Questions to consider when prioritising your ideas are:

- Does the intervention address the barriers you identified in the Explore phase?
- How large an effect do you think this intervention might have on behaviour? You may be able to find the impact of similar interventions in the literature you reviewed.
- Do you have the budget, capacity and buy-in or authority to implement the intervention (and, if it is successful, to scale it)?
- How will you evaluate whether your intervention is successful? At this point it is helpful to read ahead in the Trial section, as some interventions may only be suitable for certain types of evaluation.

4.3 Refine your chosen idea

When you have selected which idea(s) you want to test, you will need to flesh out the details, including designing the materials and determining how the intervention will be delivered. Depending on the intervention, you may want to prototype it and get feedback from your target audience. Note that this prototyping process does not show us whether the actual intervention will have an impact on the target behaviour of interest, but just whether the intervention has the potential to be effective.

The Template for Intervention Description and Replication (TIDieR) is a helpful way to think through the details of an intervention systematically.²⁷ This framework involves answering the questions in Table 2 to give a comprehensive description of an intervention, including its

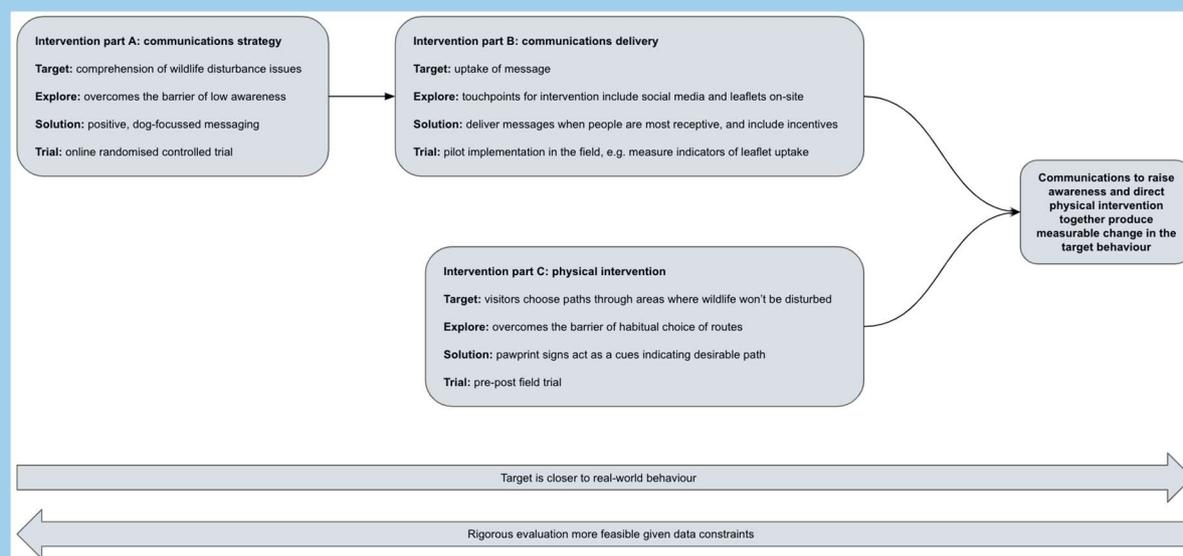
rationale; the steps, resources and personnel necessary for its implementation; and any modifications or risk mitigation to take into account.

Table 2. Template for Intervention Description and Replication.

Item	Description
Brief name	Name or phrase that describes the intervention
Why	Rationale, theory or goal of any of the elements of the intervention
What (materials)	Physical or informational materials used in the intervention, including those provided to participants or used in intervention delivery or in training of intervention providers
What (procedures)	Each of the procedures, activities, and/or processes used in the intervention, including any enabling or support activities
Who (providers)	Roles of people delivering the intervention
Who (recipients)	Groups of people receiving the intervention
How	Modes of delivery (such as via leaflets or face-to-face) of the intervention and whether it was provided individually or in a group
Where	Locations(s) of the intervention, including any necessary infrastructure or relevant features
When and how much	The number of times the intervention is delivered and over what period of time including the number of sessions, their schedule, and their duration or intensity
Tailoring	If the intervention is personalised or adapted, then what, why, when, and how
<i>Modifications</i>	<i>To be completed after the intervention: Modifications to the intervention during the course of the study (what, why, when, and how)</i>
How well (planned)	Strategies to maintain or improve intervention adherence or fidelity: how and by whom
How well (actual)	<i>To be completed after the intervention: The extent to which the intervention was delivered as planned</i>

Case study: Solution

We generated behaviourally-informed ideas for three separate intervention components, reflecting our parallel approach of including intermediate outcomes alongside our main behavioural target.



Intervention part A: a new communications strategy

Our aim is to maximise the impact of communication materials on dog-walkers' comprehension of what wildlife disturbance entails, as well as their perceptions of how positive they found the message, and how likely they would be to pick up a leaflet on a future walk. The behavioural insights we chose to incorporate into a leaflet included:

- Action-oriented branding targeted towards dog-owners rather than branding from the nature area, which may be perceived as a conservation-oriented messenger
- Simple checklist of actions for dog-owners to take, emphasising new things try with their dog rather than reducing wildlife disturbance
- Positive images, including a birdwatcher with a dog (in order to reduce perceived opposition between birdwatchers and dog-walkers)
- Appealing to dog-owners as 'nature lovers': our Explore work showed that most dog-owners in our sample considered themselves nature lovers, so we also include a social norms message
- A social norm message, highlighting that most dog-walkers consider themselves nature lovers
- Information about what wildlife disturbance looks like, highlighting the birds' story to make disturbance more salient, and emphasising potential losses to dog walkers
- Content that is useful and interesting to dog-walkers beyond providing information about disturbance, including new routes to try with your dog and birds to spot along the way

On the next page, we show the behaviourally-informed leaflet designs, with two alternative front covers, and versions displaying branding from each pilot site (see the Trial section of the case study for further details).

Two alternative front covers

Checklist inside front cover

Main inside section

Cover 1

Cover 2

Top tips for winter walks

Top tips for winter walks

www.birdaware.org

90% of dog walkers we speak to are nature lovers.

We are as well.

Please join us in protecting the wildlife we all love.

Keep your dog happy & safe

- Keep clear of roads
- Avoid sticky mud and sharp shells
- Check for ticks after your walk
- Play with toys and try new areas - take a look at our suggestions overleaf!

Are you a nature lover too?

Nature-loving dog walkers

- Never let their dog close to birds or wildlife - even when they can fly away.
- Keep their dog close to paths.
- Use a lead around livestock or when signs require it.
- Keep their dog in sight when it's off lead.
- Are considerate of other people who may not be comfortable around dogs.
- Bag and bin their dog's poo - in ANY public bin.

Protecting birds protects the Solent

Follow our dog-friendly trails. Look out for the paw-prints!

Some favourite birds in the Solent are the dunlin and the oystercatcher - have you seen them?

These wintering birds fly in from as far as the Arctic to feed on our shores.

They can only eat when the tide is right - but a bird in flight can't eat at all.

We cannot eat when we fly. Every time a dog runs by, so on the path is where to stay, or feeding birds will fly away.

Their numbers dropped over recent years - and if we continue to lose them, this area might lose its protected status.

Lead your dog somewhere new

Follow us on social media! @BirdAwareSolent

Tell us what being a #BirdAwareSolent means to you, and how you help protect our precious wild spaces - and we'll enter you into our monthly prize draw.

Explore new places

There are lots of great places to walk with your dog around the Solent. Here are some of our favourites - which will you try first?

- Royal Victoria Country Park, SO31 5GA - dog washing facilities, toilets, cafe and parking
- Manor Park Country Park, SO31 1BH - toilets and paid parking
- Alver Valley Country Park, PO13 8LU - toilets and parking
- Appley Park, Ryde, IOW, PO33 1QX - toilets, parking and nearby cafes
- Fort Victoria Country Park, IOW, PO41 0BB - toilets, free parking and cafe

My next walk will be on _____ (date) and I will go to _____ (site)

Top tips for summer walks

Top tips for summer walks

www.tbhpartnership.org

90% of dog walkers we speak to are nature lovers.

We are as well.

Please join us in protecting the wildlife we all love.

Keep your dog happy & safe

- Keep clear of roads and any military training
- Reduce the risk of fire by never discarding cigarettes, bringing BBQs or lighting fires
- Avoid adders and ticks in the heather - check after walks
- Play with toys and try new areas - take a look at our suggestions overleaf!

Are you a nature lover too?

Nature-loving dog walkers

- Never let their dog close to birds or wildlife - even when they can fly away.
- Keep their dog close to paths.
- Use a lead around livestock or when signs require it.
- Keep their dog in sight when it's off lead.
- Are considerate of other people who may not be comfortable around dogs.
- Bag and bin their dog's poo - in ANY public bin.

Protecting birds protects the heaths

Follow our dog-friendly trails. Look out for the paw-prints!

Some favourite birds in Thames Basin Heaths are the nightjar and the Dartford warbler.

These birds fly from as far as Africa to breed here during the spring and summer.

They all nest on or close to the ground and are extremely vulnerable to disturbance.

"You can help avoid disturbance and give my chicks the best chance of survival by sticking to paths and keeping dogs out of vegetation"

No birds could mean no protection from development.

Lead your dog somewhere new

Follow us on social media! @TBHPartnership and join 1000 other members in our dog-walking community group: Heathland Hounds.

Tell us what being a #TBHnaturelover means to you, and how you help protect our precious wild spaces - and we'll enter you into our monthly prize draw.

Explore new places

There are lots of great places to walk with your dog around Thames Basin Heaths. Here are some of our favourites - which will you try first?

(On the map):

- 37 = Nishe's Wood at Crookham Park, GU52 8TJ
- 38 = Wellesley Woodlands, GU11 2HL
- 39 = Lakeside Nature Reserve, GU12 5AA
- 40 = Farnham Park, GU9 0AU
- 41 = Rowhill Nature Reserve, GU11 3BD

My next walk will be on _____ (date) and I will go to _____ (site)

Intervention part B: 'delivery channels' for this communications strategy

The messaging approach developed in part A above can be delivered in a range of ways, for example through social media, as leaflets to new homemovers, or on signage in car parks. We outline behaviourally-informed next steps for this in the Scale section below, but did not develop this part of the intervention further.

Intervention part C: a physical intervention

While parts A and B address the intermediate outcome of raising awareness, part C addresses the target behaviour directly (path choice on-site). We generated a list of solution ideas based on the behavioural science literature and the evidence base for previous interventions in responsible recreation that we gathered during our Explore phase literature review. Our shortlist included:

- Create loose or temporary barriers around highly sensitive areas, or paths that we don't want people to walk down on (e.g. with vegetation, or pieces of string attached to short wooden poles); alternatively, create new paths through non-sensitive areas. *Behavioural insight: make it easier for people to visit non-sensitive areas.*
- At critical decision points (e.g. exit from a car park), indicate the preferred path choice (to non-sensitive area) with pawprints. *Behavioural insight: our attention is unconsciously drawn to novel, engaging and relevant stimuli.*
- Traffic light pawprint marker displayed on path to indicate suitability for dogs. *Behavioural insight: traffic light labelling is easy to understand and does not require much awareness of the underlying issues.*
- Provide free training events for dog-walkers; attendance could be incentivised by framing as a free coffee/social event. *Behavioural insight: training does not simply raise awareness but helps bridge the gap between intention and action by building capacity and helping people go through specific steps they need to take in the relevant moment.*
- Label certain paths in non-sensitive areas as being 'for dogs', just as bridleways are implied to be for horses. *Behavioural insight: instead of asking dog-walkers to avoid certain areas, this has a more positive framing that harnesses dog-walkers' sense of identity, allowing them to feel ownership over certain areas.*
- Provide signs with route maps that recommend good paths for dogs and give tips for 'things to do with your dog' along the way (more positive framing of 'how to behave responsibly with your dog'). *Behavioural insight: this makes it easier for dog-walkers to choose less sensitive areas, and by tailoring the map to dog-owners' specific needs and motivations, makes certain options more appealing to them. Providing the information at a timely moment (on signs while out for a walk) is more effective than when they are more removed from potential decisions (such as reading a leaflet at home).*
- 'Gamification' of desired paths by having dog-walkers take pictures of their dogs at several points along the path and post them on social media with a specific hashtag (similar to a scavenger hunt) along with a prize draw. *Behavioural insight: this aims to increase motivation to use certain paths by harnessing dog-walkers' social*

identity and desires to benefit their dog while using natural areas. Prize draws (financial or non-financial) can also be more effective than fixed incentives.

- Provide dog-related amenities or activities (such as washing stations and waste bins, or interactive 'sniff trail') on paths in non-sensitive areas. *Behavioural insight: dog-owners are highly motivated by benefits to their dogs. This intervention aims to make non-sensitive routes more attractive in this regard.*
- Create a certificate and course for professional dog-walkers to be 'Natural England approved' (or appropriate authority), which would cover dog safety and other topics in addition to wildlife awareness; promote this among dog owners to encourage them only to use approved professionals. *Behavioural insight: the effectiveness of training opportunities could be amplified by using market forces (demand from dog-owners) to encourage professional dog-walkers to take a training course.*
- Hold a dog-walking and bird-watching club (walks could be led by a 'guide dog'). *Behavioural insight: there may be hostility between dog-walkers and bird-watchers, as each perceive the other to be part of a distinct 'other' social group. A joint activity could help dissolve this barrier, and encourage dog walkers to pay attention to the birds and be aware of potential disturbance.*

After discussion with the teams at each field site, we agreed that the solution best balancing feasibility and impact, and most in line with the teams' priorities, was the **pawprint signage** indicating the preferred path, with optional provision of dog-friendly amenities on these non-sensitive paths.

5. Trial

Purpose: It's often tempting to assume we know what works, but human behaviour is complex, context-specific and unpredictable, and even interventions based on robust theory and logical assumptions may not work as expected. So the behavioural insights approach is not just about applying novel behavioural science, but also crucially about running impact evaluations, i.e. gathering evidence to find out whether an intervention is effective. Ideally we use randomised controlled trials (RCTs), where one group of people is randomly allocated to receive the intervention while the other does not, as this is the most rigorous method of impact evaluation. However there are several other methods we can use when an RCT is not possible, for example due to small sample sizes or an inability to allocate the intervention randomly.

Output: Results from an impact evaluation to tell you whether your intervention worked. You may also have findings from a process evaluation to tell you how your intervention was received by the target audience.

5.1 Define your outcome measures

As described in section 2.2 in the Target phase, we need a way to quantify people's behaviour. Outcomes are what we will measure in this trial, i.e. what we expect to change as a result of intervention. It is preferable to use direct observations of behaviour, but where this is not possible, your outcomes will have to be proxy measures for that behaviour (section 2.2.2), or intermediate outcomes which are expected to precede a behaviour such as altered attitudes or behavioural intent (section 2.2.1), noting that we cannot always assume these translate to the target behaviour itself.

We typically define a single primary outcome measure in any given trial. When we have multiple outcome measures, we risk finding statistically significant results simply by chance. To reduce this risk, best practice is to choose the outcome that we consider most important to be the primary outcome measure, and we can analyse additional outcomes of interest as secondary outcome measures, which can tell us details about how the primary outcome works, or exploratory outcome measures, where we look for trends in the data that we may not have considered before we ran the trial.

5.2 Identify your comparison group

5.2.1 Randomised controlled trials

Randomised controlled trials (RCTs; Figure 2) are seen as the gold standard of rigour in an impact evaluation.²⁸ They are standard practice in medicine; now used in many other fields such as education, they are becoming more common in conservation as well.

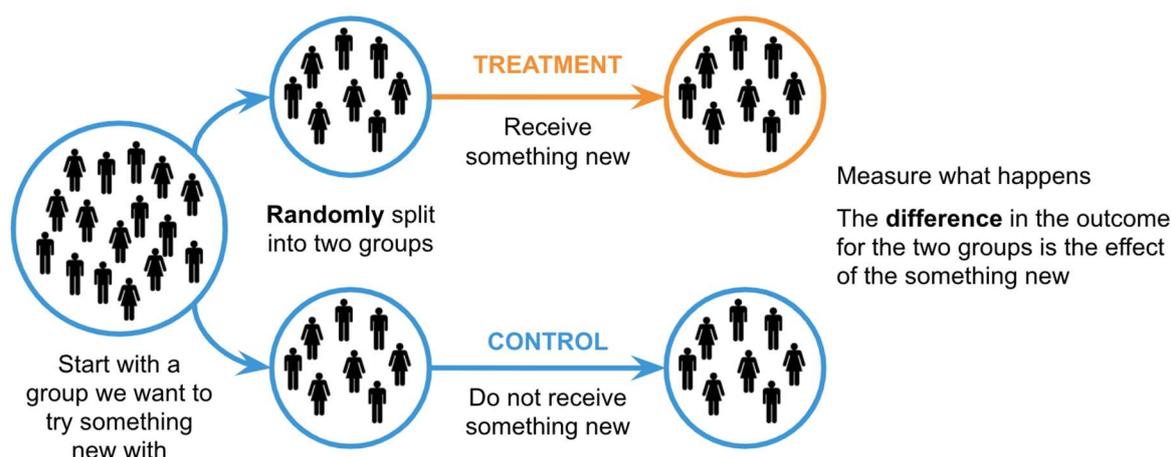


Figure 3. Overview of a randomised controlled trial (RCT).

The most important characteristics of an RCT are, as the name suggests:

- **Random assignment.** We randomly allocate people to the treatment or the control group, rather than making use of any pre-existing groupings (e.g. people from one town or in one age group receive the treatment while others do not). For a large enough sample size, we would expect randomisation to create groups that do not have any systematic differences from each other (see section 5.3 below). This means we can say that any differences in outcomes we see between the groups are caused by the intervention, rather than due to any underlying differences.
- **The control group.** One set of people receives the intervention (the treatment group) and the other does not (the control). In a given trial there may be multiple treatment groups receiving different versions of the intervention (e.g. different versions of a leaflet), but the key point is that all of them are compared against the control. This means that we are evaluating the intervention relative to what would have happened without it, because otherwise it would not be impossible to say whether our results were due to the intervention itself or other outside factors.

The main factor you will have to consider in determining whether or how you can run an RCT is whether you have a large enough sample size (see section 5.3 below). An additional consideration in designing an RCT is the risk of spillover, i.e. when people who are in the control group inadvertently receive the treatment. For example, this could happen if people in the treatment group are sent leaflets, and someone in the treatment group gives a leaflet to a friend in the control group who was not sent one. To minimise this risk, instead of randomising individuals into the treatment and control groups, you could randomise 'clusters': for example, if leaflets are distributed to new housing developments, entire developments would be randomised to be in either the treatment or control, rather than individual households. These are called levels of randomisation.

If an RCT is not feasible, we can use a 'quasi-experimental design' where we still compare two groups without random assignment. This means we won't be able to say with as much certainty whether any effect is really caused by the intervention, but we still gain some information on what would have happened without the intervention.

5.2.2 Simple quasi-experimental designs

Cross section

This is a straightforward comparison between a group that receives the intervention and one that does not, with no randomisation (Figure 3). For example, new signage could be installed in one site but not another, and walkers' path choices could be compared between the two sites. This is one of the simplest evaluations to run and is feasible with a small sample size, but we cannot be sure that any results we see are not due to pre-existing differences between the groups.

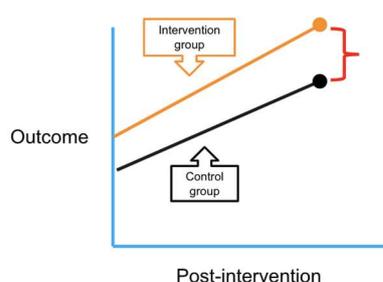


Figure 4. Comparison between different groups in a cross section study.

Pre-post

This is a before-after comparison, where we collect data prior to the intervention at all the sites where it will be implemented (baseline data), and compare to data collected after the intervention is in place (Figure 4). This is also one of the easiest and most feasible types of evaluation to run, and avoids the issue of comparing non-equivalent sites. However, within a given site there may be changes over time, so we cannot be sure to what extent any differences are caused by the intervention itself.

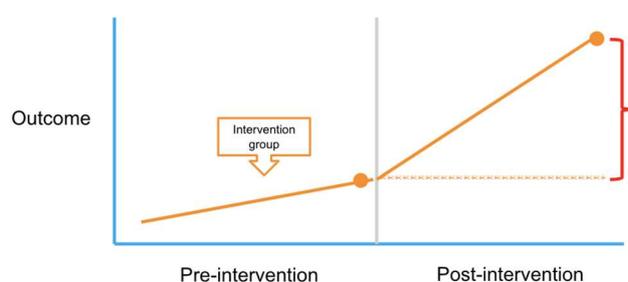


Figure 5. Comparison in the same group over time in a pre-post design.

5.2.3 More complex quasi-experimental designs

The following designs are more rigorous than those in section 5.2.2 above, and seek to recreate the conditions of an RCT where an RCT is not possible: that is, seeking to ensure the only difference we are observing, between the two groups, is caused by the intervention. However, you will need to consider whether this offsets the increased complexity for the purpose of your trial.

Difference-in-differences

This combines elements of the cross section and pre-post designs, comparing changes over time in a non-random treatment group to changes in a non-random control group (Figure 5). The underlying assumption is that, without the intervention, the groups would have had the

same change in outcomes (i.e. their trends would have moved in parallel, even if they were different to begin with). For example, two sites may have different numbers of visitors to each other, and both may increase their numbers in summer, but if the trends are consistent with each other, a difference-in-differences analysis is a good option

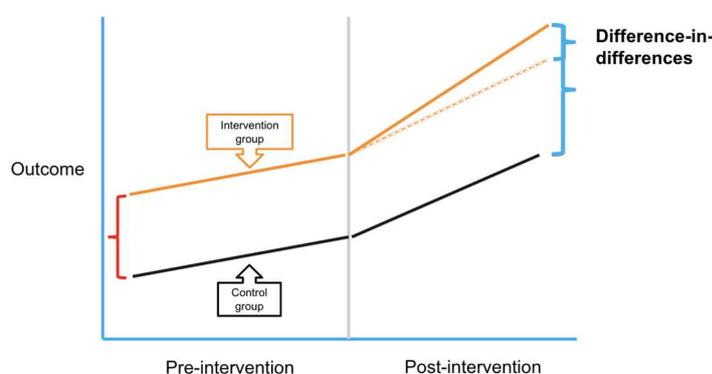


Figure 6. Difference-in-differences design: comparison between different groups' trends over time.

Matching

This approach aims to create a non-random control group that is the same as the treatment group with respect to observable characteristics such as age, gender or income. The underlying assumption is that the matched individuals are also the same on unobservable characteristics, such as motivation or experience, so that the only difference between the groups is whether or not they received the intervention (as with an RCT). However, it's not possible to check this assumption, and so there is still potential for underlying differences between groups to bias the results.

5.3 Maximise your sample size

The sample size we need depends in part on how big an effect we expect the intervention to have (the effect size; see section 5.5.2 below). Our goal in a trial is to be able to detect any effect of the intervention, if such an effect does actually exist. This is called statistical power. The smaller the impact of our intervention, the more power we need to detect it. More power is achieved by either increasing the sample size, which in turn could be achieved by including a larger group of people or number of sites in your sample or by capturing more observations from a given sample (e.g. running the trial for longer).

Different types of trials (see section 5.2) require different sample sizes. In particular, an RCT needs a large sample size, because the issue is not just statistical power, but avoiding 'randomisation failure'. Randomisation relies on the 'law of large numbers'. When people are randomly allocated to treatment and control groups, if those groups are small, there may end up being differences between them just by chance, limiting our ability to isolate any difference caused by the intervention. And remember that if you've randomised whole clusters, rather than individuals, you will need an even larger sample size.

Running a trial is an investment of time and resources, so you want to be confident that if your intervention truly has an effect, you will be able to detect it. However, we recognise that there may be constraints on sample size due to resources or simply the number of separate

sites that you may have oversight of. Reduced data collection (say, a few hundred observations) would still be worthwhile, and could be considered a 'pilot study', giving indicative results and providing valuable learning for future rollout.

5.4 Consider a process evaluation

The outcome measures we have discussed so far are *quantitative data*, i.e. numbers that we can compare to determine whether the intervention has an effect. Measuring the effect of an intervention (relative to what would have happened if the intervention had not taken place) is known as an *impact evaluation*. As part of a trial, it is also often useful to collect *qualitative data*, i.e. non-numerical findings such as responses in interviews.

Qualitative data can be collected as part of an *implementation and process evaluation* (often called an IPE or process evaluation), which tells us how and why an intervention did (or did not) have an effect. For example, you could carry out short interviews with visitors in a nature area after you have installed new signage, to better understand whether they have noticed it and how they perceive it. More generally, useful information you can gain from a process evaluation includes:

- What were the recipients' experiences of the intervention?
- What were their (conscious) motivations for changing their behaviour?
- Did all intended recipients actually 'receive' (in this case, notice or experience) the intervention? If not, why?
- If they did receive it, did they act on it? If not, why?

5.5 Implement your intervention, collect data and analyse results

5.5.1 Running the trial

Depending on your trial design, you may need to collect baseline data (e.g. in pre-post and difference-in-difference designs: section 5.2 above). In these cases, the trial will start as soon as you start collecting data, even though you will not have put the intervention in place yet. Running the trial may seem straightforward, but make sure to prepare by testing out your data collection methods and how you will implement the intervention to minimise the risk of anything unexpected happening when you launch the trial. It's also good practice to write a list of risks to the trial (i.e. what could potentially go wrong) before you start, and think of strategies to mitigate them if necessary. Keep a record too of how the trial was implemented in practice, i.e. whether anything differed from what you had planned.

5.5.2 Analysing the data

Regardless of the trial design (section 5.2 above), we will be comparing outcome measures in a group that received the intervention and a group that did not (either separate people or sites, or the same people or sites after versus before you implemented the intervention). We want to find out two pieces of information:

1. How big a difference there is between the groups (the effect size)
2. The likelihood that any difference we see is due to chance (statistical significance)

The effect size tells us whether any change in behaviour is actually meaningful in the real world. If you have an effect size expressed as a percentage, it can be useful to translate this into numbers of real people to help you think about what the practical implications are (see example in section 6.1 below). Whether an effect size is meaningful depends a lot on the behaviour and the system in question, and your desired goal.

To find out whether an effect is statistically significant, you will have to run a statistical test, which will compare the data you collected to a theoretical distribution of data that we would expect if the intervention did not have an effect. This will give us a probability that any difference between groups in our data is due to chance; the typical standard for calling a difference statistically significant is that there is a less than 5% probability that it is due to chance. The more variation there is in the data, and the smaller the sample size, the more likely it will be that an effect is due to chance.¹

¹ By analogy, if you tossed a coin four times and saw heads 75% of the time, this is quite likely to be due to chance (there is a 25% likelihood of getting 3 heads in 4 tosses). So we'd be unlikely to conclude, with much confidence, that the coin was weighted. However, if you tossed a coin 1000 times, and saw heads 75% of the time, this is *very* unlikely to occur by chance (close to 1 in 2×10^{58}). We would therefore conclude with much more confidence that the coin was weighted.

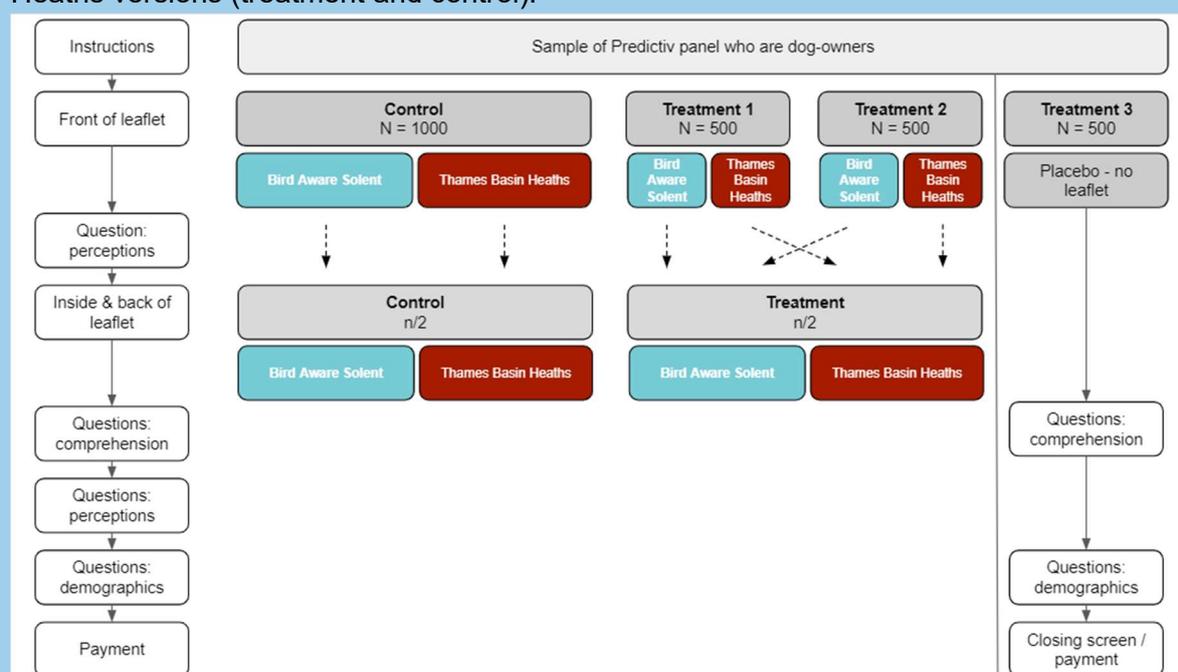
Case study: Trial

This project involved two separate trials, one online and the second in the field. Please see our standalone results report for more information about the online trial.

Trial 1: methodology

The first part of the Trial phase was an **online randomised controlled trial (RCT)** to rigorously test the effectiveness of behaviourally-informed messaging on dog-owners' comprehension of what constitutes 'wildlife disturbance' and on intentions to pick up the leaflet (the primary outcomes). An additional aim was to test the impact on dog-owners' perceptions of the message, reflected by how positive and useful they felt it was (secondary outcomes). We conducted the trial on Predictiv (www.predictiv.co.uk), an online platform for running behavioural experiments built by BIT. Predictiv has a panel of over 200,000 people in the UK; all participants who are dog-owners were eligible to participate in this trial.

Some participants were randomly allocated to see a control (business as usual) version of the leaflet, based on a leaflet designed by Bird Aware Solent, but never published or distributed. Other participants saw a treatment version informed by additional behavioural insights (see Solution section above), and a third group saw no leaflet at all. We introduced a further variation within the treatment group, testing different front cover designs (all participants in the treatment group saw the same inner panels of the leaflet, but there were two different designs for the front of the leaflet). Finally, we developed two versions of the treatment and control leaflets, with branding from each of our field sites, so that half of the control group and half of the treatment group were randomly allocated to see the Bird Aware Solent versions (treatment and control), and the other half saw the Thames Basin Heaths versions (treatment and control).



Participants were asked questions to measure their comprehension of issues around

wildlife disturbance and (for those that saw a leaflet) their feelings about different components of the leaflet. Our primary outcome measures were:

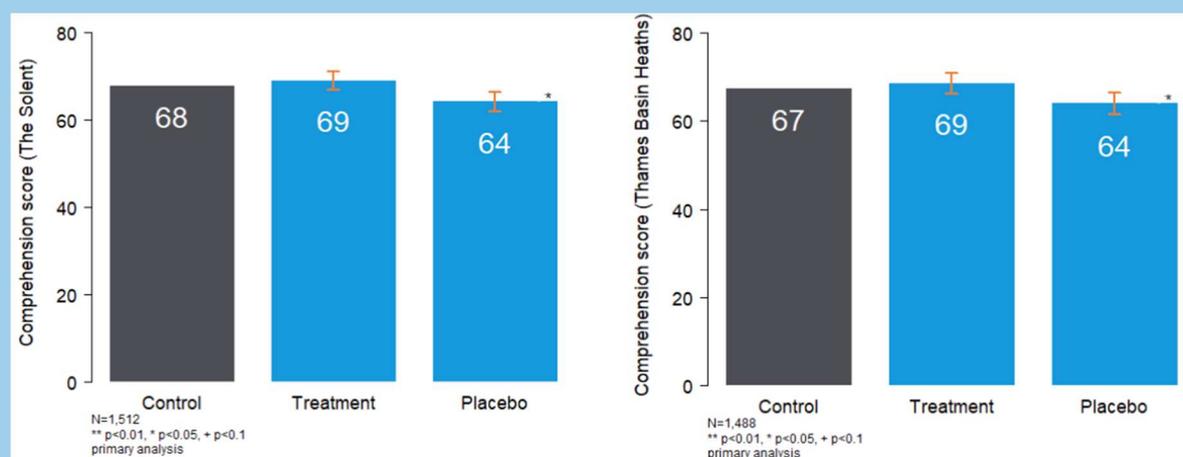
- A comprehension score, calculated as the proportion of correct answers to eight comprehension questions
- Participants' stated intent to pick up the leaflet after they had seen only the front cover

And several secondary outcomes:

- Our Explore work had revealed that an important comprehension issue to focus on was people not realising that birds flying away constitutes disturbance. For this reason, in addition to analysing the overall comprehension score, we also analysed people's answers to the question 'Is the following an example of disturbance [yes / no / don't know]? Birds flying away when a person or dog comes near.'
- Participants' perceptions of how positive the leaflet was towards dog-walkers and how useful they felt it was.

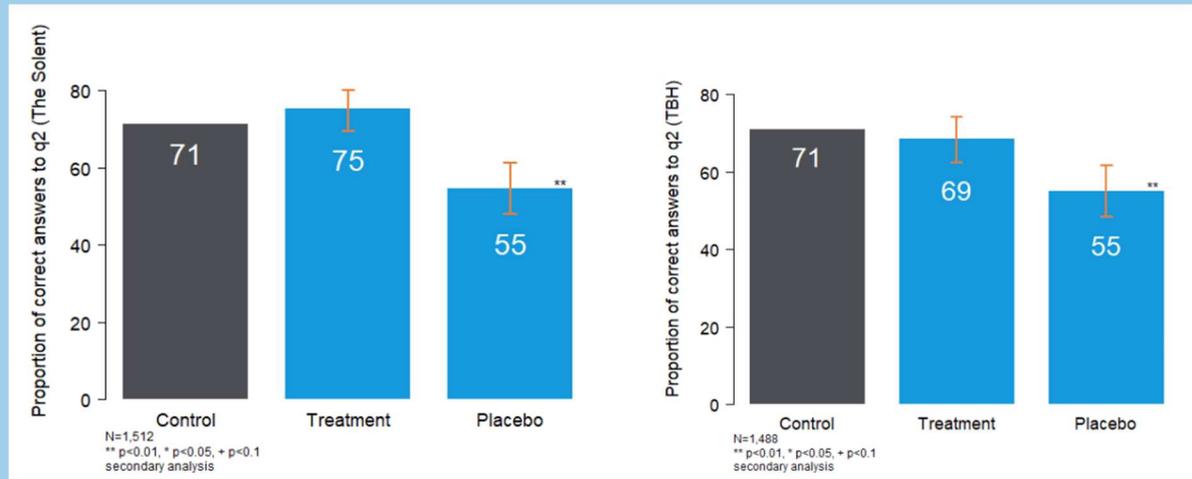
Trial 1: results

We found no statistically significant difference in overall comprehension scores between the control and treatment leaflets, although scores were significantly lower in the group who did not see a leaflet, suggesting that leaflets do improve baseline awareness of wildlife disturbance. The graphs below show the comprehension scores (percentage of the eight questions people answered correctly) for each group. 'Placebo' is the group that did not see a leaflet; the panel on the left gives the results for the Solent and the right for Thames Basin Heaths.

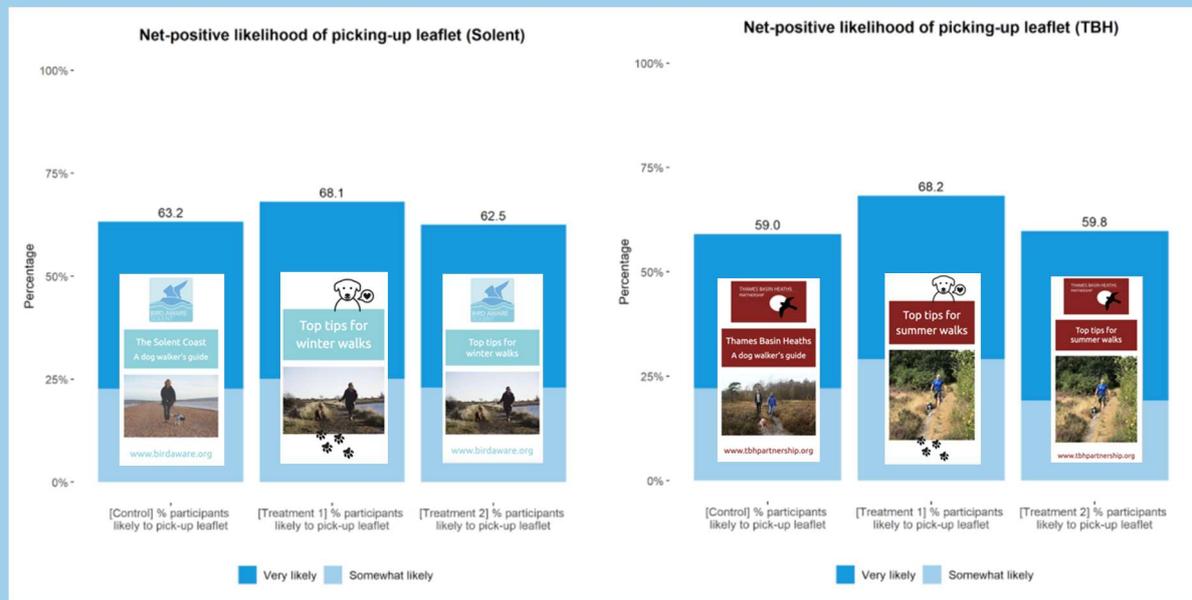


The difference between the placebo and leaflet groups is relatively modest (~4 percentage points, or 6.5% in relative terms). However, this is to be expected as many of the eight comprehension questions could be considered to be relatively 'easy', and were included, in part, to shield the question we most care about: causing birds to fly away. Analysing answers to this question alone (a secondary analysis), we saw similar patterns to the overall comprehension figures, albeit with much larger results. Specifically, 71% of participants who saw a leaflet correctly identified that causing birds to fly away constitutes disturbance, while only 55% of those who did not read a leaflet correctly answered this question. This is a statistically significant difference of 16 percentage points, or 23 per cent

fewer correct answers. That is to say, the difference in overall comprehension scores was largely driven by increased understanding that causing birds to fly away counts as a wildlife disturbance.



Participants stated they would be slightly more likely to pick up the leaflet in the treatment version whose front page contained more dog emphasis and less site branding. 68% of participants said they would be likely or very likely to pick up the leaflet with front-page dog emphasis, compared to 61% of those who saw the one treatment leaflet with more site branding, and 61% in the control group (a weakly significant difference). Participants also perceived this leaflet slightly more positively than the others.



Trial 1: recommendations

Overall, sentiment towards the leaflets was positive, and both leaflets were effective at improving comprehension of key issues. This demonstrates that dog-walkers can be engaged on wildlife issues without antagonism. Since the treatment and control leaflets were equally effective in raising awareness, which version should be used? Although there

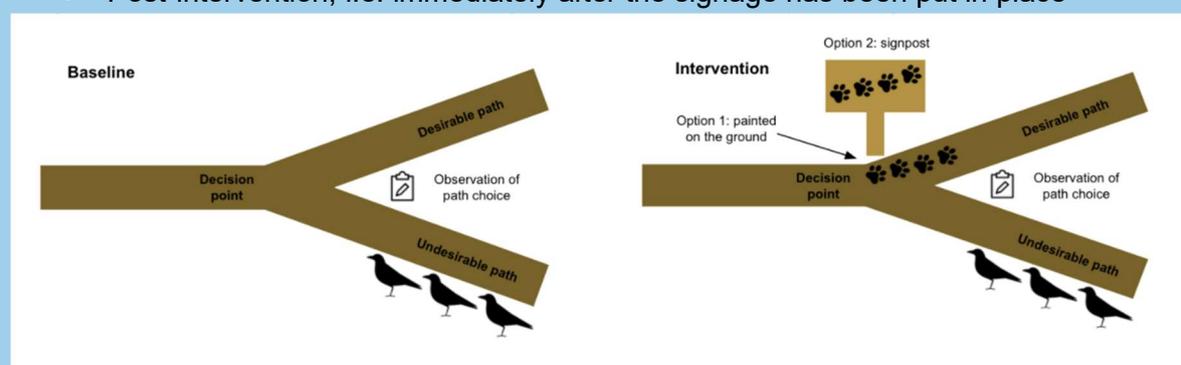
were no statistically significant differences between the two leaflets in terms of comprehension, the treatment leaflet performed very slightly better, so if all else is equal, we would recommend using this version. In addition, the trial gave some evidence that the front cover is particularly important, so we recommend fine-tuning this in any further leaflet design. The covers with more dog-emphasis performed slightly better, but we also note that the findings are consistent for each site-specific version of the leaflet. This suggests that the differences between leaflet versions are less due to the branding from a particular site but instead the more general emphasis on relevance to dog-owners.

Trial 2: methodology and protocol

The second part of the Trial phase is a **pre-post field trial of pawprint signage**. At the time of writing this report, this trial has not yet been implemented, although we have written a protocol for the site teams to run it with support from Natural England, during the appropriate field season. The main component of the intervention involves placing pawprint signs at decision points (such as an exit from a car park or at other path junctions) where visitors can choose between a path to a sensitive area (the undesirable path) and a path to a less sensitive area (the desirable path), with the aim is to encourage visitors, particularly dog-walkers, to avoid areas where wildlife may be disturbed. An additional component of the intervention that could optionally be implemented in conjunction with the pawprint signs is a network of paths through non-sensitive areas, tailored specifically to dogs and their owners with features such as dog poo bins, 'sniff trails' or other activities for dogs.

As this is a pre-post comparison, it involves two periods of data collection:

- Baseline, i.e. before the pawprint signs are installed
- Post-intervention, i.e. immediately after the signage has been put in place



We have two outcome measures in this trial:

- The proportion of dog-walkers' decisions to take the desirable path versus the undesirable path
- The proportion of all visitors' decisions to take the desirable path versus the undesirable path

We use proportions rather than the absolute number of decisions to take the desirable path as this allows us to account for overall differences in visitor traffic at different sites and times. If we counted more people on the desirable path with the intervention versus without, we would not know whether this was due to more people passing through that

decision point (and thus there would be more visitors on the undesirable path as well) or due to more visitors taking the desirable path *instead of* the undesirable path.

A simple process evaluation would provide information how the intervention may have worked (or not worked), and could involve just a few questions to visitors on-site after the period of post-intervention data collection has finished (to avoid biasing people's path choices during data collection):

- Which paths/areas in this site have you visited today?
- Have you seen any new signs [and features on the paths, if applicable] during your visit? If so, what were they?
- [If they saw the signs] Did you take the paths the signs indicated? Why or why not?
- [If they saw the signs] How noticeable / appealing / useful did you find the signs?

6. Scale

Purpose: At the end of the project, we consider the lessons learned from our trial and what to do next. This involves identifying what worked, and considering how it could be rolled out at scale, as well as identifying what did not work, and whether we can make changes to our initial ideas and test a different intervention.

Output: A plan for next steps (scale up or take a different approach).

6.1 Interpret your findings from the trial

The first step in the Scale phase is to consider your trial results to determine how effective you think the intervention was. Ask yourself the following questions to help you make a conclusion and decide what next steps to take.

Did your intervention work as expected?

- How much (if at all) did people's behaviour change? How does the difference in the outcome measures between treatment and control (the treatment effect) translate into real numbers of people behaving differently? For example, imagine your intervention caused a 5 percentage point increase in people choosing a path through a non-sensitive area instead of a sensitive area. If 100 people per day make a decision about which path to take, this would mean an extra 5 people per day choosing that path.
- How big a change in behaviour would you want to see to meaningfully reduce disturbance to wildlife? For example, would a change in path choice by 5 people per day have an impact in your area?
- Was the intervention cost-effective?
- If you trialled the intervention at multiple sites or analysed the results for subgroups of the population (e.g. dog-walkers versus visitors without dogs), were the results similar?
- If you ran a process evaluation, what did people's answers tell you about why the intervention may have worked or not worked? Was there anything surprising?

How strong do you think your evidence is?

- What type of trial did you run? Evidence from a randomised controlled trial is more robust than that from other types of trial, so you can be more confident in the results.
- How large was the effect size? Even if a result is statistically significant, if it was a small effect it should be treated with caution. Larger results let us be more confident in our conclusions.
- Were there any challenges in running the intervention that impacted the quality of the data you could collect?
- Did you observe behaviour directly, or did you rely on proxy measures?
- Did you end up with a reduced sample size because you had to exclude any data?
- How much variation is there in your data? More variation makes it harder to detect any difference between treatment and control groups.

6.2 Plan next steps

6.2.1 *If the intervention was effective*

Where an intervention is successful, and where the evidence meets high standards, we seek not only to implement it again, but also to improve it and to roll it out to more people. Use the following 'SCALE' checklist to assess how your intervention might be implemented more widely:

Sponsorship: Do you have buy-in from both leaders and frontline practitioners who were not involved in the initial trial, and who may need persuading of the value?

Cost/benefit: Can the intervention be delivered at scale in a cost-effective way? If the intervention is a communication, the answer is probably yes. But if the cost of implementing the intervention at scale is higher than the benefit, consider whether narrowing down implementation to a sub-group where it is most effective or cheapest to implement will make the cost-benefit trade-off positive.

Accountability: Who will be responsible for implementing the intervention and do they have the necessary support? Are there clear levers and reporting structures?

Logistics: Will there have to be changes in delivery? For example, rangers may be able to hand out leaflets to a small number of people but this would not be feasible at scale. Can you make use of existing delivery channels, or create new ones? Can you codify the intervention for others to adopt, or develop best practice guides?

Evidence: Do you need further evidence before scaling up? This is particularly relevant if:

- You are unsure whether the results will replicate for other locations or subgroups of the population (that is, you are unsure whether the results from your trial are 'externally valid', i.e. how widely they apply to other contexts).
- You need to adjust the intervention, even slightly, to implement it at scale, and you are not sure whether it will be as effective; for example, you have to switch from sending a letter to sending an email, and people might react differently.
- You think there may be a difference in how effective the intervention is if people receive it again and again. For example, a behaviourally-informed communications campaign may be effective if baseline awareness is very low, but is likely to have a smaller impact on behaviour if awareness is already high.
- You think there is some evidence that your intervention worked but the effect size was too small to make a meaningful difference, you might not want to scale it up straight away. Instead, return to the earlier TESTS stages and refine your intervention.

6.2.2 *If the intervention was not effective*

It is just as important to know what doesn't work as it is to know what does. It means you won't waste money implementing an intervention at scale that isn't effective. Unsuccessful trial results also help you generate new intervention ideas for testing in the future.

If your intervention did not have any positive impact, or even backfired (had the opposite effect you intended), don't despair! Around half of all interventions in pre-registered studies fail to show a statistically significant effect.²⁹ Each trial is an opportunity for you and other organisations to learn. Even trials with null results have a lot to teach us.

If you suspect you didn't find an effect because your sample was too small, not because the intervention didn't work, you could test it again with a larger sample. However, we wouldn't recommend this if your qualitative research suggests there are ways the intervention needs to be improved, e.g. low take-up or messages that were misunderstood.

Use the TESTS framework to reflect on why your intervention did not work as expected, and what you could do differently. For example:

- In the Target phase, did you choose a behaviour that is simply difficult to change?
- In the Explore phase, were there influences on behaviour that you may have overlooked, or could not leverage?
- In the Solution phase, were there assumptions you made about how an intervention idea might work?
- In the Trial phase, what did your process evaluation tell you about people's experiences and perceptions of the intervention?

We emphasise that running behavioural insights trials is an iterative process, and one of continual learning.³⁰ We hope you enjoy the journey! Whether your intervention delivered significant results or not, we want to hear about it - please tell us about your project by emailing us at info@bi.team.

Case study: Scale

The results from our online RCT and the findings from our Explore research suggest that leaflets could be a useful tool to encourage responsible recreation, given the low levels of understanding of what constitutes wildlife disturbance.

However, there are two main issues to consider with using leaflets on-site:

- They will only be effective if dog-walkers pick them up on-site and read them. In the online trial, participants were not 'forced' to read the leaflet as they could stop taking part in the trial any time. We did not incentivise participants to answer the comprehension questions correctly, as is commonly done in similar online trials, as a quick and imprecise reading of the leaflet more closely mimics how people would be likely to read it in the real world, but nonetheless we recognise that seeing it online is not the same decision as picking up and reading a leaflet in the real world.
- Increased comprehension does not necessarily translate into changed behaviour, for example due to existing routines that are hard to shift (e.g. people may automatically take the same route every day) or due to competing motivations (e.g. people may prefer wildlife-sensitive sites for other reasons).

The other two components of this project - optimising leaflet delivery on-site, and trialling a physical intervention in the field that aims to change behaviour directly - are designed to address these issues, but have not been implemented at the time of writing this report. Next steps for the physical intervention are outlined in the Trial section above.

To roll out leaflet delivery on-site, we recommend the following approaches:

- *Using behavioural insights to increase leaflet uptake.* This could include making leaflet dispensers stand out with visual cues or small incentives (Attractive), or by targeting people who have just moved into the area or who have just bought a new dog (Timely).
- *Measuring uptake.* This could include monitoring key indicators such as the number of leaflets taken from dispensers, the number of online visits, social media likes, etc, of relevant websites etc mentioned in the leaflet.

Finally, key messages from the leaflet could also be delivered separately, in channels other than the leaflet. These could include printing messages on dog poo bags or other small items that are useful for dog owners, featuring a new message every week or month on display boards on-site, or holding a competition for dog-walkers to write their own message encouraging responsible recreation.

Checklist for a successful TESTS project

1. Target: choose a specific behaviour

- What is the specific target behaviour you want to change?
- Who is your specific target audience?

2. Explore: understand the context

- What are the factors influencing the target behaviour at the individual, social and material levels (ISM)?
- What capability, opportunity and motivation is needed to produce the target behaviour (COM-B)?
- What are the touchpoints where you could intervene to change behaviour?

3. Solution: design a behaviourally-informed intervention

- What is your intervention?
- What resources will you need?
- Whose buy-in do you need in order to implement it?

4. Trial: test the effectiveness of your intervention

- What behavioural outcome will you measure?
- What is your comparison to know whether your intervention had an impact?

5. Scale: reflect and redesign

- How could you improve your intervention?
- If your intervention was effective, what might you need to change to roll it out more widely?

References

- ¹ See [Natural England's mission](#) and the Government's [25-Year Environment Plan](#)
- ² [Natural England \(2018\)](#) Monitor of Engagement with the Natural Environment survey
- ³ [Banks & Bryant \(2007\)](#) *Biology Letters* 3:611-613
- ⁴ 2012 survey with participants in Brazil, China, Germany, India, the UK and the US. http://theregenerationroadmap.com/files/reports/TRR_Rethinking_Consumption.pdf
- ⁵ Noble J (2019). [Theory of change in ten steps](#). New Philanthropy Capital report
- ⁶ Scottish Government (2013). [Influencing behaviours - moving beyond the individual: ISM user guide](#).
- ⁷ Michie S, van Stralen MM & West R (2011). The behaviour change wheel: A new method for characterising and designing behaviour change interventions. *Implementation Science* 6:42.
- ⁸ The Behavioural Insights Team (2014). [EAST: four simple ways to apply behavioural insights](#). Rare and The Behavioural Insights Team (2019). [Behaviour Change for Nature: a behavioural science toolkit for practitioners](#). Defra (2008). [A framework for pro-environmental behaviours](#).
- ⁹ Duffy S & Verges M (2009). It matters a hole lot: Perceptual affordances of waste containers influence recycling compliance. *Environment and Behavior* 41(5): 741-749.
- ¹⁰ Thiagarajah RD & Getty VM (2013). Impact on plate waste of switching from a tray to a trayless delivery system in a university dining hall and employee response to the switch. *Journal of the Academy of Nutrition and Dietetics* 113(1):141-145.
- ¹¹ Kurz V (2018). Nudging to reduce meat consumption: Immediate and persistent effects of an intervention at a university restaurant. *Journal of Environmental Economics and Management* 90:317-341. Garnett EE, Balmford A, Sandbrook C, Pilling MA & Marteau TM (2019). Impact of increasing vegetarian availability on meal selection and sales in cafeterias. *Proceedings of the National Academy of Sciences of the USA* 116(42):20923-20929.
- ¹² Ebeling F & Lotz S (2015). Domestic uptake of green energy promoted by opt-out tariffs. *Nature Climate Change* 5(9):868.
- ¹³ Beard, E., West, R., Michie, S., & Brown J. (2016). Association between electronic cigarette use and changes in quit attempts, success of quit attempts, use of smoking cessation pharmacotherapy, and use of stop smoking services in England: Time series analysis of population trends. *BMJ*.
- ¹⁴ Howell RA (2013). It's not (just) "the environment, stupid!" Values, motivations, and routes to engagement of people adopting lower-carbon lifestyles. *Global Environmental Change* 23:281-290
- ¹⁵ Schneider CR, Zaval L, Weber EU & Markowitz EM (2017). The influence of anticipated pride and guilt on pro-environmental decision making. *PLOS ONE* 12(11):e0188781.
- ¹⁶ Ro M, Brauer M, Kuntz K, Shukla R & Bensch I (2017). Making Cool Choices for sustainability: Testing the effectiveness of a game-based approach to promoting pro-environmental behaviors. *Journal of Environmental Psychology* 53:20-30
- ¹⁷ Scannell L & Gifford R (2013). Personally relevant climate change: The role of place attachment and local versus global message framing in engagement. *Environment and Behavior* 45(1): 60-85.
- ¹⁸ <https://inudgeyou.com/en/green-nudge-nudging-litter-into-the-bin/>
- ¹⁹ <https://blogs.oracle.com/utilities/the-truths-about-opower-smiley-faces>
- ²⁰ Sparkman G & Walton GM (2017). Dynamic norms promote sustainable behavior, even if it is counternormative. *Psychological Science* 28(11):1663-1674.
- ²¹ The Behavioural Insights Team (2017). Encouraging people into university: research report. https://www.bi.team/wp-content/uploads/2017/03/Encouraging_people_into_university.pdf
- ²² Alpizar F, Carlsson F & Johansson-Stenman O (2008). Anonymity, reciprocity, and conformity: evidence from voluntary contributions to a national park in Costa Rica. *Journal of Public Economics*, 92(5-6):1047-1060.
- ²³ Willemsen M & Nguyen T (2017). Chi briefing paper. <http://dx.doi.org/10.13140/RG.2.2.18724.37761>

- ²⁴ Kirkman E (2019). Free riding or discounted riding? How the framing of a bike share offer impacts offer-redemption. *Journal of Behavioral Public Administration* 2(2):1-10.
- ²⁵ Holland RW, Aarts H & Langendam D (2006). Breaking and creating habits on the working floor: A field experiment on power of implementation intentions. *Journal of Experimental Social Psychology* 42:776-783.
- ²⁶ Baca-Motes K, Brown A, Gneezy A, Keenan EA & Nelson LD (2012). Commitment and behavior change: Evidence from the field. *Journal of Consumer Research* 39(5):1070-1084.
- ²⁷ Hoffman et al. (2014). Better reporting of interventions: template for intervention description and replication (TIDieR) checklist and guide. *BMJ* 348:g1687 <https://www.bmj.com/content/348/bmj.g1687>
- ²⁸ Haynes, L. et al. (2013). Test, Learn, Adapt: Developing Public Policy with Randomised Controlled Trials. Cabinet Office / The Behavioural Insights Team <https://www.bi.team/wp-content/uploads/2013/06/TLA-1906126.pdf>
- ²⁹ Warren, M. (2018). First analysis of 'pre-registered' studies shows sharp rise in null findings. *Nature* doi: 10.1038/d41586-018-07118-1. Note that these studies are mostly laboratory studies, which can be expected to be more likely to deliver significant results than field studies, because researchers are able to conduct their experiment under much more controlled conditions.
- ³⁰ Haynes, L. et al. (2013). Test, Learn, Adapt: Developing Public Policy with Randomised Controlled Trials. Cabinet Office / The Behavioural Insights Team <https://www.bi.team/wp-content/uploads/2013/06/TLA-1906126.pdf>