

Rapid Evidence Review of Littering Behaviour and Anti-Litter Policies



Zero Waste Scotland works with businesses, individuals, communities and local authorities to help them reduce waste, recycle more and use resources sustainably.

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Executive Summary

This rapid evidence review of littering behaviours and policy interventions was commissioned by Zero Waste Scotland as part of a wider research programme into the issue of littering in Scotland. This summary provides a brief outline of the approach to and the key findings of the review.

Aims and methodology

The two key research objectives for the rapid evidence review were to:

- Identify, summarise and map existing evidence on littering behaviours, motivations and barriers, and possible opportunities for changing behaviour; and
- Review evidence to identify existing anti-litter policy interventions and, where, possible, review evidence on the impacts of those measures.

The review covered both academic and grey literature from 1995 onwards, and was carried out in two phases: a long-listing phase to identify potential documents for review, and a detailed review phase of a selected shortlist of documents. A total of 124 documents were identified, and 39 of these were selected for inclusion in the detailed review on the basis of their relevance to the research questions. Whilst the review aimed to cover a broad spectrum of content, it is unlikely to be fully comprehensive as material was selected on the basis of immediate availability due to time constraints. In particular, an evidence gap was highlighted around anti-litter policy interventions, where readily accessible evidence tends to be limited to campaign evaluations.

Conceptual approach

The review has considered the drivers for both littering behaviour and proper disposal behaviour; it is the tension between these two alternative courses of action which determines whether or not litter is dropped. Influences (motivations and barriers) on these two behaviours were explored within a conceptual framework developed from behavioural theories and previous research by Scottish Government. The framework identifies four different kinds of influence:

- The **personal**, which refers to personal attributes and influences, including aspects such as values, attitudes, identity and personal norms (e.g. feelings of responsibility and a sense of agency)
- The **social**, which refers to the influence on our thinking and behaviour from the wider social context, including social norms (established or accepted ways of behaving), cultural conventions and shared understandings;
- The **material**, which refers to the context in which behaviours are formulated and acted out, which can enable or constrain particular kinds of behaviour. It can include, for example, services, infrastructure and technologies.
- **Habits**, which refers to patterns of behaviour which individuals carry out almost automatically; in other words, unconscious drivers of behaviour which result from becoming 'locked in' to certain patterns.

The conceptual framework is repeated throughout this report to summarise key findings from each section.

What is littering?

Whilst there is no official definition of litter, the broadly accepted definition of litter (as used by ENCAMS and Keep Britain Tidy) is 'waste in the wrong place caused by human agency'. This means that littering behaviours are more complex than might be expected; in addition to simply 'dropping' litter, it includes other sub-behaviours such as folding

litter up and tucking it into small spaces, placing litter down carefully in a chosen location, and leaving litter nearby for a length of time before abandoning it.

Who litters and how much?

The evidence both in the UK and internationally suggests that everyone, or almost everyone, admits to having littered at some point, with the majority of people littering at least occasionally. However, there is wide variation between individuals in the frequency and extent of their littering behaviour and the types of objects they litter. While some groups are more likely to litter than others, there is no evidence that a particular 'littering demographic' exists – i.e. no specific group can be identified as being responsible for the majority of litter. However, the evidence does suggest that there are some factors which are linked with *slightly* higher predispositions to littering. These are:

- Age – younger people litter slightly more than older people, and are more willing to admit to littering;
- Gender – men drop slightly more litter than women do, and are also more willing to admit to littering; and
- Smoking – not only are smoking-related items littered more frequently than most other litter items, but smokers also tend to litter more in general, compared to non-smokers.

The relationship between socio-economic factors and littering behaviour, however, is not considered in the reviewed literature in sufficient depth to draw conclusions about the influence of socio-economic group.

Motivations and barriers

The motivations and barriers that influence littering behaviour and proper disposal behaviour can be broadly grouped into the four types described above: personal, social, material and habitual. However, it is important to note that these four types of influences interact and modify each other's effects.

A key influence at the personal level is a sense of responsibility for litter, which can be stronger or weaker depending on the type of spaces and the individual's feelings about that space. There is substantial evidence which indicates that sense of personal responsibility varies between locations, and that where people feel less of a personal responsibility for maintaining the space they are in, they are more likely to litter. For example, places where the public believe that someone else will clean up after them, such as council-maintained sites and indoor public spaces, are often seen as more acceptable places in which to litter (but see also discussion on social norms and physical context below).

An individual's feelings about and relationship to their community can also affect their behaviour, with a strong sense of community and respect for others driving proper disposal behaviours. When individuals feel disenfranchised or alienated from their community, in contrast, this can create a motivation to litter, in some cases as a form of rebellion.

Uncertainty about what 'counts' as litter is another important driver of littering behaviour, and the evidence shows that people are more willing to litter, for example, biodegradable items and small items, as these are not necessarily considered 'litter'. In addition, where people do not fully understand the environmental and other impacts of littering, this lack of knowledge may make them more inclined to litter, though the evidence here is much weaker.

The desire to be rid of litter as quickly as possible because it is perceived to be unpleasant (termed in the literature as the 'ick factor') motivates littering behaviour, while many openly admit that laziness prevents them from using litter bins.

There also appears to be a range of 'deeper' personal psychological influences that can affect littering behaviour, although the reviewed literature makes only limited direct reference to these. However, those that are either mentioned in or can be inferred from the reviewed literature include personal values and norms, a sense of identity, beliefs, and

feelings such as guilt and fear. Guilt in particular has received some attention in the literature, and there is evidence to suggest that people rationalise their littering behaviour through excuses in order to alleviate the associated guilt.

Littering behaviour is very strongly affected by the social context in which it takes place. Social norms, defined as socially accepted or agreed ways of behaving, can drive either littering or proper disposal behaviours, depending on their nature and the context. Social norms can be broadly categorised into injunctive norms, which indicate what is considered the 'correct' behaviour, and descriptive norms, which indicate what most other people are doing. For example, if a site is already littered, people may infer from this that other people normally litter in that space.

The influence of social norms means that people tend to behave like those around them, in order to avoid social disapproval. Immediate company, as well as people's wider social networks of family and friends both have an influence on behaviour. The immediate presence of people who are considered 'respectable' company (e.g. parents, employers) tends to drive correct disposal behaviours. The presence of children can have a similar effect, as parents aim to set a good example. The presence of peers seems to drive littering behaviour among the young, but correct disposal among older age groups.

The physical context affects littering behaviour, with existing litter and other indicators of a 'run-down' site increasing the likelihood of further littering. Conversely, a clean and well maintained site can discourage litter. In addition, sites that create a sense of anonymity for potential litterers tend to see higher levels of littering.

Although littered sites tend to encourage further littering and clean sites deter littering, the provision of a cleaning service, as noted above, appears to diminish a sense of personal responsibility and encourage littering. Although the literature has not delved in great detail into this apparent contradiction, it seems that familiarity with the site and the visibility of the cleaning service both play a role in determining the overall effect. Simply knowing that a site is normally littered or gets regularly littered, even if it has been recently cleaned, appears to be enough to make littering behaviour the norm. In addition, a high-visibility cleaning service can send a signal that someone else is taking responsibility for litter, encouraging littering even on a clean site.

The number of litter bins, their spacing and cleanliness are regularly claimed to have an influence on littering behaviour, but the evidence on the actual impact of bins on littering is mixed.

Measures such as enforcement and fines may make some people less likely to litter, but people generally remain sceptical about the effectiveness of such measures. This is mainly because they feel the threat is not real enough to deter people from littering. However, in principle the public are supportive of enforcement and fines.

The role of habit and the subconscious is noted across the literature as a factor which can shape littering behaviour. As with many repeat behaviours, littering may become an individual's 'default' disposal behaviour, so it is done without any particular intention or thought. However, it is difficult to assess the true role of habits, as much of the evidence uses self-reported survey data on behaviour, which may well be unreliable when it comes to such subconscious influences.

Segmentation models

The reviewed literature included five segmentation models, which suggest typologies of litterers. It is important to note that segmentation models are by definition developed for a particular purpose and audience in a specific context. They may, nevertheless, provide useful ways of conceptualising litterers when planning interventions.

Key themes that are evident in these segmentation models include factors similar to the behavioural influences discussed above. These include furtive littering behaviours, guilt around littering – accompanied by rationalisation through excuses, understanding of the concept or impacts of littering, perceived unpleasantness of litter, laziness and rebellion, and blaming the lack (perceived or otherwise) of bins.

Interventions

The review identified 22 interventions reported in 14 source documents. These were typically large-scale, long-term campaigns, run by government (national or local) or publicly funded bodies, targeted at the general public, and frequently using mass media communications – although there is a significant amount of variation in the approaches taken. It is important to note that this selection of interventions is unlikely to accurately reflect the profile of litter interventions in practice: large-scale campaigns are simply more frequently evaluated and reported on than smaller-scale interventions, which inevitably introduces a degree of selection bias into any evidence review.

Although intervention aims are rarely specifically stated in the literature, there is data to indicate that these interventions appear to have achieved significant reductions in littering. However, care should be taken when attributing impact to intervention, particularly over long timescales and without reference to a control group or scenario. In addition, impacts are reported in such varied ways that it is difficult to draw comparisons between interventions or to determine which factors are responsible for their success. Notably, the reviewed reports rarely reflect on how the interventions aim to influence behavioural drivers, though some inferences can be drawn and analysis shows that these interventions have addressed personal, social, material and habitual factors in a range of ways.

There are lessons to be learned from the literature with respect to effective delivery of interventions. Key recommendations reported include careful intervention design, strong partnerships, sufficient resources and effective evaluation. Costs of campaigns and savings from avoided litter were rarely reported, however. Effective delivery, however, is only one factor in delivering an impactful intervention, but other success factors appear to go largely unreported in the literature.

Discussion and overall observations

The research team's analysis of the evidence suggests that littering behaviour is influenced by a number of factors which act in conjunction and should, in fact, be seen as a by-product of other behaviours rather than necessarily as a behaviour in itself. The concept of 'litterers' may be a misleading one, and it may be more constructive to think in terms of 'littering incidents' which are triggered by behavioural cues.

Drawing on this conceptualisation of litter, the research team suggest that the most effective way to tackle litter may be a two-strand approach:

1. Raising awareness of what 'counts' as litter, and the impacts of littering; and
2. Targeting specific "occasions" (which can be defined as 'bundles' of activities, people, locations and potential litter items) which generate litter.

Evidence gaps

The review highlighted the following key evidence gaps and research needs:

1. A better understanding is needed of the deep psychological and cognitive individual-level influences on littering behaviour, including scope for capitalising on the important role that sense of personal responsibility plays.
2. Factors which influence the success of anti-litter interventions are not well documented. Future interventions need to be evaluated in a robust manner to learn lessons about effectiveness and replicability.
3. In the meantime, a small-scale interview study to explore recent and ongoing interventions with those responsible for delivery may also provide useful insight on success factors.

4. It would also be useful to explore possible ways of capitalising on the influence of descriptive social norms (people's perceptions of what 'everyone else' is doing) in anti-litter interventions.

In practice, there is scope to link up further research with interventions, for example through robustly evaluated pilots or trials.

1 Introduction

Background and aims

The Scottish Government's vision for a Zero Waste society includes tackling litter, turning the problem into materials which can be used again (through 'recycle on the go' facilities). In this context, Zero Waste Scotland (ZWS) needs to have a clear and full understanding of the incidence and location of littering, the impacts of littering, and the policy options available to tackle the issue. As part of a wider work programme to understand and address the litter problem, ZWS commissioned this rapid evidence review of littering behaviours and policy interventions.

The purpose of the rapid evidence review was to consolidate the existing evidence around littering behaviours and interventions, and to identify opportunities for changing behaviour. This report therefore aims to provide a robust summary of the key evidence, which can be used to inform further anti-litter work.

Specifically, the two key research objectives for the rapid evidence review were to:

- Identify, summarise and map existing evidence on littering behaviours, motivations and barriers, and possible opportunities for changing behaviour; and
- Review evidence to identify existing anti-litter policy interventions and, where possible, review evidence on the impacts of those measures.

Methodology

The methodology employed was a rapid evidence assessment (REA) covering academic and grey literature. The REA involved two phases: scoping, or long-listing of documents (phase 1), and a detailed review of a selected shortlist of documents (phase 2). The scoping phase drew on the expertise of the ZWS project steering group, who were invited to recommend documents for inclusion on the longlist. These recommendations were complemented by relevant documents identified in the research team's library, and by further documents identified through targeted searches of academic journals available online. A total of 124 documents were identified, and 39 of these were selected for detailed review on the basis of their relevance to the research questions. The shortlist is presented in Annex A, and the methodology is outlined in more detail in Annex B.

Evidence quality and coverage

Whilst the review aimed to cover a broad spectrum of content, it may not be fully comprehensive. This is particularly relevant with respect to policy interventions, the evidence around which was biased towards anti-litter campaign evaluations, as reports were selected on the basis of immediate availability due to time constraints.

The overall evidence base on the influences that affect individual littering behaviour can be characterised as relatively robust and thorough, and the reviewed evidence provided broad coverage of the research questions of interest. However, the perspective from which research into littering behaviour has hitherto been carried out tends towards the practical more than the theoretical: while a range of types of behavioural drivers are considered in the existing evidence, the focus tends to be on those drivers that are more top-of-mind for people, and these do not necessarily constitute the whole picture. In contrast, relatively limited analysis appears to have been carried out to fully explore the underlying psychological drivers of littering behaviour, such as wider values and sense of identity. Some of the segmentation studies referred to in this review do appear to have considered such factors, but in these cases the analysis is not reported in detail.

The evidence on policy-led interventions appears to be less thorough, and the body of research available is subject to certain biases. The reviewed documents on policy interventions were mainly evaluations of large-scale public-facing

campaigns, and the evidence contained limited coverage of smaller-scale interventions – which may also be more likely to include non-campaign approaches (such as experimental research from academic psychology or action-based research). This bias may well be a function of the fact that large-scale publicly funded campaigns are simply more likely to have the resources available for evaluation, in comparison to other types of interventions, particularly smaller-scale ones. The evidence also appears to be biased towards successful interventions over unsuccessful ones (in that few examples of unsuccessful campaigns were identified), and again this is logical as successes are more likely to be reported on than failures. Relatively little evidence on policy instruments other than campaigns was identified within the timescale for the review.

Conceptual approach and the behaviours framework

In order to understand the littering problem, this review considered not only littering behaviour itself and what drives that behaviour, but also the proper disposal of litter and what influences work for or against this desirable behaviour. It is the tension between these two alternative courses of action which may or may not result in the action of dropping litter.

Influences on behaviour were conceptualised in terms of motivations – i.e. factors which make a certain behaviour more likely – and in terms of barriers – i.e. factors which make that behaviour less likely. Motivations were considered with respect to both littering and proper disposal, as different motivations could potentially drive behaviour in either direction on this dichotomy. Barriers were only considered with respect to proper disposal, as the concept of ‘barriers to littering’ was not deemed useful. The review therefore considered:

- Motivations to litter;
- Barriers to proper disposal; and
- Motivations for proper disposal.

Policy makers and practitioners are drawing increasingly on behavioural theories to help them understand such motivations and barriers and to shape the design of interventions. There are many strands of theory and behavioural models to choose from (psychology, sociology, behavioural economics and so on) and no consensus on which is ‘best’. Recent practical guides to the theory¹ have suggested that, while it is important not to lose sight of where behavioural models came from originally, practitioners can usefully draw on the insights provided by a range of different approaches.

This was the approach taken in previous desk research for the Scottish Government which reviewed international examples of behaviour change interventions². Drawing particularly on models from psychology (including Triandis’ theory of interpersonal behaviour) and sociology the findings were organised around a framework which referred to three central strands of behavioural influence:

- The **individual**, which refers to personal attributes and influences, including aspects such as values, attitudes, identity and personal norms (e.g. feelings of responsibility and a sense of agency)
- The **social**, which refers to the influence on our thinking and behaviour from the wider social context, including social norms (established or accepted ways of behaving), cultural conventions and shared understandings;
- The **material**, which refers to the context in which behaviours are formulated and acted out, which can enable or constrain particular kinds of behaviour. It can include, for example, services, infrastructure and technologies.

¹ Darnton A (2008); Chatterton T, 2011.

² Southerton, D. Et al (2011)

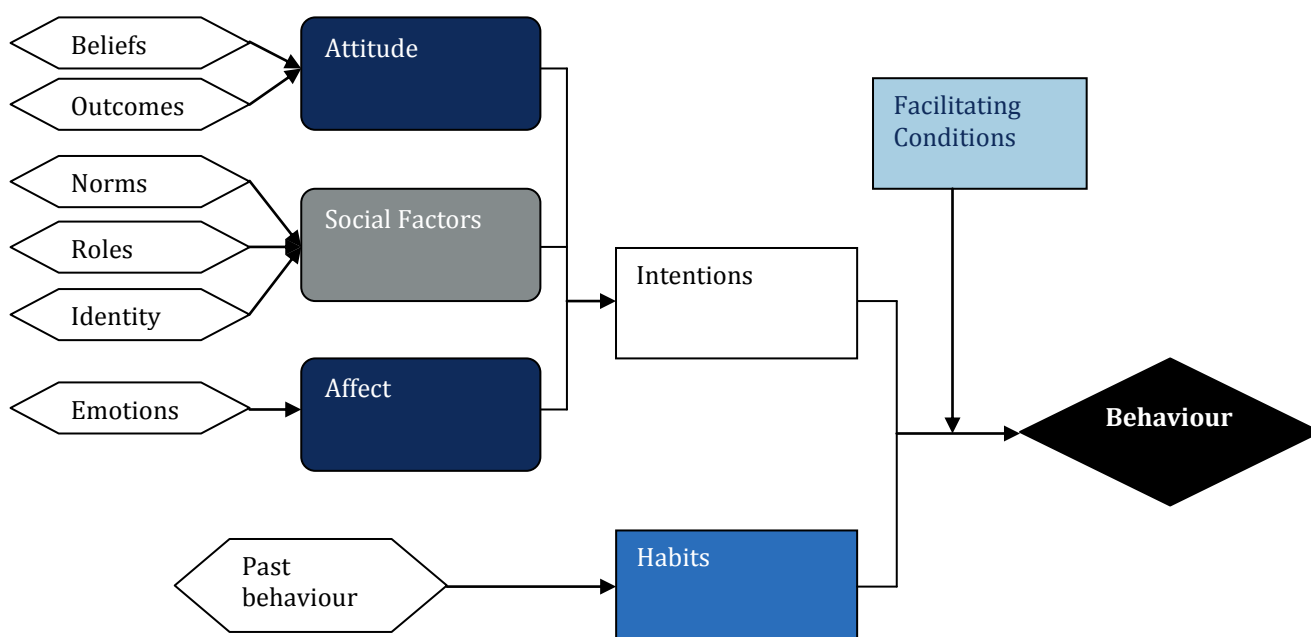
The addition of **habits**, from Triandis' model of Interpersonal Behaviour (see figure 1 below), was based on the expectation that habitual influences would be relevant in explaining littering behaviour. Habits refer to patterns of behaviour which individuals carry out almost automatically; in other words, unconscious drivers of behaviour which result from becoming 'locked in' to certain patterns.

The framework used in this review blends together the Scottish Government framework described above and the different elements of the Triandis model as follows:

- **Personal** – attitude and affect in the Triandis model
- **Social** – social factors in Triandis
- **Material** – facilitating conditions in Triandis
- **Habits** – as in Triandis

The four element conceptual framework is repeated throughout this report to summarise key findings from each section.

Figure 1 Triandis' behaviour change model, adapted from Jackson, T. (2005)



In choosing a behavioural framework which puts psychological factors as the core influence, it is important also to acknowledge the group of behavioural models known as 'sociological approaches', which emphasise the role of actions – rather than actors – in social processes. Recent research for the UK Department of Energy and Climate Change³ notes that *'..by putting this approach in the context of looking at habitual behaviours, it can be seen as being complementary to the individualist approaches, and so can be linked in with the Triandis model to show other drivers on behaviour...'*

³ Chatterton, T. (2011)

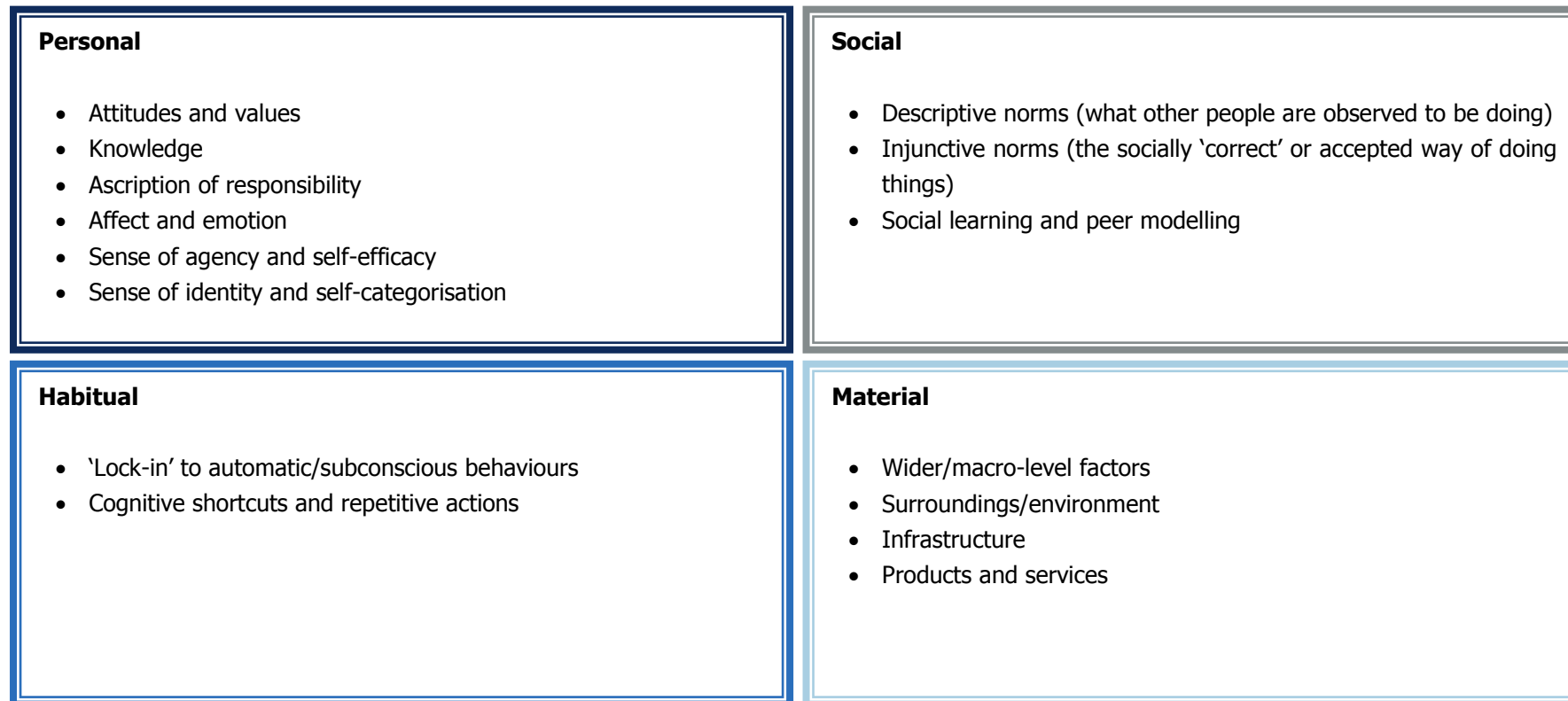
Report structure

The rest of this report is set out as follows:

- **Chapter 2, Who litters and how much?** describes the evidence on frequency and extent of littering behaviours, including variation in behaviour between different types of people and the characteristics of litterers.
- **Chapter 3, Motivations and barriers**, sets out the evidence on factors that influence littering behaviour, presented under the four headings of the behaviour framework.
- **Chapter 4, Segmentation models**, describes the five littering segmentation models identified through the review.
- **Chapter 5, Interventions**, describes the types of interventions identified in the review and the key success factors that contribute to the effectiveness of interventions.

Chapter 6, Discussion and overall observations, presents a summary of the key themes to emerge from the evidence and sets out the research team's thoughts on opportunities for changing behaviour to reduce littering based upon the evidence, as well as highlighting evidence gaps.

Figure 2 Conceptual framework of littering behaviour



2 Who litters and how much?

Littering behaviour is more complex than meets the eye, and encompasses a range of different disposal practices. The evidence both in the UK and internationally suggests that everyone, or almost everyone, has littered at some point, with the majority of people doing so at least occasionally. However, there is wide variation between individuals in the frequency and extent of their littering behaviour and the types of objects they litter. While some groups are more likely to litter than others, there is no evidence that a particular 'littering demographic' exists.

2.1 What is littering?

A wide range of definitions of 'littering' have been used in the literature, and while there is no official definition, the broadly accepted one (as used by ENCAMS and Keep Britain Tidy) is 'waste in the wrong place caused by human agency'. Several studies reviewed here similarly assert that the underlying idea of litter is one of '*items out of place*', where an individual no longer wants or has use for an item, and disposes of it in a way which is considered to be inappropriate in that setting. Through this lens, littering can be viewed as a social construct, dependent on the individual, the item, and the context in which they are acting.

Littering behaviour is therefore not a single, easily defined behaviour, but a concept that includes a broad range of sub-behaviours. For example, a study in Australia⁴ found that litter is often not simply dropped or left behind, but is deliberately placed in certain locations. A high proportion of such littering occurs in locations where litter can be hidden, or in places resembling litter bins, for example in bushes or pot planters. The authors note that this is all the more surprising as people often go to a great deal of trouble to place their litter carefully in locations like these, while ignoring nearby bins. The same study found that where bins are present and overflowing, many people litter their objects around the overflowing bin rather than taking their litter with them. Furthermore, there was a tendency for people to continue using the same bin even after it was overflowing, while another bin remained almost empty, which the author suggests is indicative of social 'herd' behaviour.

Sibley and Liu (2003) categorise littering behaviour into active and passive littering. Their study of students in New Zealand found that when people put their litter down in a space for a long period of time before they themselves leave that space, they are significantly more likely to leave that item behind compared to those who put their litter down shortly before leaving. The researchers argue that littering can therefore be seen as '*a two-stage process of (a) placing litter in a proximal location in the environment and then (b) failing to remove that litter when vacating the immediate area*'. This failure to remove litter is termed passive littering, to differentiate it from more 'active' littering behaviours whereby an individual takes a shorter amount of time to litter an object, for example just before leaving or while passing through an area. A further example of passive littering is found in US research⁵ which showed that some vehicle litter results from people not properly securing the loads on the back of their vehicles, because their focus is primarily on meeting the legal requirements on covering the load, and not on preventing litter.

2.2 Overall levels of littering

Attitude and behaviour surveys

Research into the proportion of people littering and the frequency with which they litter, using attitude and behaviour surveys which have been conducted in a range of settings, suggests that approximately 50% of people litter or have littered at some point. For example, research in Scotland in 2007⁶ found that 54% of respondents admitted to having ever dropped litter, with 46% admitting to dropping litter at least occasionally nowadays. The picture is similar in

⁴ Curnow, R.C., Streker P., & Williams, E. (1997)

⁵ Sharp Hartwig, Inc. (2001)

⁶ Keep Scotland Beautiful (2007)

Wales, with 50% of people admitting to littering in the last year in 2009/10⁷, and in Great Britain more widely where in 2006 48% of the general population admitted to dropping some form of litter⁸. However, not all surveys are in full agreement: one that was carried out in England in 2008⁹ found that only 20% of respondents admitted to dropping litter in the past year. The cause of this discrepancy is unclear – although, while the survey was independent and nationwide, the precise wording of the survey questions does not appear to be publicly available, and may account for the difference.

While the surveys cited above focused on littering in general, Keep Britain Tidy (2009) has also looked in more detail at roadside litter, which arises mainly from litter thrown from vehicles. This survey found that 20% of the general public admitted to littering from a car in the six months prior to the survey. Out of those who admitted that they drop litter from their cars, 35% admitted having done this on the day of the survey, the figure rising slightly to 36% among commercial drivers.

Comparing the UK picture to international evidence suggests that there may be variation in general littering behaviour between countries. Research in the US suggests slightly lower rates of littering, at around 40-50%¹⁰. An even greater difference is evident when looking at data from Singapore, where a year-long sociological study¹¹ found that 63% of the Singaporean public always use a bin, whereas 36% do so only when it is convenient, suggesting that the cultural and political environment of a place may influence littering behaviour.

Observational studies

Observational studies involve researchers attempting to unobtrusively watch people's littering and disposal behaviours within particular sites, recording different disposal behaviours in order to estimate their prevalence in that particular site (in some cases also recording characteristics such as gender and estimated age, or interviewing some of their research subjects as they leave the site). The reviewed literature included no observational studies carried out in Scotland or the UK, but two US studies, observing just under 10,000¹² and 2,000¹³ disposal actions respectively, both found a littering rate of 17% of all items disposed of. An Australian study¹⁴ of nearly 9,000 disposal actions found a littering rate of 23%, while a study of students in New Zealand¹⁵ covering 271 observations found a littering rate of 20%.

Observed versus reported littering behaviour

Attitude and behaviour surveys and observational studies provide different kinds of data on littering. Observational studies give an indication of the proportion of objects needing disposal which are littered, but they cannot provide any indication of what proportion of the population will always or never litter. While attitude and behaviour surveys can provide a useful benchmark of reported littering behaviour, it needs to be borne in mind that they may not give a robust indication of actual levels of littering behaviours. Studies combining observation of littering behaviour followed by interviews have found that there can be significant differences in the attitudes and reported behaviours recorded through interviews, compared to actual littering or disposal behaviour.

For example, a 1997 Australian study combining observation with interviews notes that almost half of the people who had been observed littering within the previous five minutes told interviewers that they had not littered in the last 24 hours, or that they could not remember the last time they littered¹⁶. In a similar study carried out in 2009, only 33% of

⁷ Keep Wales Tidy (2010)

⁸ Environmental Campaigns Ltd [ENCAMS] (2007)

⁹ Lewis, A., Turton, P. & Sweetman, T. (2009)

¹⁰ Alice Ferguson Foundation (2011)

¹¹ Singapore National Environment Agency (2011)

¹² Keep America Beautiful (2009)

¹³ Schultz, P., Bator, R., Large, L., Bruni, C., & Tabanico, J. (2011)

¹⁴ Curnow, R.C., Streker P., & Williams, E. (1997)

¹⁵ Sibley, C. & Liu, J. (2003)

¹⁶ Curnow, R.C., Streker P., & Williams, E. (1997)

those observed littering only moments before agreeing to be interviewed admitted that they had littered within the previous 24 hours, while 28% told the interviewer that they had never littered in their life.¹⁷

This difference between observed and reported behaviour is more evident among some demographic groups than others. ENCAMS research¹⁸ found that most teenagers willingly admit dropping litter on an almost daily basis, whereas research into adults' littering behaviour suggests that littering is accompanied by '*high levels of guilt, and often, total denial*'. Research in Australia found a similar willingness to admit to littering among young people, as well as noting that women (of all ages) were a little more likely to be frank about their littering behaviour than men¹⁹.

The discrepancy between observed and reported behaviour may be in part due to social desirability response bias (whereby interviewees tend to give socially 'acceptable' rather than honest answers) and in part due to the subconscious role of habit in influencing littering behaviour. The researchers²⁰ note that '*some respondents clearly misled the interviewers - or attempted to do so while not realising that their behaviour had been observed. However, many of the litterers interviewed seemed genuinely unaware of what they had done.*' In either case, these studies indicate that data on claimed littering behaviour should be treated with caution, as many people will tend to underestimate their littering behaviour, and as some groups persistently do so more than others.

2.3 Factors affecting littering prevalence

The literature suggests that, while there is no core littering demographic or group responsible for the majority of litter, there are some demographic characteristics which slightly increase the likelihood of an individual littering. The features that are most frequently cited in the reviewed literature are age, gender, and whether or not the individual is a smoker. Other factors considered include education levels, socio-demographics, and family status (being married and/or having children).

Age

Overall, the literature suggests that younger people litter more than older people, with one US study²¹ suggesting that age is a statistically significant predictor of littering behaviour, although the effect is small. While data on observed and reported littering behaviour are not directly comparable, there is enough variation in the evidence to suggest that, while age does influence littering likelihood, its influence may be over-emphasised in survey data, as young people tend to be more frank about their littering behaviour.

The survey-based evidence on reported littering behaviour suggests that, while all age groups say they litter, it is far more prevalent among the younger demographics. A survey in Scotland²² found that those aged 16-24 appeared to be the most prevalent litterers, with 86% reporting they had dropped litter, compared to only 29% among those aged 65+ (see figure 3 below). Similarly, a Welsh survey²³ classified 76% of those aged 16-34 as litterers, compared to only 24% of those aged 55+, while a poll of the general public in England²⁴ found that 38% of those aged 18-24 admit to dropping litter, compared to 9% of those aged 65+.

¹⁷ Beverage Industry Environment Council (2009)

¹⁸ Environmental Campaigns Ltd [ENCAMS] (2004)

¹⁹ Curnow, R.C., Streker P., & Williams, E. (1997)

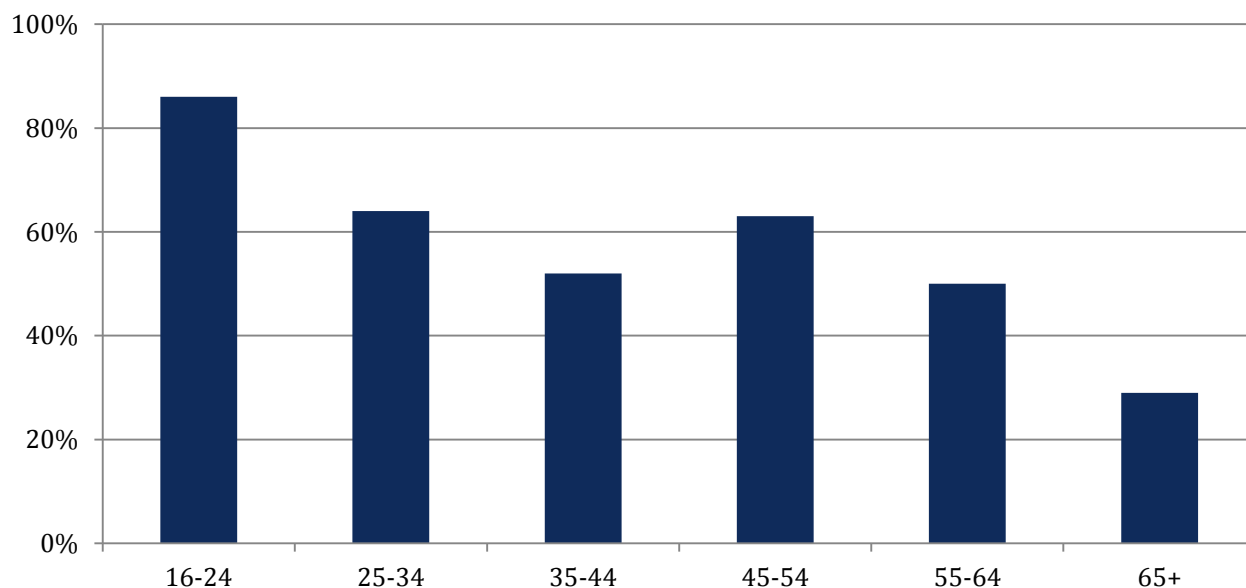
²⁰ Curnow, R.C., Streker P., & Williams, E. (1997)

²¹ Schultz, P., Bator, R., Large, L., Bruni, C., & Tabanico, J. (2011)

²² Keep Scotland Beautiful (2008)

²³ Keep Wales Tidy (2010)

²⁴ Lewis, A., Turton, P. & Sweetman, T. (2009)

Figure 3 Proportion of Scottish public who have dropped litter, by age group (N=1,001)

Source: Keep Scotland Beautiful (2008) State of the Nation report

Observational research evidence may present a more accurate picture of the influence of age on littering behaviour, as it eliminates the bias associated with self-reporting. A US study²⁵ found that the observed littering rate was highest (26%) among adults aged 18-29, while for adults aged 30+ the littering rate remained steady at around 15%. However, this study found that the rate was lowest (13%) among children and adolescents (who were not considered in the reported behaviour surveys described above). Observational research in Australia²⁶ similarly found that those aged under 24 used bins less frequently – with 43% of their disposals going into bins – than other age groups, while those aged 45-54 and 55+ littered the least. Other research in Australia²⁷ also suggests that those aged under 15 have the lowest littering rate, of around 10%, with those aged 15-24 littering marginally more than all other age groups, although everyone over 15 had a littering rate of between 30-40%.

Gender

The reviewed evidence suggests that women have stronger anti-litter attitudes than men, and that men drop slightly more litter than women do. This pattern is consistent between both survey and observational evidence.

In terms of attitudinal research, Scottish survey²⁸ found that women (61%) are more likely than men (55%) to think that littering is not understandable under any circumstances, while surveys across Europe²⁹ suggest that being a woman increases the probability of stating that littering is never justifiable by 5.4 percentage points. In addition, US research into littering attitudes³⁰ describes men as being on average less 'pro-social' in their attitudes to littering, compared to women.

²⁵ Keep America Beautiful (2009)

²⁶ Beverage Industry Environment Council (2009)

²⁷ Curnow, R.C., Streker P., & Williams, E. (1997)

²⁸ Keep Scotland Beautiful (2007)

²⁹ Torgler, B., Garcia-Valinas, M., & Macintyre, A. (2008)

³⁰ de Kort, Y., McCalley, L. & Midden, C. (2008)

In terms of behaviour, the Scottish survey responses suggest that 61% of men report having ever dropped litter in the past, compared to 49% of women³¹. Similarly, a survey in England found that 24% of men admitted to having dropped litter in the past year, compared to 15% of women³². Observational research also suggests that men tend to litter more than women; for example, research in Australia found that 55% of women used bins, compared to 46% of men³³. Similarly, a US study observed a 21% littering rate among men, compared to 15% among women³⁴, although this difference was not statistically significant. Elsewhere, however, Gershman, Brickner & Bratton, Inc. (2005) claim that men are in fact responsible for 72% of all deliberate littering and 89% of accidental littering.

Smokers

The literature strongly suggests that littering rates are higher for cigarette butts and other smoking-related items than for general litter items. For example, one US study³⁵ found that cigarette butts are the most frequently littered item – with a 65% littering rate compared to the overall 17% littering rate – while an observational study of New Zealand students in a particular outdoor quad³⁶ calculated a baseline rate of littering for cigarette butts of 99%.

Survey evidence similarly supports the case for cigarettes having a high littering rate. In a US study of smokers, 74% reported having disposed of cigarettes on the ground or from a car window at some time in the past, with 55.7% admitting to having done this in the past month³⁷. Research in Britain³⁸ found that of the 51% of vehicle litterers who report that they smoke, 95% admit to throwing a cigarette out of their vehicle in the past six months, with 40% admitting to doing so on the day of the survey.

Work by Schultz et al (2011) indicates that age may be more important in influencing smoking-related littering than other types of littering; in their study, the highest littering rates observed were for smokers in their 30s (72%), compared with smokers in their 20s (66%), 40s (58%), 50s (66%) and 60s (50%).

The evidence also suggests that smokers litter at a higher rate when it comes to other litter items that are not smoking-related, as well as having more relaxed attitudes towards littering behaviour in general. For example, research in Belfast found some of the highest levels of general littering among smokers, of 60%³⁹. Similarly, US research among young people⁴⁰ found that smokers have the highest likelihood of littering not only cigarette butts but other items as well. In the model developed as part of that research, being a smoker was the second strongest predictor of willingness to litter (after the perception that one's friends litter).

Furthermore, smoking-related littering has also been found to have a relationship with vehicle littering. UK research found that smokers were overrepresented within vehicle litterers, and that smokers were also more likely than non-smokers to have thrown all other types of litter out of their vehicles in the previous six months.⁴¹

In terms of smokers' attitudes to litter, a survey in England⁴² found that 42% of smokers believe it is acceptable to drop litter, compared with 16% of non-smokers. Research in Singapore⁴³ found that as well as being more likely to admit to littering than non-smokers, smokers also feel it is '*culturally acceptable and even expected among themselves to flick the cigarette butt after smoking*'.

³¹ Keep Scotland Beautiful (2008)

³² Lewis, A., Turton, P. & Sweetman, T. (2009)

³³ Beverage Industry Environment Council (2009)

³⁴ Schultz, P., Bator, R., Large, L., Bruni, C., & Tabanico, J. (2011)

³⁵ Keep America Beautiful (2009)

³⁶ Sibley, C. & Liu, J. (2003)

³⁷ Rath, J., Rubenstein, R., Curry, L. Shank, S., & Cartwright, J. (2012)

³⁸ Environmental Campaigns Ltd [ENCAMS] (2008)

³⁹ Belfast City Council (2008)

⁴⁰ Keep Los Angeles Beautiful (2009)

⁴¹ Keep Britain Tidy (2009)

⁴² Lewis, A., Turton, P. & Sweetman, T. (2009)

⁴³ Singapore National Environment Agency (2011)

3 Motivations and barriers

This chapter describes the influences on littering behaviour under the following four headings, which correspond to the four categories of influencing factors shown in the behaviour framework in figure 2. These are:

- Personal factors;
- Social factors;
- Material factors; and
- Habitual factors.

These headings are used to organise the reviewed evidence, but in practice they cannot be considered in isolation. In reality, the different types of factors interact with and modify each other. The report narrative provides a commentary on these interlinkages.

This chapter ends with three diagrams which summarise the key behavioural influences on littering, separated out under the two key behaviours of interest (littering and correct disposal) and two types of influences (motivations and barriers) which may drive behaviour in opposite directions (as outlined in chapter 1):

- motivations for littering,
- motivations for correct disposal,
- and barriers to correct disposal.

The fluidity between these definitions means that similar factors may be relevant to more than one of these categories of interest.

3.1 Personal factors

A sense of personal responsibility for litter, which can be stronger or weaker depending on the type of spaces and the individual's feelings about that space, appears to be a key influence on littering and disposal behaviours. An individual's feelings about and relationship to the community can also affect their willingness to litter. Uncertainty about what 'counts' as litter is another important driver of littering behaviour, while a lack of understanding of the impacts of litter may also be a factor, though the evidence here is much weaker. The desire to be rid of litter as quickly as possible because it is perceived to be unpleasant (or the 'ick factor') motivates littering behaviour, with laziness preventing trips to bins. There is also a range of 'deeper' personal influences, which the reviewed literature makes only limited direct reference to, and which include personal values and norms, a sense of identity, beliefs, and feelings such as guilt and fear.

3.1.1 Responsibility and pride

Perceived personal responsibility

A key theme that emerges from the literature is that of an individual's sense of their personal responsibility with respect to litter. Qualitative research in Scotland found there to be 'widespread acknowledgement' that everyone (which implicitly includes the individual themselves) is responsible for dealing with litter. Survey data shows that those who

admit to dropping litter are more likely to say that everyone is responsible (41%) and that the person who drops litter is responsible (25%) compared to those who do not admit to littering (34% and 20%, respectively).⁴⁴

The findings of this survey also suggest that responsibility for litter is often ascribed to local authorities, with 37% of the overall sample considering the council to be one of the entities responsible. Overseas research also suggests that litterers are generally more likely than non-litterers to ascribe responsibility to someone else – and particularly to local authorities. For example, in a survey in Australia⁴⁵, over 90% of respondents felt that litter was primarily each individual's responsibility, yet of those who were observed littering, a quarter suggested it was mainly a council responsibility. Similarly, in Singapore, litterers are more likely to consider it outside the responsibility of citizens to keep shared spaces clean, and they also feel that provided there is no intent to litter (e.g. if an item is accidentally dropped or flies away) then they should not have to actively go after it.⁴⁶

There is substantial evidence which indicates that sense of personal responsibility varies between locations, and that where people feel less of a personal responsibility for maintaining the space they are in, they are more likely to litter. For example, places where the public believe that someone else will clean up after them, such as council-maintained sites and indoor public spaces, are often seen as more acceptable places in which to litter.

ENCAMS (2007), analysing the acceptability and excusability of littering in a range of contexts, conclude that littering is perceived as more acceptable when personal responsibility is considered diminished. Surveys and interview research in England⁴⁷ suggest that a large proportion of people feel littering can be justified in spaces which someone else is paid to clean up. Research in the UK⁴⁸ found that some people feel dropping litter in the city is not much of an issue, compared to rural areas, because they assume that cities and large towns will be cleaned overnight. In Singapore⁴⁹, the younger age groups were particularly prone to ascribing responsibility for cleaning up elsewhere, referring in particular to the heavy presence of cleaners in public spaces. Further variation is seen between particular types of locations: for example, focus group research in Scotland⁵⁰ found that leaving litter in a public indoor environment such as in a cinema or on public transport was not considered littering by the research participants, because they did not feel it was unsightly or a danger to the environment, and, crucially, because they knew it would be cleaned up.

A further factor which was considered to diminish perceived personal responsibility was being under the influence of alcohol. Research by ENCAMS (2001 and 2007) found that people feel that if they are drunk, littering is more excusable as they cannot be held personally responsible for it.

Community pride and social bonds

The desire to 'do the right thing' and take pride in a local area of neighbourhood appears to be an important driver for correct disposal behaviours. ENCAMS (2001) found that 'pride' and 'respect' were frequently mentioned as reasons for not littering. Similarly, research carried out in Britain⁵¹ found that many respondents believed the reasons people did not litter were respect for others, their property and general environment; taking pride in where they lived; being raised by their parents not to litter; and having a conscience and sense of responsibility – all of which link into local pride and sense of community. Another British survey also found that those without a strong sense of community are 10% more likely to litter⁵². Further parallels are found in survey data from the US, which suggests that those with the

⁴⁴ Keep Scotland Beautiful (2007) – the question allowed multiple responses, and the response options were (with the percentage of the overall sample, including litterers and non-litterers, who selected each option): everyone (38%), council (37%), parents (27%), whoever drops the litter (22%), and schools (10%).

⁴⁵ Curnow, R.C., Streker P., & Williams, E. (1997)

⁴⁶ Singapore National Environment Agency (2011)

⁴⁷ Lewis, A., Turton, P. & Sweetman, T. (2009)

⁴⁸ Environmental Campaigns Ltd [ENCAMS] (2001)

⁴⁹ Singapore National Environment Agency (2011)

⁵⁰ Keep Scotland Beautiful (2007)

⁵¹ Environmental Campaigns Ltd [ENCAMS] (2007)

⁵² Lewis, A., Turton, P. & Sweetman, T. (2009)

strongest community bonds, and those who most frequently visit recreational areas, feel the highest obligation not to litter⁵³.

In contrast, when an individual feels disenfranchised or alienated from a community, littering can become a form of rebellion – a phenomenon seen particularly among younger people. Research with British teenagers⁵⁴ notes that littering is seen by them as a *'safe, minor form of rebellion and transgression; you are unlikely to get caught and you certainly won't get fined or put in prison'*. The authors also suggest that the act of littering casts teenagers as consumers, giving them a means of showing visual signs of their wealth and spending. In Singapore, research identified⁵⁵ a general perception that it is 'cool and manly' to flick cigarette butts onto the floor, and a sense that this behaviour is expected among smokers.

Curnow and Spehr (2011) provide a possible explanation for this variation in behaviour, noting that groups within the community share certain values and feelings, which predispose them to pay attention to certain things while ignoring others. They argue, for example, that people with largely egalitarian views may perceive that everyone has a right to enter a clean place, whereas a more individualistically oriented person may see their own needs as of overriding importance. This may explain how littering can become a form of rebellion or social protest (a phenomenon most commonly seen in the under-25 age group), as well as the observation by Curnow et al (1997) that people's attitudes to littering may be related to how they litter – whether they *'carefully put their litter in places where it appears tidy/tidier [or] deliberately use their waste to make sites look more littered'*.

3.1.2 Knowledge of litter and its impacts

What 'counts' as litter

Confusion and uncertainty about what 'counts' as litter – in terms of which items, their size and the context – is another recurring theme. Research with the Scottish public⁵⁶ found that food-related items are top-of-mind when thinking about litter: 87% of survey respondents mentioned food and drink packaging when asked to list types of litter unprompted, while 48% mentioned fast food leftovers and packaging 48%. Other items that people commonly think of as constituting litter are flyers and newspapers (52%), cigarette stubs (43%), dog poo (42%), chewing gum (38%) and plastic bags (36%). Keep Scotland Beautiful (2007) report that, of the various types of litter considered, dog poo was the one that bothered the most people (69% of survey respondents) followed by chewing gum (49%) and food and drink packaging (45%). The authors suggest people are most bothered by messy and dangerous items – i.e. those associated with germs, rodents or disease.

There appears to be a perception that it is more acceptable to litter items that are biodegradable – food in particular. In focus groups in Scotland⁵⁷, most participants felt that it was acceptable to drop biodegradable items as these were seen as harmless. Some even felt that they would be good for the environment by benefiting wildlife. The same perception was evident among survey respondents, 19% of whom felt it was understandable to litter if the item is biodegradable or can rot away. These findings are echoed in research from the US, which found that people report a greater likelihood to litter when the item in question is biodegradable⁵⁸.

People also appear to be less likely to consider smaller items as litter, seeing them as *'more acceptable because they were felt to cause minimal impact, both aesthetically and in terms of health and safety'*.⁵⁹ Research by Keep Scotland Beautiful (2007) suggests that people consider large or highly visible items of food and drink packaging to be the most

⁵³ Keep America Beautiful (2007)

⁵⁴ Environmental Campaigns Ltd [ENCAMS] (2004)

⁵⁵ Singapore National Environment Agency (2010)

⁵⁶ Keep Scotland Beautiful (2007)

⁵⁷ Keep Scotland Beautiful (2007)

⁵⁸ Keep Los Angeles Beautiful (2009)

⁵⁹ Keep Scotland Beautiful (2007)

irritating types of litter, and focus groups in Wales⁶⁰ found that many people are willing to drop smaller items (including food), while finding a bin for larger items.

Particular items that appear commonly to be excluded from people's definitions of litter include cigarette butts and chewing gum. US research⁶¹ notes that survey respondents reported they were most likely to litter cigarette butts (if smokers) and chewing gum, because these may be *'outside the framework of what people consider litter to be'*.

Although some authors⁶² go as far as to suggest that smokers may not be convinced that cigarette butts are litter, other research⁶³ contradicts this, finding instead that smokers who admit to dropping cigarette butts generally acknowledge that this is, technically, littering. However, they also feel that cigarette butts are less important than other types of litter, claiming that they do not drop other, in their view more 'unacceptable', types of litter such as food (in direct contrast with the evidence elsewhere on smokers' littering behaviours and the acceptability of food litter). The evidence suggests that smokers regard cigarette butts as different to other types of litter, due to the (incorrect) belief that cigarette butts are biodegradable, due to believing that disposing of them in bins could be a fire hazard, and due to feeling that carrying their cigarette butts with them would be difficult because they are unclean and odorous⁶⁴. These beliefs appear to carry over to littering behaviour: US research⁶⁵ found that those who do not believe or are not sure whether cigarette butts constitute litter are over three and a half times as likely than others to report having littered their cigarette butts on the ground or out of a car window at some point in the past.

Similarly, research with chewing gum droppers⁶⁶ found that gum chewers who dispose of their gum incorrectly do not regard it as litter, on the basis that they consider chewing gum to be small and insignificant. Although most research participants were aware that dropping gum on the street is not fully socially acceptable, the authors found that it was not perceived to be important or particularly problematic.

It is worth noting here that, as well as creating a barrier to the proper disposal of litter, these knowledge-related issues around the definition of litter may be contributing to mis-reporting of littering behaviour in surveys.

Understanding the impact of littering

In addition to the range of views of what 'counts' as litter, there also appears to be a widespread lack of understanding of the impacts of litter. For example, Scottish focus group research⁶⁷ found that participants did not view litter as a serious problem, while focus group research with vehicle litterers in the UK⁶⁸ found that most vehicle litterers do not immediately see the link between littering and the environment (despite the environment being the second most highly rated reason not to drop litter from vehicles). Similarly, research from Australia⁶⁹ notes issues around ignorance of the problem or its consequences, such as a lack of understanding that litter on the ground may end up in stormwater and harm wildlife, or incorrect beliefs, such as the idea that cigarette butts will break down quickly and harmlessly in the environment. A US review of cigarette litter research⁷⁰ found that smokers tend to consider the impact of cigarette butts as minimal, particularly when there are not many in sight. Their rationale appeared to be grounded in the lack of any readily evident environmental impacts associated with cigarette litter.

Evidence on whether having an understanding of the impact of litter encourages people to dispose of their litter properly is mixed. For example, research in Los Angeles⁷¹ found that 83% of survey respondents who believed that

⁶⁰ Keep Wales Tidy (2010)

⁶¹ Keep Los Angeles Beautiful (2009)

⁶² Lewis, A., Turton, P. & Sweetman, T. (2009)

⁶³ Environmental Campaigns Ltd [ENCAMS] (2008)

⁶⁴ Environmental Campaigns Ltd [ENCAMS] (2008)

⁶⁵ Rath, J., Rubenstein, R., Curry, L. Shank, S., & Cartwright, J. (2012)

⁶⁶ Environmental Campaigns Ltd [ENCAMS] (2004)

⁶⁷ Keep Scotland Beautiful (2007)

⁶⁸ Keep Britain Tidy (2009)

⁶⁹ Curnow, R. & Spehr, K. (2011)

⁷⁰ Rath, J., Rubenstein, R., Curry, L. Shank, S., & Cartwright, J. (2012)

⁷¹ Keep Los Angeles Beautiful (2009)

litter on the streets goes to landfill or treatment plants, or is picked up, reported at least some willingness to litter. Willingness to litter was only slightly less prevalent (at 78%) among those who believed that litter ends up in the ocean. However, research in Australia⁷² found that three quarters of people who were observed littering said they considered littering to be a 'very important' or 'extremely important' environmental issue, suggesting a disconnect between understanding of impacts and littering behaviour.

3.1.3 The 'ick' factor and laziness

The desire to be rid of 'icky' litter

Alice Ferguson Foundation (2011) describe littering behaviour as driven *'by the desire to push unwanted trash out of one's own space into others' space'*. Lewis et al (2009) describe this desire to get rid of messy items as the 'ick factor'. People are reluctant to carry 'dirty' or 'unclean' items until they find a bin⁷³, and focus group evidence⁷⁴ suggests that heavy litterers may have a very narrow personal zone – when litter leaves that space it leaves their consciousness. Research from Australia⁷⁵ suggests that convenience may be a key factor here, with 14% of survey respondents citing the inconvenience of having to hold on to their items as a main reason for littering. Research with teenagers⁷⁶ also found cleanliness to be a central concern; interestingly, while litter was considered 'dirty' to carry around, the research participants did not consider littering to have many implications.

The 'ick factor' appears to apply particularly to gum, which many people wish to dispose of quickly. Research shows that people are adverse to touching gum with their hands, and concerned about the possible damage to clothing even if the gum is wrapped before being put in a pocket⁷⁷. Other items considered 'icky' include food and drink⁷⁸, fast food packaging⁷⁹, and wet items such as food wrappers⁸⁰.

The 'ick factor' and the desire for a clean personal space may also be particularly relevant to car litter. Research from the US⁸¹ notes that litterers have a dislike for the smell and/or appearance of rubbish in their car, and consider it messy, which creates a desire to be rid of it. The same study also found that most smokers prefer not to use the car ashtray, as this retains the smell and debris within the car, which they see as unpleasant. In Britain, research with commercial drivers⁸² found that they view their cab as their 'office' and wish to keep a high standard of cleanliness inside as they will be spending long periods of time in it.

Laziness in the face of effort required

The influence of the 'ick factor' may be strengthened by the presence of another key driver of littering behaviour, which is laziness. In a US study⁸³, 'feeling lazy' was given as one of the top three reported barriers to proper disposal of rubbish, and respondents suggested they are more likely to litter when in a hurry. Laziness was also the most common reason given by people who were observed littering in study in Australia⁸⁴. Research in Britain⁸⁵ with vehicle litterers also notes laziness as a main cause of roadside litter, citing a focus group respondent who said that *'even at service stations...lorry drivers are idle. It's warm in your cab.. (and you don't want to get out to find a bin)'*.

⁷² Curnow, R.C., Streker P., & Williams, E. (1997)

⁷³ Environmental Campaigns Ltd [ENCAMS] (2007)

⁷⁴ Alice Ferguson Foundation (2011)

⁷⁵ Curnow, R.C., Streker P., & Williams, E. (1997)

⁷⁶ Environmental Campaigns Ltd [ENCAMS] (2004)

⁷⁷ Environmental Campaigns Ltd [ENCAMS] (2004)

⁷⁸ Keep Britain Tidy (2009)

⁷⁹ Sharp Hartwig, Inc. (2001)

⁸⁰ Curnow, R.C., Streker P., & Williams, E. (1997)

⁸¹ Sharp Hartwig, Inc. (2001)

⁸² Keep Britain Tidy (2009)

⁸³ Keep Los Angeles Beautiful (2009)

⁸⁴ Curnow, R.C., Streker P., & Williams, E. (1997)

⁸⁵ Keep Britain Tidy (2009)

3.1.4 'Deep' personal influences

Personal values

Wider behavioural literature suggests that values, including the balance between intrinsic and extrinsic values, play an important role in individual behaviour⁸⁶, but the reviewed literature makes only limited reference to the role of personal values in influencing littering behaviour. Curnow and Spehr (2011), as discussed in section 3.1.1 above, suggest that people with largely egalitarian views may be less likely to litter than those who are more individualistically oriented and place their personal needs above the needs of the community. Similarly, ENCAMS (2007) suggests that respect for others can drive correct disposal behaviour.

Personal norms

Personal norms are individuals' beliefs about what constitutes their own standard behaviour, and chapter 2 suggests that these beliefs are often biased towards not littering. The influence of personal norms can therefore decrease people's likelihood of littering. In an experiment⁸⁷ testing implicit and explicit ways of activating or communicating norms by focussing an individual's attention on their own behaviour, the researchers increased the visibility and salience of norms in two ways: by activating personal norms by placing a mirror over the litter bin (so people would observe their own behaviour), and by activating norms more explicitly by placing a sign nearby with the text 'Do you leave your litter lying around?'. In these experiments, both approaches to activating personal norms resulted in significantly less litter, compared to the control/baseline scenario (10-12% of items compared to 19%).

Identity

The concept of identity – the kind of person that an individual considers themselves to be – is closely linked to personal norms. The survey data reported in chapter 2 suggests there is a reasonable proportion of people who claim that they do not litter, but whether there exists a type of person who self-identifies as a "non-litterer" has not been explored in the reviewed literature. However, for some, littering appears to be an activity that demonstrates a 'rebellious' identity – this is discussed in section 3.1.1 above.

Research in a deprived community in the District of Columbia, USA⁸⁸, took a deeper psychological approach to analysing rebellious behaviour, suggesting that littering for this reason in fact goes further than minor rebellion and concluding that those who litter frequently may be experiencing and reacting to negative feelings, such as insignificance, disappointment, or disenfranchisement.

Beliefs

One survey of the Scottish public⁸⁹ found that, of those who said they had not dropped litter in the past year, 79% felt that littering was not understandable under any circumstances, compared to only 41% of those who admitted they had dropped litter. While this suggests a possible association between beliefs about littering and littering behaviour, the study is based on survey data, and there is no indication in the literature to explicitly demonstrate a causal link between beliefs about litter and behaviour.

The role of beliefs in influencing littering behaviour emerged as a key evidence gap in this review. The qualitative studies reviewed generally took reported attitudes to litter at face value (and some of the findings therefore appear in other sections of this report) and did not attempt to explore them further.

⁸⁶ E.g. Crompton, T. (2010) Common Cause – The Case for Working with our Cultural Values.

⁸⁷ de Kort, Y., McCalley, L. & Midden, C. (2008)

⁸⁸ Alice Ferguson Foundation (2011)

⁸⁹ Keep Scotland Beautiful (2007)

Affect: guilt and fear

In terms of emotions surrounding litter and littering behaviour, the concept of guilt is the only one to have received sufficient attention in the reviewed literature to enable discussion. Keep Britain Tidy (2009) reports that 75% of people feel guilty to some degree for littering. In a survey in Wales⁹⁰, 51% of respondents said they would feel very guilty dropping litter or leaving it behind instead of using a bin, while a further 19% said they would feel fairly guilty.

The extent to which feelings of guilt may actually prevent people from littering is uncertain. A US-based model of littering behaviour found that feeling guilty about littering made people less likely to litter⁹¹, but research from Australia noted that 67% of people who said they 'felt guilty' about littering included 64% of people who had littered only moments before. The evidence suggests that people may deal with guilt by rationalising their behaviour through excuses⁹², rather than changing their behaviour to avoid feelings of guilt in the first place.

Other research⁹³ also suggests that the health impacts of littering are important, and that people respond to concepts such as "bacteria" and "toxins" which are associated with possible negative health consequences that could result from litter. The thought of other people close to them coming into contact with litter that can affect their health bothers individuals, particularly if they perceive the person in question to be innocent, for example a child.

3.2 Social factors

Littering behaviour is very strongly affected by the social context in which it takes place, including by the prevailing injunctive and descriptive social norms, which may be inferred from the appearance of an area as well as from other people's behaviour. People tend to behave like those around them in order to avoid social disapproval, with both the social networks of family and friends and immediate company having an influence on individual behaviour. The presence of 'respectable' company tends to drive correct disposal behaviours, while the presence of peers seems to drive littering behaviour among the young and correct disposal among older age groups.

3.2.1 Social norms

Littering and other disposal behaviours, like all socially visible activities, often take place in a social setting and are therefore shaped by the actions and interactions of multiple individuals, and not just the litterer⁹⁴. The concept of 'social norms' – the accepted, standard social behaviour – is a recurring theme in the literature. In the context of littering, two types of social norms are particularly relevant: the '**descriptive**' norm, i.e. what most other people are doing, and the '**injunctive**' norm, i.e. what society considers ought to be done.

Descriptive norms ('what other people do')

Descriptive norms are not only observed through other people's actions, but also inferred from the current level of litter in a particular location. Experimental research by Cialdini (1990) demonstrated that littering behaviour is significantly affected by the state of the local environment: people are less likely to litter in a cleaner environment and more likely to litter in a dirty environment⁹⁵ (this phenomenon will be explored further in section 3.3). Subsequent research by Reno et al (1993) showed that descriptive norms are situation-specific and do not carry over into other environments⁹⁶.

Messages appealing to descriptive norms may not be effective if they contradict the actual descriptive norms on a site. For example, de Kort et al (2008) refer to an experimental study where littering was reduced by a message appealing

⁹⁰ Keep Wales Tidy (2010)

⁹¹ Keep Los Angeles Beautiful (2009)

⁹² E.g. Environmental Campaigns Ltd [ENCAMS] (2007), Environmental Campaigns Ltd [ENCAMS] (2004)

⁹³ Alice Ferguson Foundation (2011), Keep Wales Tidy (2010)

⁹⁴ Perry, M., Juhlin, O. & Normark, D. (2010)

⁹⁵ Keep Britain Tidy (2010)

⁹⁶ de Kort, Y., McCalley, L. & Midden, C. (2008)

to descriptive norms only when the environment itself was already clean, while in a littered environment, anti-littering messages using descriptive norms were actually shown to lead to an increase in littering⁹⁷.

Injunctive norms ('what ought to be done')

The prevailing public view on littering in Scotland, as observed through focus group research⁹⁸, appears to be that it is 'wrong' and undesirable, but is considered commonplace and a nuisance, rather than a danger. However, the research participants felt there was an absence of clear, consistent messaging that society believes littering is unacceptable, a perception reinforced by their sense that, at the time the research was carried out (in 2007), there had been no recent anti-litter campaigns or initiatives.

The unacceptability of littering, expressed through the injunctive norm, can be important in generating social pressure which affects littering behaviour. Research in Britain⁹⁹ noted a trend of increasingly intolerant attitudes towards dog fouling litter between 2001 and 2006, associated with a reduction in dog fouling in physical street surveys.

De Kort et al (2008) suggest that injunctive norms can be more effective than descriptive norms when establishing the degree of social acceptability of littering behaviours in general, in that injunctive norms can shift attention away from the descriptive norm created by the appearance of a littered environment, re-focussing an individual's attention on the social consequences of littering.

3.2.2 Social networks and immediate company

Networks of family and friends

The prevailing norms within individuals' personal networks may be more salient to them than wider societal norms. For example, research from Singapore¹⁰⁰ suggests that litterers are more likely to *'be embedded in informal support networks where significant proportions of others litter'* and are therefore more likely to disregard general anti-littering norms.

The influence of family has been noted in a number of research contexts. For example, research carried out in the UK¹⁰¹ found that upbringing has an influence on littering behaviour, while lack of education about litter is also suggested by many as a reason for their littering behaviour. Focus group research in Wales¹⁰² also suggests that littering behaviour can result in part from never having been taught to not litter. Similarly, in the US, participants in focus groups of litterers described having seen other people – including their parents – throw cigarettes out of car windows¹⁰³, while other US research found a statistical relationship between individuals' reported likelihood of littering and the frequency with which their parents litter¹⁰⁴.

The same research project also found that the strongest predictor of willingness to litter was the perception held by an individual as to whether their friends litter¹⁰⁵. Similar findings emerged from research in Singapore, which concluded that those with a close family member, or a close friend, who disapproves of littering, or does not litter, are less likely to litter in general. This report also suggests that the effect of peer influence is stronger than that of family¹⁰⁶.

⁹⁷ Cialdini, R. B., Reno, R. R., & Kallgren, C.A. (1990), cited in de Kort, Y., McCalley, L. & Midden, C. (2008)

⁹⁸ Keep Scotland Beautiful (2007)

⁹⁹ Environmental Campaigns Ltd [ENCAMS] (2007)

¹⁰⁰ Singapore National Environment Agency (2011)

¹⁰¹ Environmental Campaigns Ltd [ENCAMS] (2001)

¹⁰² Keep Wales Tidy (2010)

¹⁰³ Sharp Hartwig, Inc. (2001)

¹⁰⁴ Keep Los Angeles Beautiful (2009)

¹⁰⁵ Keep Los Angeles Beautiful (2009)

¹⁰⁶ Singapore National Environment Agency (2011)

Immediate company: 'respectable' people

The literature suggests that being in 'respectable' company makes people less likely to litter, for fear of social sanctioning¹⁰⁷. Examples of the types of 'respectable' company that made people less likely to litter are parents (especially for young people)¹⁰⁸, employers (noted in research with car drivers)¹⁰⁹ and children¹¹⁰ – for example, research in Singapore suggested that women felt they ought to set a good example for their children by binning their litter¹¹¹. In addition, smokers have been found to be less likely to litter in front of non-smokers, or if someone is watching them¹¹².

Immediate company: peer groups

The influence of the presence of a peer group appears to vary by age, with young people more likely to litter when in a group, and older people less likely to litter in a group, compared to when they are alone. For example, observational research in Australia¹¹³ found that people under the age of 25 are most likely to litter when in a group, whereas people over the age of 25 are most likely to litter when they are alone.

The reason behind this pattern appears to be that younger people feel under pressure from their friends to litter, or fear that they may be ridiculed if they go out of their way to use a bin. Focus group research with young people in the UK¹¹⁴ found that participants expressed embarrassment at binning their litter, noting that when in a group it is considered normal to litter. In another UK study¹¹⁵, heavy litterers also referred to this 'group mentality' around littering. Similarly, research in Singapore¹¹⁶ found that younger people reported that their peers offer little or no social sanctioning of their behaviour, and the report notes that *'in fact, the collectivity of the social group and the anonymity it offered may have actually promoted the littering behaviour'*. With age, peer group pressure seems to shift towards an expectation not to litter: evidence from UK focus group research¹¹⁷ reflects this pattern, with respondents commenting that their friends' attitudes to littering have changed in time as they have grown older.

3.3 Material factors

The physical context is reported to have an influence on littering behaviours, with existing litter and other indicators of a 'run-down' site increasing the likelihood of further littering. Sites that get regularly cleaned and sites that create a sense of anonymity for potential litterers also tend to see higher levels of littering. The number of bins, their spacing and cleanliness are regularly claimed to have an influence on littering behaviour, but the evidence on the actual impact of bins on littering is mixed. While there appears to be public support for enforcement and fines in principle, people remain sceptical about the effectiveness of such measures in practice, mainly due to lack of belief in the reality of the threat.

3.3.1 Characteristics of the site

Existing litter levels

There is a strong body of evidence which shows that people are more likely to litter in spaces that are already littered. This phenomenon was demonstrated in practice in early experimental research by Cialdini et al (1990 and 1991), who found that in an already-littered environment, 32% of individuals littered, whereas in a litter-free environment the

¹⁰⁷ Environmental Campaigns Ltd [ENCAMS] (2007)

¹⁰⁸ Environmental Campaigns Ltd [ENCAMS] (2004); Keep Britain Tidy (2009)

¹⁰⁹ Keep Britain Tidy (2009)

¹¹⁰ Environmental Campaigns Ltd [ENCAMS] (2001)

¹¹¹ Singapore National Environment Agency (2011)

¹¹² Environmental Campaigns Ltd [ENCAMS] (2008)

¹¹³ Curnow, R.C., Streker P., & Williams, E. (1997)

¹¹⁴ Environmental Campaigns Ltd [ENCAMS] (2004)

¹¹⁵ Environmental Campaigns Ltd [ENCAMS] (2001)

¹¹⁶ Singapore National Environment Agency (2011)

¹¹⁷ Environmental Campaigns Ltd [ENCAMS] (2001)

figure was only 14%. The presence of existing litter (rated by the researchers through observation on a scale from 0-10) was predictive of observed littering behaviour: for every 'unit' increase in existing litter, the observed littering rate¹¹⁸ increased by 2%¹¹⁹. Further evidence is given in an observational study of 130 US sites, which also found that the amount of litter already present on a site contributed to the littering rate¹²⁰.

As noted above, existing litter on a site is an indicator of a descriptive norm which suggests that littering is socially acceptable on that particular site. In focus group research in Wales¹²¹, respondents noted that high levels of existing litter meant it was 'the norm' to litter, and therefore considered it permissible. Similarly, research in Britain¹²² found that respondents felt tidy and presentable areas were more likely to stay that way.

As well as being indicative of the social norm, existing litter levels create the impression that further littering does not 'count', as the site is already dirty. Focus group research with the Scottish public¹²³ suggests that people feel more guilty littering in a clean area than in an already littered area, because on a clean site they feel as though they are a more direct cause of the litter problem, whereas on a dirty site the problem is pre-existing. The report states that *'there was a sense that, as long as the 'real' litter culprits were not being tackled, minor indiscretions by the everyday citizen made no difference to the bigger picture'*. Similarly, survey research in England¹²⁴ found that 15% of people polled felt they were justified in adding litter to an 'already littered' area. Research participants in a study in Singapore¹²⁵ went as far as to say that if a place is already very dirty, then dropping litter cannot be considered littering, as littering can only happen in 'clean' places.

Interestingly, observational and interview research in Australia¹²⁶ suggests that littering may be more likely to happen at certain times on certain sites. In some locations, littering appears to follow a well established pattern, which people are familiar with and use to justify their littering behaviour. Research participants suggested that although a particular site may not be littered at the time of the research, they knew that it would be littered later in the day. That research suggests that in some cases, the concept of 'existing litter' on a site may include not only the currently visible litter, but the litter which people know was discarded on the site on previous days.

Overall cleanliness of the area

Curnow et al (1997) suggest that the characteristics of the site – whether highly littered and/or graffitied, or clean and well-kept – affect people's choice of disposal method, with littering more prevalent on run-down or apparently uncared-for sites. For example, Keizer et al (2009) found that 69% of research participants were willing to litter in an environment which contained graffiti, compared to only 33% in an environment containing no graffiti¹²⁷. In contrast, areas perceived as clean and presentable are more likely to stay that way, as people report they are less likely to litter in what they consider 'posh' areas¹²⁸.

Locations that are regularly cleaned

As noted in section 3.1.1, people are more likely to litter in areas where they do not feel personally responsible for their litter. This often means sites that are regularly cleaned. For example, research by ENCAMS (2001) and Lewis et al (2009) found that people are less concerned about dropping litter in towns and cities than in the countryside, as they believe that in urban areas it will be cleaned away overnight. ENCAMS (2001) also note that large public events are

¹¹⁸ Littering rate is defined as the proportion of all disposals observed which are 'improper' disposals i.e. where the individual does not bin the item or take it away with them.

¹¹⁹ Schultz, P., Bator, R., Large, L., Bruni, C., & Tabanico, J. (2011)

¹²⁰ Keep America Tidy (2009)

¹²¹ Keep Wales Tidy (2010)

¹²² Environmental Campaigns Ltd [ENCAMS] (2001)

¹²³ Keep Scotland Beautiful (2007)

¹²⁴ Lewis, A., Turton, P. & Sweetman, T. (2009)

¹²⁵ Singapore National Environment Agency (2011)

¹²⁶ Curnow, R.C., Streker P., & Williams, E. (1997)

¹²⁷ Keizer, K., Lindenberg, S. & Steg, L. (2009), cited in Keep Britain Tidy (2010)

¹²⁸ Environmental Campaigns Ltd [ENCAMS] (2007)

viewed in a similar way – people consider littering to be more likely and less important, as the problem will be dealt with by a council or venue-run clean-up effort. However, people's knowledge of or feelings about the costs of such clean-up efforts is an aspect that remained unexplored in the reviewed evidence.

'Anonymous' locations

People appear to be more likely to litter in locations that provide anonymity or otherwise make the litterer feel they are out of sight of others. In Welsh focus group research¹²⁹, many of the participants reported that they are more likely to litter when no one is there to see them, giving examples such as quiet country lanes, or when alone in their car.

Anonymity appears to be particularly relevant with respect to littering from vehicles. Whether or not a driver thinks they can be seen by others plays a crucial role in their littering behaviour, with many vehicle litterers admitting that they litter more often when they have greater anonymity – for example, with 60% of respondents reporting that the last time they littered from their vehicle, it was moving, and 71% reporting that they were in quiet traffic rather than busy traffic¹³⁰. The scope for anonymity may be part of the explanation for vehicle littering behaviour, as many vehicle litterers feel that car drivers, including themselves, are likely to litter '*because it [is] almost impossible to be found out*'¹³¹.

3.3.2 "Binrastructure"

Claimed importance of bins

The absence of litter bins is a factor which can make people feel that littering behaviour is acceptable. For example, a poll in England¹³² found that 37% of people believe littering is sometimes or always acceptable if there are no bins or ashtrays available. Similarly, research in Australia¹³³ found that a third of the public believe it is acceptable to litter where no bins are present. In addition, as already noted in section 2.1, where bins are present but over-flowing, many people appear to consider it acceptable to litter their objects around and near the overflowing bin¹³⁴.

The reviewed literature reports extensively on public claims their littering behaviour is caused by lack of bins. For example, focus group research around the UK found that many people feel their council is not providing enough litter bins¹³⁵, while in Wales a lack of bins was considered to be an issue by litterers who did not want to hold their items¹³⁶. Lack of bins was considered to be an issue particularly for cigarettes (which require ashtrays), and for other items which people have a low tolerance for carrying, such as messy items, food, chewing gum and dog poo¹³⁷. For example, ENCAMS (2004) report that gum chewers felt there were either no bins available or not enough bins – at least not in the right place for them at the moment of disposal. In addition, for private and commercial drivers the lack of available and usable bins in lay-bys was highlighted as a significant cause of vehicle littering¹³⁸.

Similar evidence is found internationally, with a survey in Singapore finding the 'insufficient availability of litter bins' the most commonly given reason for littering, given by 48% of litterers¹³⁹. In a survey in Australia, the lack of a bin nearby was the second most common reason for littering, given by 19% of litterers, with 10% blaming lack of ashtrays specifically¹⁴⁰, and a US survey¹⁴¹ found lack of bins nearby to be one of the top three barriers to proper disposal.

¹²⁹ Keep Wales Tidy (2010)

¹³⁰ Keep Britain Tidy (2009)

¹³¹ Environmental Campaigns Ltd [ENCAMS] (2001)

¹³² Lewis, A., Turton, P. & Sweetman, T. (2009)

¹³³ Golding-Williams, K. & Barons, S. (2010), cited in Curnow, R. & Spehr, K. (2011)

¹³⁴ Curnow, R.C., Streker P., & Williams, E. (1997)

¹³⁵ Environmental Campaigns Ltd [ENCAMS] (2001)

¹³⁶ Keep Wales Tidy (2010)

¹³⁷ Keep Scotland Beautiful (2007)

¹³⁸ Keep Britain Tidy (2009)

¹³⁹ Singapore National Environment Agency (2011)

¹⁴⁰ Curnow, R.C., Streker P., & Williams, E. (1997)

Where bins are available, their perceived state of cleanliness, if poor, can still prevent their use. For example, observational research in Australia found that people are less likely to open a bin which is dirty, due to a perceived physical or health risk¹⁴². Focus group research in the UK found that people felt litter bins are not emptied often enough¹⁴³, while negative perceptions of bins among British teenagers include feeling that litter bins are full, dirty, and attract wasps¹⁴⁴. Keep Wales Tidy (2010) recommend attractive, well designed bins which can even be “a destination in themselves” as one element that can help tackle littering.

Impact of bins on littering

Despite the claimed influence of lack of bins on littering behaviour, the evidence regarding their impact on correct disposal behaviour is mixed. Some studies suggest that the presence of bins can encourage correct disposal behaviour. For example, observational research in the US found that the availability and distance to litter receptacles was strongly predictive of actual littering behaviour¹⁴⁵. Another study¹⁴⁶ found that on sites with at least one existing bin, increasing the number of bins lowered the littering rate by 1% (from the overall rate of 17%). Distance to receptacle at the time of disposal was also found to be strongly related to the likelihood of littering, with the probability of littering increasing by 0.7 percentage points for each added foot of distance from a receptacle (e.g. within 10ft of a bin the littering rate was 12%, but at 60+ft the rate was 30%). For cigarette littering, the number of ash receptacles was found to be one of the strongest predictors of littering – with littering rates decreasing by 9% (from an initial base of 65%) for every added ash receptacle on site¹⁴⁷. Focus group findings in Wales¹⁴⁸ suggests that installing more bins could work by addressing the laziness barrier, through increasing the convenience of proper disposal.

However, Keep Britain Tidy (2010) note that, while bins are vital in reducing litter levels, the presence of bins does not wholly prevent littering. The report cites an Australian study in which about 50% of observed littering occurred within 26ft of a litter receptacle¹⁴⁹, while another study from Australia¹⁵⁰ found that that most littering occurred within 5 metres of a bin; this was particularly the case for cigarettes. In addition, an observational study in the US¹⁵¹ failed to find any relationship between the number of litter bins in a location and the likelihood of littering.

Although bin-related issues are commonly given as reasons for littering, the availability of bins may be a question of perception rather than objective fact. ENCAMS (2007) found that, in reality, many people would not go out of their way to find a bin, preferring instead to drop their litter on the street, and concludes that *‘simply providing more bins or emptying them more often is unlikely to be effective’*. Other research also notes that although smokers are more likely to litter if a suitable bin is not available, they will not go far out of their way to find one¹⁵².

3.3.3 Enforcement measures and fines

The British public are supportive, in principle, of the use of enforcement to prevent littering¹⁵³, and international evidence suggests that fines or other punishments such as litter picking can be a significant enough threat to prevent people from littering. For example, research in the US found that the threat of a litter picking community service as punishment is seen by most people as an extremely strong deterrent for littering behaviour, due to the embarrassment involved¹⁵⁴. In Singapore, research¹⁵⁵ found that litterers believe the presence of a visible enforcement officer in

¹⁴¹ Keep Los Angeles Beautiful (2009)

¹⁴² Curnow, R. & Spehr, K. (2011)

¹⁴³ Environmental Campaigns Ltd [ENCAMS] (2001)

¹⁴⁴ Environmental Campaigns Ltd [ENCAMS] (2004)

¹⁴⁵ Keep America Beautiful (2009)

¹⁴⁶ Schultz, P., Bator, R., Large, L., Bruni, C., & Tabanico, J. (2011)

¹⁴⁷ Schultz, P., Bator, R., Large, L., Bruni, C., & Tabanico, J. (2011)

¹⁴⁸ Keep Wales Tidy (2010)

¹⁴⁹ Victoria Litter Action Alliance n.d. In Transportation Research Board (2009), cited in Keep Britain Tidy (2010)

¹⁵⁰ Curnow, R.C., Streker P., & Williams, E. (1997)

¹⁵¹ Keep Los Angeles Beautiful (2009)

¹⁵² Environmental Campaigns Ltd [ENCAMS] (2008)

¹⁵³ Environmental Campaigns Ltd [ENCAMS] (2007)

¹⁵⁴ Sharp Hartwig, Inc. (2001)

¹⁵⁵ Singapore National Environment Agency (2011)

uniform would have the greatest deterrent effect on them, and a majority (73%) agreed that Corrective Work Orders (a form of community service) are effective in deterring littering, as they are considered very embarrassing.

Focus group research in Scotland¹⁵⁶, on the other hand, found considerable public scepticism around the idea of fines and enforcement. Although fines were seen as an effective deterrent for some who feared being caught, they were also considered difficult to enforce. While the idea of litter wardens was appealing in principle, there was scepticism around their effectiveness in practice, in particular their numbers, location, and whether they really have the authority to administer fines. Police and other authorities were perceived to currently take little interest in litter, which to the research participants indicated that littering is not seen as a real crime or a notable problem. Most research participants didn't know of anyone who had actually been fined, and some considered fines to be simply a "council ploy to generate money". There were also concerns of enforcement being unfair in that it is seen to focus on "easy prey" rather than persistent, but more intimidating, types of litterers.

While the majority of litterers feel that stricter enforcement of fines would be a potential deterrent for their littering behaviour¹⁵⁷, many do not believe it is currently likely that they will be fined for environmental offences¹⁵⁸. For example, smokers are reportedly sceptical of fines, as they do not believe that these can realistically be enforced for smoking-related behaviour¹⁵⁹. Similarly, vehicle litterers also feel that any enforcement action would need to be reasonably likely in order to create a deterrent to vehicle littering¹⁶⁰. It appears that the threat of enforcement is generally not perceived as real enough to motivate action. For example, at present, just 49% of the British public believe that fixed penalty notices are effective in changing people's behaviour¹⁶¹.

Welsh research¹⁶² suggests that highlighting enforcement can deter littering behaviour, both through fines and a system of publicising the fining and enforcement systems – noting that awareness of fines is a deterrent as well as the fines themselves. Those who have seen or heard about fixed penalty notices being issued (e.g. via local and national newspaper reports) are significantly more likely than others to consider them to be effective¹⁶³, with the exception of cigarette butt litterers who feel the chances of being caught are too low to present a real risk to them¹⁶⁴. It is worth noting, however, that although offenders were more careful about their behaviour after receiving a Fixed Penalty Notice (FPN), the authors of the report suspect that their underlying values generally remained unchanged. This may mean that receiving a FPN can actually make litterers 'better' at offending, as it draws their attention to their behaviour and potentially encourages them to behave more surreptitiously¹⁶⁵.

3.4 Habitual factors

The role of habit and the subconscious is noted across the literature as a factor which acts as a driver of littering behaviour for some. As with many repeat behaviours, littering may become an individual's 'default' disposal behaviour, so it is done without any particular intention or thought. It is difficult to assess the true role of habits, as much of the evidence uses self-reported data on behaviour, which may well be unreliable when it comes to such subconscious influences. Habits may be changed by events or interventions that draw attention to and therefore disrupt established patterns of behaviour.

Habit is cited in the literature as a factor that influences the littering behaviour of a wide range of different types of people. For example, research in the UK among HGV drivers found that the tendency to throw items of litter out of the

¹⁵⁶ Keep Scotland Beautiful (2007)

¹⁵⁷ Sharp Hartwig, Inc. (2001)

¹⁵⁸ Keep Britain Tidy (2011)

¹⁵⁹ Environmental Campaigns Ltd [ENCAMS] (2008)

¹⁶⁰ Keep Britain Tidy (2009)

¹⁶¹ Keep Britain Tidy (2011)

¹⁶² Keep Wales Tidy (2010)

¹⁶³ Keep Britain Tidy (2011)

¹⁶⁴ Sharp Hartwig, Inc. (2001)

¹⁶⁵ Keep Britain Tidy (2011)

vehicle had simply become an ingrained habit, which was done without thinking¹⁶⁶, while US research noted that, among teenagers in particular, much of littering behaviour is believed to be thoughtless, an ingrained habit that is typically rampant among this age group¹⁶⁷.

The role of habit is evident in both observational research and in surveys of litterers. For example, observational research in Australia¹⁶⁸ noted that some littering behaviours appear very conscious, with people engaging carefully in the act of littering, while others appear to be carried out without thinking. Curnow and Spehr (2011) note that people may not be aware of the influences that act on their subconscious to drive their disposal behaviour – including some of the influences covered in sections 3.1-3.3 above; for example, while people are less likely to litter in a public place that looks clean and well cared for, they may not be consciously aware of this reasoning.

Surveys suggest that a relatively small proportion of litterers are aware of habits as a behavioural driver. For example, in one US survey¹⁶⁹, just 6% of respondents cited habit as a main reason for their littering behaviour, while 14% of those observed littering in Australia¹⁷⁰ cited habit and forgetfulness. In Singapore, 7.1% of litterers claimed that their behaviour was habitual, and some noted that littering is almost a 'way of life' for them, which they give little thought to¹⁷¹.

Qualitative research by ENCAMS (2001) suggests that 'moments of change' may draw attention to and disrupt existing habits. Events such as moving away from home and having children were mentioned by focus group participants as triggers for changing their littering behaviour. This also ties in with research which suggests that parents may be motivated not to litter by the desire to set a good example for their children¹⁷², as noted in section 3.2.2 above.

A key implication of the role of habits in littering behaviour is that anti-littering interventions may well be more effective when habits are disrupted and specific calls to action are made (e.g. 'bin your butts' or 'clear your tray using the bins provided'), as these requires less cognitive processing than more broadly worded requests (e.g. 'do not litter')¹⁷³.

¹⁶⁶ Keep Britain Tidy (2009)

¹⁶⁷ Alice Ferguson Foundation (2011)

¹⁶⁸ Curnow, R.C., Streker P., & Williams, E. (1997)

¹⁶⁹ Keep America Beautiful (2007)

¹⁷⁰ Curnow, R.C., Streker P., & Williams, E. (1997)

¹⁷¹ Singapore National Environment Agency (2011)

¹⁷² Singapore National Environment Agency (2011)

¹⁷³ Huffman, K.T., Grossnickle, W., Cope, J., & Huffman, K.P. (1995)

Figure 4 Summary: Motivations for littering

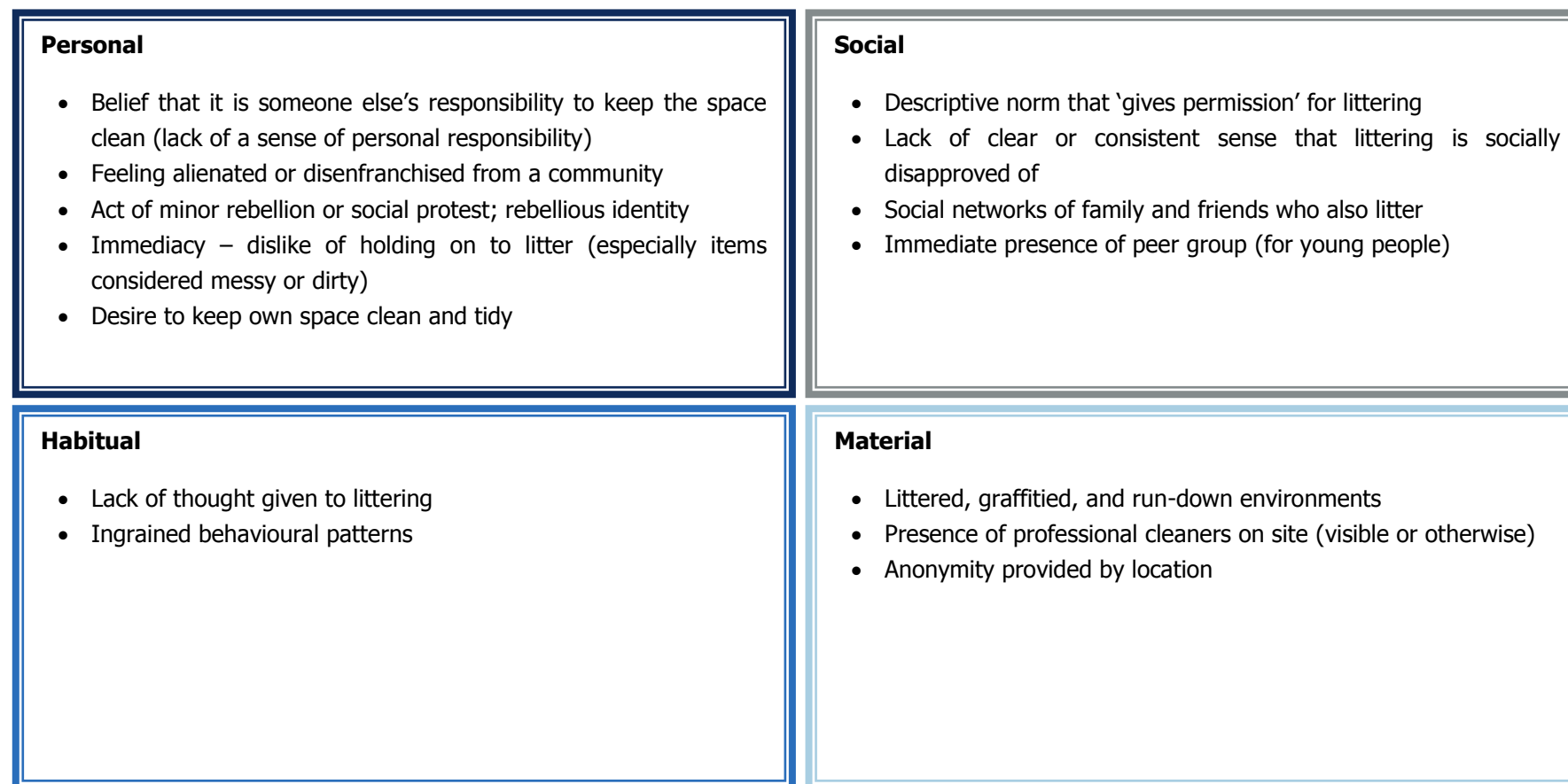
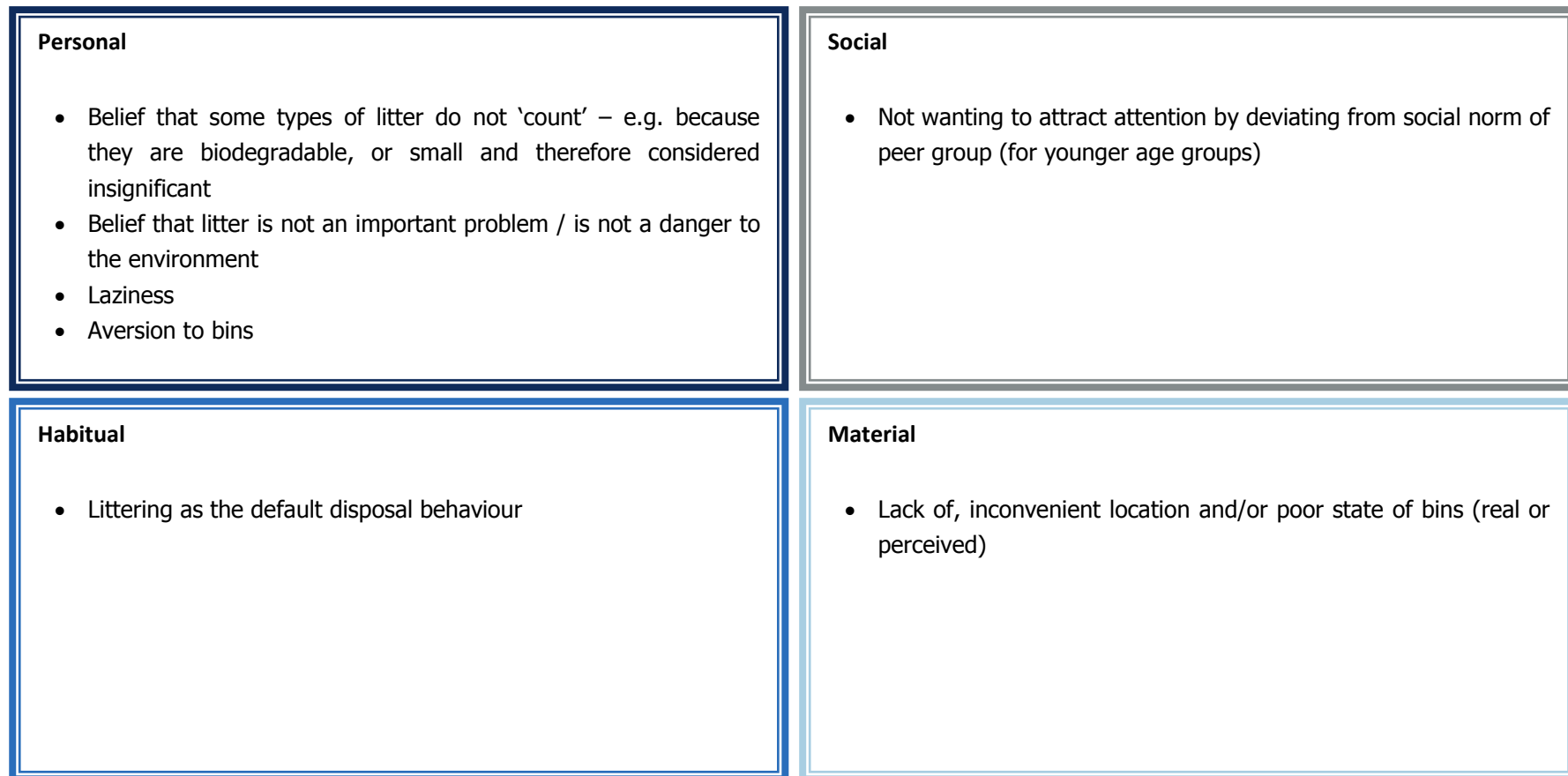


Figure 5 Summary: Motivations for proper disposal

Personal <ul style="list-style-type: none">• Sense of personal responsibility for litter, and for the physical space• Pride in local area or neighbourhood• Respect for others• Personal values and norms that are against littering• Sense of guilt or embarrassment from littering• Fear of the health impacts of litter	Social <ul style="list-style-type: none">• Injunctive social norm of littering being unacceptable• Descriptive norm of other people not littering• Being in the company of 'respectable' people• Setting an example for children• Immediate presence of peer group (for older age groups)
Habitual <ul style="list-style-type: none">• Moments of change that break existing habits	Material <ul style="list-style-type: none">• Threat of fines or other enforcement measures (although there are issues with believability)• Tidy/presentable area

Figure 6 Summary: Barriers to proper disposal



4 Segmentation models

This section describes the five segmentation models of litterers identified through the literature review, summarising their basic features. Each example is presented separately in order to maintain the integrity of the overall model outcomes in each example.

As well as identifying the characteristic tendencies of litterers, the models give a flavour of how the whole population can be split up with respect to their stance on littering, which can be (and has been) used to develop messaging and to target interventions.

For example, segmentations have been used by Keep Britain Tidy¹⁷⁴ to inform and develop the following campaigns¹⁷⁵:

- Car Litter Campaign (2009) was based on the Litter Droppers segmentation research (model 2 below) and targeted the 'Life's Too Short' segment;
- General Litter Campaign (2010) was based on the Litter Droppers segmentation research and targeted the 'Guilty' segment;
- Dog Fouling Campaign (2010) was based on the Litter Droppers segmentation research and targeted the 'Justifiers' segment; and
- Gum Campaign (2012), which was run with the Chewing Gum Action Group was based on the Gum Droppers segmentation research (model 4 below) and targeted the 'Excuses Excuses' segment.

These examples may therefore provide useful insight for conceptualising different types of litterers for the purposes of future interventions.

¹⁷⁴ Talbot, A., Keep Britain Tidy (2012) Personal communication.

¹⁷⁵ However, no evaluation reports for any of these campaigns were identified through the review.

Segmentation model 1 This is a segmentation of Welsh adults who admit to littering, developed as part of a wider research project on littering in Wales. The segmentation was undertaken using a multivariate analysis known as cluster analysis, based on a quantitative survey of 809 Welsh litterers. The purpose of the model is to improve understanding of attitudes towards littering, and how these link to the behaviour and demographics of those within each cluster. (Source: Keep Wales Tidy (2010) Litter Perception Summary Report.)

Segment name	Characteristics	Littering behaviour
Litter louts (17%)	<p>Youngest, most male and most 'downmarket' segment; most likely to be smokers.</p> <p>More likely than other segments to access internet for social networking.</p>	<p>Heavy litterers; much more likely than other segments to drop a range of different items, including some larger items (e.g. fast food packaging, cans, bottles). Litter is an ingrained social habit.</p> <p>Find litter to be excusable and acceptable in a range of different scenarios. Give little, if any, thought to consequences.</p>
Not my fault (28%)	<p>More likely than the average litterer to be aged 16-34, C2DE, and to smoke. Even balance of genders.</p> <p>More likely than any other group to listen to commercial radio.</p>	<p>Second heaviest littering segment (although much lower than 'litter louts').</p> <p>Most likely to consider littering as unacceptable in theory, but in practice find circumstantial excuses related to control.</p>
Does that count (28%)	<p>More likely than the average litterer to be male and older. Social grade and propensity to smoke in line with average litterer.</p> <p>More likely than any other group to read local/regional newspapers.</p>	<p>Generally lighter litterers – fruit and cigarette ends most likely to be dropped.</p> <p>Largely anti-littering and do not look for excuses, but do not appear to count fruit and leaving things near a bin as littering.</p>
Principled light litterers (27%)	<p>Most 'upmarket' and most female segment, least likely to smoke. Also tend to be older.</p> <p>More likely than any other group to read UK national newspaper.</p>	<p>The lightest litterers of all segments – fruit and food are only items which are dropped where levels are above or close to the average litterer.</p> <p>Generally believe littering to be lazy and unacceptable and other attitudes reinforce this.</p>

Segmentation model 2 This model was designed to build on an earlier segmentation model created by ENCAMS, to find out whether the same segments still existed, to determine whether attitudes and behaviours amongst litterers had changed during the six years that had elapsed between the two models, and to include some previously excluded 'harder to reach' groups. The segmentation was based on a three-step process; the first two steps involved qualitative research (focus groups) to identify the segments, and the final step involved quantitative research to quantify the segments across England. (Source: Environmental Campaigns Ltd [ENCAMS] (2007) People who Litter.)

Segment name	Characteristics	Littering behaviour
Beautifully behaved (43%)	More likely to be female, non-smokers, aged <25. Tend to read the Express/Mail, favour sport magazines, and enjoy TV.	Drop apple cores and small pieces of paper, but little else, and often do not see this as a problem. Brought up not to drop litter. Take pride in where they live; almost 'smug' about their seemingly perfect behaviour. Would be embarrassed if caught littering. Regard others who litter as thoughtless.
Justifiers (25%)	Predominantly male segment. Tend to be smokers, aged 34 and under. Read the tabloids, a few favoured magazines.	Justify their behaviour by saying 'everyone else is doing it'. Also blame the lack of bins for their littering, particularly of cigarette butts and chewing gum. Some members also fail to clean up after their dog foul. Would be embarrassed if caught littering. Think people who litter are lazy.
Life's too short & Am I bothered? (combined, 12%)	More likely to contain young male smokers. Tend to read tabloids. Drive 'sporty' cars such as GTIs.	'Life's too short' segment are aware dropping litter is 'wrong' but feel they have more important things to worry about. 'Am I bothered?' segment are completely unaware of the consequences of dropping litter, and would not care even if they were. Neither segment would feel guilty if caught littering, and might even be aggressive, but would consider it rude if someone dropped litter in front of them.
Guilty (10%)	Predominantly female, more likely to be non-smoking and aged 25 and under.	Litter furtively to avoid carrying litter around - when others are not around to watch them, in the car or at public gatherings. Know dropping litter is 'wrong' and feel guilty when doing so. Regard people who litter as lazy and inconsiderate.
Blamer (9%)	Predominantly young, male, smoking segment. Read the Mail and Mirror, and favour women's magazines.	Blame their littering on the council for inadequate bin provision. Also blame fast food operators, teenagers and manufacturers for over-packaging. Would be embarrassed if caught them littering. Think people who litter are lazy, but if there are no bins or if the bins are overflowing or full then consider it acceptable.

Segmentation model 3 This is a segmentation of teenagers aged 13-16, based on research undertaken by ENCAMS to inform the development of campaigns to target teenagers' littering behaviour. The research was undertaken in three stages: a qualitative stage using 'friendship paired' interviews and focus groups used to identify generalised segments; a second qualitative stage of further interviews to explore the segments further; and a final stage of quantitative questionnaire data analysis to quantify each segment. (Source: Environmental Campaigns Ltd [ENCAMS] (2004) Teenage Dirt Bag.)

Segment name	Characteristics	Littering behaviour
I don't want to be seen as a geek (minority segment)	Mainly younger, more impressionable students of both genders.	Unlikely to litter when alone; at school habits are influenced by peer pressure – seek safety in numbers. More likely to want to resolve the litter problem, but afraid to speak their mind.
I'm hard, I'm cool (minority segment)	Both younger and older pupils who had, or were trying to achieve, alpha status. Not a solely male segment but also includes females.	Behave worst when with others or in front of adults they do not know. Litter as a sign of rebelliousness, proving their status. Boast about their misdemeanours.
Chat chat, munch munch, litter litter	Any age, slightly more likely to be female than male.	Give no thought to their actions, would rather not be distracted from their activities. View litter as simply something that happens.
Blame it on the bins (very large segment)	No segment characteristics given	Blame their littering on a lack of bins. Know that littering is wrong and most would rather not litter, but inherent laziness, or perhaps some other aversion, prevents use of bins. See no alternative but to litter if there are no bins in the vicinity.

Segmentation model 4 This model was developed in order to understand the attitudes and behaviours of chewing gum droppers – both adults and children – and to develop behaviour change messages. The segmentation was developed through a mix of qualitative and quantitative research, including focus groups with adults, research with children aged 12-17, and 1,000 on-street interviews. All research was conducted with gum-chewers who disposed of their gum incorrectly at least some of the time. (Source: Environmental Campaigns Ltd [ENCAMS] (2004) Chewing Gum Droppers Segmentation Study.)

Segment name	Characteristics	Littering behaviour
Excuses, Excuses (16%)	Over 50% chew gum daily. More likely to be female, and DE. Includes all age groups. Likely to be heavy smokers.	Drop gum discreetly; habitual dropping and spitting. Feel guilty about dropping gum and makes excuses for their behaviour, e.g. 'everyone else does it' and lack of bins. Aware of the consequences of getting chewing gum on their clothes or shoes, but blame others' gum for this rather than their own. Feel they are not encouraged to dispose in the correct way.
Bravado (5%)	More likely to chew gum everyday. More likely to be male, aged 14-18, and ABC1.	Most likely to swallow gum; most likely to throw or spit gum from a car window. Spit and kick their gum in a demonstrative way; younger ones enjoy impressing their friends, while older ones are more likely to dispose in a solitary yet dramatic way. Give disposal little thought; unconcerned about their behaviour, consider it a habit. Do not think dropping or spitting gum is a problem and believe others agree. Older members are concerned about the antisocial aspect of taking gum out their mouths.
Revolted (58%)	More likely to be female, aged over 35. Least likely to smoke (but still more than national average).	Keenest on discreet and thoughtful disposal; often choose the grass verge, drain or gutter, but prefer the bin. Have feelings of guilty selfishness. Most appalled by the personal impact of gum on their shoes, clothes and hair. Feel there is no advertising to suggest that they should not drop gum; admit that it is a habit.
Selfish cleanser (13%)	More likely to be aged 14-18 or 25-34 year olds, and DE. Likely to be lighter smokers.	Throw or spit their gum, sometimes onto the floor and sometimes in the bin. Averse to keeping hold of their chewed gum; concerned that correct disposal is not discreet enough. Largely driven by their need to get rid of their chewing gum quickly. Concerned about the hygiene implications of improper disposal, but do not consider it anti-social and do not easily imagine negative personal consequences.
Whatever (8%)	More likely to be male, aged 14-18, and DE. Most likely to be heavy smokers.	Prefer to throw or spit gum on the floor. Not aware of the consequences of dropping gum and do not think about its effect on the environment; education has little impact on their attitudes or behaviour. Feel there are more important things to worry about.

Segmentation model 5 This model segments young people (n=655) on the basis of their littering attitudes and behaviours. It was developed as part of a study of littering among young people in Los Angeles. It is predictive of different intended littering patterns, and was developed using a combination of discriminant function analysis, cluster analysis, and factor analysis. Note that 13% of the sample were not allocated to any segment; hence the percentages given in the table below do not add up to 100. (Source: Keep Los Angeles Beautiful (2009) Littering and the iGeneration.)

Segment name	Characteristics	Littering behaviour
Green Crusaders (25%)	Average age 21. High environmental concern. Less likely to smoke, spend less time watching TV, in organized sports, and playing video games. Less likely to attend church, spend more time volunteering. May view themselves as green.	Least likely to litter. Reported willingness to litter: 0.95/10. Likely to feel guilty for littering. Less influenced by peers and more motivated to act on their personal convictions, but influenced by level of litter on site. Widely perceive fewer reasons for not properly disposing; willing to overcome greater barriers to avoid littering.
Apathetics (18%)	Average age: 20 (more likely to be 18 to 20). Mixed gender. In school, often work part-time. Little involvement in organized activities or sports. More likely to smoke. Low environmental concern.	Likely to litter when in a hurry. Reported willingness to litter: 2.31/10. Ambivalent about littering, and express little guilt when littering. Littering habits appear to be curbed with easy access to trash disposal receptacles. Amount of existing litter at the site predicts willingness to litter.
New Adults (12%)	Average age: 22. Typically working. More likely to smoke. Spend fewer hours in sports, watching TV or playing video games. Unlikely to attend church. See themselves as increasingly "adult".	Likely to litter when no bin nearby. Reported willingness to litter: 2.87/10. Littering behaviour likely to be influenced by internal characteristics more than by external factors.
Acceptance Seekers (19%)	Average age: 18 (more likely to be 16 or 17). Still in high school, care about academic performance, involved in organized activities. Less likely to smoke, or work. More likely to volunteer or attend church. Low environmental concern.	Likely to litter when there is already litter on the ground. All other segments were most likely to litter cigarette butts, but for this segment it was chewing gum. Reported willingness to litter: 2.96 out of 10. Number of receptacles at the location significantly predict willingness to litter. Strongly influenced by parents and peers.
Digitally Disengaged (13%)	Average age: 18. More likely to be male. Low environmental concern, and may even see this as a way to rebel. Generally do not work. Little involvement in organized activities or volunteering	Reported willingness to litter: 3.80/10. See littering as wrong but will not go out of their way to avoid it. Report their friends litter; strongly influenced by perceptions of littering among peers. May litter as an act of rebellion. More likely to litter when in a bad mood.

A number of key themes can be identified across these segmentation models, including furtive littering, understanding the concept of litter or the impacts of littering, 'ickiness' of litter and laziness around proper disposal, levels of guilt around littering and the justifications or excuses that people use to rationalise their behaviour, adherence to the descriptive norm (taking cues from both people and places), rebellion, and blaming lack of bins for littering behaviour. Similar themes are seen elsewhere in the evidence, and all of the above themes have already been discussed in detail in chapters 2 and 3.

5 Interventions

Previous anti-litter interventions covered in the reviewed literature have typically been large-scale, long-term campaigns, run by public sector or publicly funded bodies, targeted at the general public, frequently using mass media communications. The evidence indicates that these interventions have achieved significant reductions in littering – although care should be taken when attributing impact to intervention, and impacts are reported in such varied ways that it is difficult to draw comparisons between interventions. The reviewed reports make recommendations with respect to effective delivery, suggesting that careful intervention design, strong partnerships, sufficient resources and effective evaluation are key to success. However, it is likely that there are also other factors which play a role in intervention success, but this point is rarely reflected upon in the literature. In particular, the reviewed reports rarely consider how the interventions addressed the kinds of behavioural drivers discussed in chapter 3, although some inferences can be drawn.

5.1.1 Introduction

This section considers the evidence on interventions that have previously been employed to tackle littering. Literature on interventions was selected for the review on the basis that it contained information on how the intervention was delivered and, crucially, what impacts it resulted in. In total, the review covered 22 interventions from 14 documents. Table 1 overleaf illustrates the characteristics of these interventions.

As already mentioned in chapter 1, the vast majority of the reviewed interventions were reported to have been successful at reducing littering. It is difficult however to generalise about the reasons why they were successful because there was wide variation in the approaches and messaging used. Indeed, the evidence shows that a range of different approaches can be successful. One key factor that needs to be taken into account is context: these interventions were found to work in particular contexts, and the impacts of even the most successful intervention may not be replicable in different contexts.

5.1.2 Intervention characteristics

Lead organisations, target audiences and timescales

Most of the reviewed interventions were run by local or national authorities, or by organisations with an environmental remit such as or ENCAMS or CPRE in the UK, or Sustainability Victoria in Australia. There were also a small number of experimental interventions carried out for research purposes, for example by academic researchers. Although the majority of the interventions were led by a single organisation, there was also a large proportion of interventions that were delivered by multi-stakeholder partnerships.

The interventions were commonly targeted broadly at 'the public', for example at residents or communities in a defined area, with one (the plastic bag levy in Ireland) specifically reported to be a national intervention and four statewide interventions in the US and Australia. In addition, a notable proportion focused on school students or smokers, while a small number had identified other specific target audiences such as fast food consumers, drivers, cinema goers, or young men.

The timescales on which the interventions were run ranged widely, from weeks to years or even decades, and the reviewed evidence contains interventions from the 1970s through to almost the present day. It is also worth noting that the majority of these campaigns were run several years ago; it may be that evaluation reports have not yet been published for more recent campaigns.

Communication channels

The intervention activities and engagement methods tended towards more 'passive' interventions such as information provision and advertising. Mass media campaigns were the most common type among the reviewed evidence and included, for example, TV and radio advertising and posters. Notably, some mass media campaigns made use of celebrity endorsement. Other promotion tools included leaflets, banners, stickers and T-shirts. Websites and hotlines were also mentioned in the literature, though these appeared to be less commonly used in the reviewed interventions. Many of the interventions targeting smoking-related litter handed out personal portable ashtrays to encourage proper disposal of cigarette litter.

Active engagement methods – those that involve face-to-face interactions with the target audience – were more rarely used, but some of the approaches mentioned in the literature included presentations, 'champions' (although it was unclear what their precise role was, other than to deliver the more passive materials to the target audience) and clean-up activities. School-based interventions were, in general, more interactive than others and included, for example, education activities and the deployment of student wardens.

Carrots versus sticks

There were too few of these types of intervention in the literature reviewed to draw any definite conclusions about the relative effectiveness of 'carrots' versus 'sticks'. The carrots and sticks mentioned in any case very different in scope and intention, ranging from national level waste policies that had indirect impacts on litter (e.g. deposit return schemes or plastic bag bans) to very local interventions that directly targeted the littering behaviour of specific individuals. The observations that can be made relate specifically to the interventions mentioned: it is clear this is not a comprehensive evidence base for assessing interventions.

Table 1 Interventions reviewed

Source	Organisation responsible	Activity / engagement method	Target audience	Timescale	Location	Slogan (if applicable)
Lewis, A., Turton, P. & Sweetman, T. (2009)	New York State	Deposit return scheme for beverage containers ¹⁷⁶	Residents of the state of New York	Since 1983	New York, USA	n/a
Lewis, A., Turton, P. & Sweetman, T. (2009)	Policy Exchange/CPRE	Flyers handed out outside cinema screens before early evening showings (testing two alternative messages)	Cinema goers in England	Three cinema screens over 9 days	England, UK	"Contrary to what people might think, it is not OK to litter in this cinema. Thank you." OR "Please help us keep your cinema tidy by using the bins outside the auditorium. Thank you."
Sharp Hartwig, Inc (2001)	State of Texas	TV, radio and outdoor advertising using celebrities; website; t-shirts, bumper stickers, flags; clean-ups; incorporation of litter prevention information in drivers' education and license programme; personalised license plates with campaign logo	Residents of Texas, particularly young smokers, drivers, and consumers of fast food	Evaluation over 1985-1991	Texas, USA	"Don't Mess with Texas"
Alice Ferguson Foundation (2011)	Alice Ferguson Foundation	A pilot campaign using posters, brochures, Decals, banners, presentations and clean-ups	Deanwood, Columbia	Not stated	Columbia, DC, USA	"Take control, take care of your trash." "Your litter hits close to home."
Environmental Campaigns Ltd [ENCAMS] (2008)	ENCAMS, in partnership with 10 local authorities and ASDA	Advertisements at bus shelters, Pocket ashtrays and posters	Smokers	2 weeks in February-March 2006	UK	"No butts - stub it, bin it!"

¹⁷⁶ This example was included as it was cited in a source that looked at several approaches that impact on littering *behaviours*. Deposit Return Schemes were outside the agreed scope for this review since there is a large body of evidence elsewhere on such schemes.

Source	Organisation responsible	Activity / engagement method	Target audience	Timescale	Location	Slogan (if applicable)
Environmental Campaigns Ltd [ENCAMS] (2008)	ENCAMS, in partnership with 12 local authorities and Tesco	Advertisements at bus shelters, billboards, telephone boxes and lamp posts; posters in washrooms; beer mats; Sale of 'Ashcan' portable ashtrays	Smokers	2 weeks in June 2007	UK	"No butts - stub it, bin it!"
Environmental Campaigns Ltd [ENCAMS] (2008)	ENCAMS, in partnership with 10 local authorities	Advertising campaign including posters and window vinyls; beer mats; cigarette bins and portable ashtrays	Smokers	5 weeks in September-October 2007	UK	n/a
Belfast City Council (2008)	Belfast City Council	TV, radio and outdoor advertising	Residents of Belfast City Council area	4 years	Belfast, Northern Ireland	"So why do you do it here?" "Excuses, excuses" "Don't drop it, stop it"
Environmental Campaigns Ltd [ENCAMS] (2004)	ENCAMS	Rewards (e.g. non-uniform days, CD tokens and mobile phone extras) for returning a set number of crisp packets	School students	2003	UK	n/a
Environmental Campaigns Ltd [ENCAMS] (2004)	ENCAMS	Ban on eating and drinking in certain areas of school	School students	2003	UK	n/a
Environmental Campaigns Ltd [ENCAMS] (2004)	ENCAMS	Sixth formers as litter wardens	School students	2003	UK	n/a
Department of the Environment, Community and Local Government (2011)	Irish Government	Plastic bag levy (15c in 2002, increased to 22c in 2007)	Irish public	2002 onwards	Ireland	n/a

Source	Organisation responsible	Activity / engagement method	Target audience	Timescale	Location	Slogan (if applicable)
Beverage Industry Environment Council (2009)	Beverage Industry Environment Council	Anti-littering signs, new street litter bins, public place recycling facilities	Australian public	November 1997	Australia	"Do the right thing - bin your litter please." "\$200 on the spot fines for littering."
Hansmann, R. & Scholz, R. (2003)	Authors (experiment)	Cinema advertising	Cinema goers in Switzerland	June 2001	Switzerland	"Is it all in the can?" (which, when translated, can also mean 'is it hopeless?') followed by a 'thank you' message (which also show litter being put in a bin, to resolve the ambiguity).
Sibley, C. & Liu, J. (2003)	Authors (experiment)	Banner with information about littering rates on the previous day, article in student magazine, followed by introduction of litter bins and ash trays	Students at a NZ university	3 weeks	New Zealand	"You know the odds- beat them!" (when given feedback on littering rates of the previous day)
Cialdini, R. B. (2003)	Not stated	Televised public service announcement	US public	1970s-1980s	USA	"People start pollution, people can stop it."
Sustainability Victoria (2007)	Sustainability Victoria, Australia	Mainstream advertising campaign (radio and bus stop advertisements); posters, stickers, personal ashtrays; launch event	Smokers at licenced venues, , focusing on high-risk venues	February-September 2007	Victoria, Australia	"Don't be a tosser"

Source	Organisation responsible	Activity / engagement method	Target audience	Timescale	Location	Slogan (if applicable)
Keep Scotland Beautiful (2008)	Falkirk Council, in partnership with Eco-Schools, KSB, Education & Community Services, Enforcement Officers, Cleansing Teams, Community Wardens and individual schools and groups	Educational materials, resources (including workbooks and website) and incentives; Litter Education Support Officer; Kaptain Kleen (Falkirk's litter superhero); competition	School students	Not stated	Falkirk, Scotland	"There's no excuse"
Keep Scotland Beautiful (2008)	TIDY Northern Ireland	Advertising, public relations and media campaign; posters and pocket ashtrays	Smokers who dispose of their cigarette ends incorrectly	Not stated	Northern Ireland	n/a
Gershman, Brickner & Bratton, Inc. (2005)	New Jersey Department of Transportation	Adopt-a-highway program.	Not stated	Established in 1991	New Jersey, USA	n/a
Gershman, Brickner & Bratton, Inc. (2005)	New Jersey Department of Environmental Protection, Keep America Beautiful	Comprehensive litter control programme including voluntary cleanups, school education, enhanced enforcement, hotlines, beautification projects, media events	Not stated	From 1986	New Jersey, USA	n/a

Source	Organisation responsible	Activity / engagement method	Target audience	Timescale	Location	Slogan (if applicable)
Gershman, Brickner & Bratton, Inc. (2005)	Unknown	Television advertising using football stars, singers and musicians; bumper stickers, T-shirts, mural posters	Texas residents, initially men aged 20-34	1985-7	Texas, USA	n/a

5.1.3 Development of interventions

Background research

The reviewed evidence rarely made direct reference to any background research that had been undertaken to help develop the interventions, although, as noted in chapter 4, many campaigns have drawn on such background research, for example in the form of segmentation models. The only non-experimental intervention whose evaluation report was accompanied by a thorough report on the background research was the 'Don't Be a Tosser, Bin Your Butts' Campaign Evaluation Report¹⁷⁷ (the background research that went into campaign development is described in case study 1 below). The two experimental interventions¹⁷⁸, described in academic journals, were both supported by a rationale grounded in prior research.

Case study 1

Developing the 'Don't Be a Tosser, Bin Your Butts' Campaign

The need for this campaign in Australia was identified before the introduction of the smoking ban in public places: the experiences of other locations showed that it would be necessary to plan for and tackle a likely increase in cigarette butt litter in open spaces. The campaign was developed following a desk review of prior research and best practice case studies, consultation (face-to-face, e-mail and telephone) with key stakeholders – which led to the development of a Consultative Committee for the campaign – and a survey of 136 establishments to establish their needs in preventing cigarette butt litter. The campaign message combined two taglines from other campaigns, and three alternatives were tested before this was selected.

Source: Sustainability Victoria (2007)

Other reports that touched on background research mentioned baseline research to establish who is currently responsible for littering¹⁷⁹, and message development using consumer research¹⁸⁰. In the case of the plastic bag levy in Ireland¹⁸¹, research had been carried out to assess the likely impacts of the levy before its introduction. It is also interesting to note that one of the ENCAMS cigarette litter campaigns made use of creative visuals from a previous campaign¹⁸². The experiences of this and the 'Don't Be a Tosser, Bin Your Butts' campaign suggest that there may be benefits in 'recycling' elements of prior campaigns that have proven to be successful.

It is not known to what extent the other interventions described in the reviewed evidence were grounded in research; lack of evidence does not necessarily mean that no research was undertaken, rather, it may simply be the case that this was not reported on. On that basis, it is not possible to draw definitive conclusions as to how research findings were translated into campaign design and messaging. However, the success of the 'Don't Be a Tosser, Bin Your Butts' campaign suggests that it was important in that case.

Setting aims for interventions

The original aims of interventions were frequently not clearly stated in the reviewed evidence. Where the aims were stated, they were often simply to 'reduce littering'¹⁸³, which at first glance seems straightforward enough. However, some of the interventions had very specific aims such as to 'reduce the weight of litter per person'¹⁸⁴ or to 'reduce the

¹⁷⁷ Sustainability Victoria (2007)

¹⁷⁸ Hansmann, R. & Scholz, R. (2003), Sibley, C. & Liu, J. (2003)

¹⁷⁹ Sharp Hartwig, Inc. (2001)

¹⁸⁰ E.g. Alice Ferguson Foundation (2011)

¹⁸¹ Department of the Environment, Community and Local Government (2011)

¹⁸² Environmental Campaigns Ltd [ENCAMS] (2008)

¹⁸³ E.g. Sharp Hartwig, Inc. (2001)

¹⁸⁴ Hansmann, R. & Scholz, R. (2003)

littering rate¹⁸⁵ which show that a reduction in littering could be achieved in a number of different ways. It was very rare for the reviewed documents to quantify their aims at the outset, and in fact only the 'Don't Be a Tosser, Bin Your Butts' Campaign Evaluation Report sets out such a target, aiming for a 50% reduction in litter on the ground¹⁸⁶. Whilst there is no evidence to suggest that certain types of aims were more likely to be met than others, it is important for the purposes of monitoring and evaluation to have clear aims, so that intervention success can be determined.

Other considerations that are relevant in setting aims for interventions are whether the intervention aims to tackle litter in a particular location, or a specific type of litter. Examples of specific locations and types of litter targeted by the reviewed interventions were litter left in the cinema¹⁸⁷, litter on highways, accidental and deliberate litter¹⁸⁸, smoking-related litter¹⁸⁹, and litter from beverage containers¹⁹⁰. Interventions can also have 'soft' aims such as increasing awareness of personal responsibility for litter, and fostering knowledge of what constitutes litter – both of which were set as aims of the 'Don't Be a Tosser, Bin Your Butts' campaign specifically with respect to cigarette litter¹⁹¹.

Messaging

Most of the slogans used as part of the reviewed interventions were worded in a relatively forceful or direct manner. Fewer of the interventions had used gentler or 'polite' slogans. Although this may suggest that forceful messages are more effective than gentler messages, it is worth bearing in mind that message wording is only one of many factors that determine an intervention's success, and that other research suggests some people may in fact respond negatively to what they perceive to be 'impolite' or controlling messages – to the point that some will litter more when faced with a message specifically prohibiting litter¹⁹².

5.1.4 Addressing behavioural drivers through interventions

Only very limited reference is made in the reviewed reports to the mechanisms by which these interventions were conceived to address the kinds of behavioural drivers identified in chapter 3. However, it is clear that many of the interventions aim to influence the personal, social, material or habitual drivers of behaviours, and the ways in which they do this is analysed in the following sections. It is important to note, however, that while this analysis deconstructs the interventions and focuses on their component parts, many of the interventions utilised multiple complementary elements.

The ways in which these interventions have addressed the four types of behavioural influences are summarised in a behavioural framework diagram at the end of this section.

Addressing personal factors

By using the slogan "So why do you do it here?" the advertising campaign run by Belfast City Council (2008) may have helped to create a new sense of personal responsibility for litter among the target audience, by encouraging the audience to extend the sense of responsibility they feel for their own homes or local areas, and to carry it over into new locations. Community clean-ups¹⁹³, beautification projects¹⁹⁴ and adopt-a-highway programmes¹⁹⁵ may also help to increase people's sense of ownership of and pride in their local areas – factors which have been shown to reduce littering behaviour.

¹⁸⁵ Sustainability Victoria (2007)

¹⁸⁶ Sustainability Victoria (2007)

¹⁸⁷ Hansmann, R. & Scholz, R. (2003)

¹⁸⁸ Gershman, Brickner & Bratton, Inc. (2005)

¹⁸⁹ Sustainability Victoria (2007)

¹⁹⁰ Lewis, A., Turton, P. & Sweetman, T. (2009)

¹⁹¹ Sustainability Victoria (2007)

¹⁹² Huffman, K.T., Grossnickle, W., Cope, J., & Huffman, K.P. (1995)

¹⁹³ E.g. Sharp Hartwig, Inc. (2001), Gershman, Brickner & Bratton, Inc. (2005)

¹⁹⁴ Gershman, Brickner & Bratton, Inc. (2005)

¹⁹⁵ Gershman, Brickner & Bratton, Inc. (2005)

While none of the reviewed interventions appear to have explicitly tackled misperceptions about what constitutes litter, a number of them have taken educational approaches to raise awareness about the negative impacts of litter. For example, an intervention in Texas incorporated litter prevention information into the drivers' education and licence programme to inform drivers about the negative impacts of litter as well as to draw attention to the injunctive norm that littering was not acceptable¹⁹⁶. Similarly, Keep Scotland Beautiful (2008) report on work carried out in partnership with Eco-schools to educate children about litter.

A particularly interesting example is the community intervention run by Alice Ferguson Foundation (2011), which not only highlighted the negative impacts of litter on the environment (including the risk of a dirty and toxic watershed), but drew links from this into the potential health impacts for people, and in particular for children playing outdoors. In this way, this intervention addressed not only the lack of knowledge about the impacts of litter, but appealed to self-interest, family values and emotion. Another campaign that may also have appealed to personal values and norms is that run by the Beverage Industry Environment Council (2009), using the slogan "Do the right thing – bin your litter please".

Another personal factor which appears to have been successfully addressed by the reviewed interventions, at least with respect to cigarette litter, is the 'ick factor'. Portable ashtrays¹⁹⁷ which were used as part of broader campaigns on cigarette litter – and which are also relevant in the context of addressing material factors – appear to have successfully helped to overcome the aversion to carrying litter around, as well as addressing the laziness barrier that can prevent proper disposal of cigarette butts.

Personal factors which appear to have been less frequently addressed by the reviewed interventions include guilt and identity, with the exception of the Belfast City Council (2008) slogan "Excuses excuses", which aims to directly activate guilt, and the Sustainability Victoria (2007) slogan "Don't be a tosser", which may humorously suggest a sense of identity. Appeals to identity were notably absent in the four schools-based interventions that were reviewed, even though the evidence suggests that littering may be part of their identity for many teenagers.

In contrast, although the reviewed literature contained no evidence on the role of agency in influencing littering behaviour, a number of campaigns used slogans which could potentially help create a sense of agency around preventing litter. These include "Take control, take care of your trash"¹⁹⁸, "You know the odds – beat them!"¹⁹⁹ and "People start pollution – people can stop it"²⁰⁰.

Addressing social factors

The majority of the large-scale campaigns have aimed to raise awareness about the fact that littering is a negative thing that should not be done – in effect, communicating the injunctive social norm. Many of the slogans that accompany these campaigns similarly highlight the injunctive norm. Examples include "Don't mess with Texas"²⁰¹, "No butts – stub it, bin it!"²⁰² and "Don't drop it, stop it"²⁰³.

Descriptive social norms may be more difficult to address through interventions. Activities such as community clean-ups have the potential to change the appearance of an area as well as to send out a highly visible descriptive signal that the community cares about their local area. However, the impacts may not be permanent, especially in light of the evidence that suggests people infer descriptive norms not only from the current appearance of a place and the behaviour of others, but also from their memories of how those places have appeared in the recent past²⁰⁴ – which

¹⁹⁶ Sharp Hartwig, Inc. (2001)

¹⁹⁷ E.g. Environmental Campaigns Ltd [ENCAMS] (2008), Sustainability Victoria (2007)

¹⁹⁸ Alice Ferguson Foundation (2011)

¹⁹⁹ Sibley, C. & Liu, J. (2003)

²⁰⁰ Cialdini, R. B. (2003)

²⁰¹ Sharp Hartwig, Inc. (2001)

²⁰² Environmental Campaigns Ltd [ENCAMS] (2008)

²⁰³ Belfast City Council (2008)

²⁰⁴ Curnow, R.C., Streker P., & Williams, E. (1997)

could pre-date the intervention. There may be other means of incorporating descriptive norms into campaigns, for example as illustrated in an experiment run by Sibley and Liu (2003) which included, as one of several activities, feedback on the previous day's littering rates (together with encouragement to improve on this).

Some of these interventions also include elements that may work to increase the visibility of norms within people's social networks. Tools which have the potential to do this include bumper stickers, personalised licence plates carrying the campaign logo²⁰⁵ and T-shirts²⁰⁶. If such items become sufficiently widespread within a community, they can effectively send a message to others about the prevailing social norm in that community. However, influencing people through their peer networks in such ways appeared not to form a significant element of most campaigns, but it was rather used as a complementary minor strand alongside the main campaign.

Instead, utilising well-known individuals or other key figures as role models appeared to be a supporting element in some of the campaigns. For example, one advertising campaign in Texas²⁰⁷ was fronted by famous football stars, singers and musicians, while Keep Scotland Beautiful (2008) report on a schools-based campaign in Falkirk which created a litter superhero as a figurehead for their multi-strand campaign figurehead. While such role models may appear too distant for the target audience to feel that they reflect the social norms of their own networks, they have been used to exemplify aspirational behaviours, potentially promoting social learning.

Addressing material factors

Some of the reviewed interventions involved the installation of new litter bins²⁰⁸. Interestingly, while these were shown to be effective in reducing littering, in one case the installation of bins led to an increase in surreptitious types of littering behaviour²⁰⁹. Another approach to addressing infrastructural issues was the deployment of personal ashtrays, often in conjunction with a wider campaign on cigarette litter²¹⁰.

A number of the schools-based interventions²¹¹ had attempted to use enforcement measures to reduce littering – including the use of sixth formers as litter wardens, and bans on eating in certain areas of the school. Notably, these interventions did not appear to address the personal, social or habitual drivers of behaviour, but were solely focused on changing the material context. In terms of their impacts, these interventions had been unsuccessful.

Addressing habitual factors

Some of the reviewed interventions may have helped to draw attention to habitual behaviours, which is the first step in breaking old habits and adopting new ones²¹². One such example is the Belfast City Council (2008) campaign which used the slogan "So why do you do it here?" In a sense, campaigns which target specific littering behaviours – such as those focusing on cigarette litter and unintentional litter from cars – draw attention to certain habitual behaviour in ways that generic anti-litter campaigns may not.

²⁰⁵ Sharp Hartwig, Inc. (2001)

²⁰⁶ Gershman, Brickner & Bratton, Inc. (2005)

²⁰⁷ Gershman, Brickner & Bratton, Inc. (2005)

²⁰⁸ E.g. Beverage Industry Environment Council (2009), Sibley, C. & Liu, J. (2003)

²⁰⁹ Beverage Industry Environment Council (2009)

²¹⁰ E.g. Sustainability Victoria (2007), Environmental Campaigns Ltd [ENCAMS] (2008)

²¹¹ Environmental Campaigns Ltd [ENCAMS] (2004)

²¹² For a detailed discussion on habits and how to address them through interventions, see Darnton, A, Verplanken, B, White, P and Whitmarsh, L (2011). *Habits, Routines and Sustainable Lifestyles: A summary report to the Department for Environment, Food and Rural Affairs*. AD Research & Analysis for Defra, London.

Figure 7 Summary of intervention approaches

<p>Personal</p> <ul style="list-style-type: none"> • Extending personal responsibility • Increasing sense of ownership and pride in local area • Raising awareness of negative impacts of litter on the environment and on people • Appealing to values, personal norms, emotion or identity • Providing tools to overcome aversion to 'icky' litter • Utilising guilt or sense of agency 	<p>Social</p> <ul style="list-style-type: none"> • Communicating the injunctive social norm that litter is unacceptable • Community clean-ups to change and signal the descriptive norm of not littering and taking care of local area • Feedback on littering rates • Increasing the visibility of norms in social networks • Using role models
<p>Habitual</p> <ul style="list-style-type: none"> • Drawing attention to existing habits • Focusing on specific littering behaviours 	<p>Material</p> <ul style="list-style-type: none"> • Providing new bins to improve their attractiveness • Providing personal ashtrays to increase convenience • Enforcement action against littering

5.1.5 Impact and effectiveness

Monitoring and evaluation

The monitoring and evaluation methods used to assess the impact of the interventions ranged from litter surveys²¹³, bin audits²¹⁴, and weighing and classification of litter²¹⁵, through to attitude surveys, interviews²¹⁶ and observation²¹⁷. Whilst some of the evaluations used control areas or control groups, this was by no means ubiquitous. Given the long timescales involved with many of the reviewed interventions, the extent to which impacts can be attributed to the interventions themselves, particularly in the absence of a counterfactual control, may be questionable.

Intervention outputs and outcomes

Intervention outputs and outcomes were widely reported in the reviewed literature, possibly reflecting the relative ease with which these can be quantified. Measures reported included the amount of campaign materials produced or distributed²¹⁸, numbers of campaign partners recruited²¹⁹, amount of media coverage²²⁰, website hits²²¹, and campaign recognition levels²²². Table 2 (from p. 63) illustrates the outputs and outcomes of the reviewed interventions

Intervention impacts

The impacts of the reviewed interventions were mainly positive (bearing in mind, as already noted in chapter 1, that there is likely to be reporting bias in favour of successful interventions). The reported figures, shown in table 2 (from p. 63), suggest extensive impacts, in line with the fact that most of the reviewed interventions were delivered on a large scale. Intervention impacts have, however, been variously measured in terms of litter weight, number of items and proportion of people littering, which makes it difficult to draw comparisons between interventions. In addition, it is worth noting that although some of the reported reductions in litter are very large, some of these have been achieved over long timescales – up to decades in some cases – while other reports fail to provide a timescale at all. In terms of the longevity of impacts, this has rarely been assessed, although one exception²²³ shows that four months after implementing an intervention, littering was still below the baseline level, though not as low as immediately following the intervention.

Case study 2

Impacts of the Irish plastic bag levy

The point-of-sale plastic bag levy was introduced in 2002 at 15 cents and increased to 22 cents in 2007. On introduction, the levy led immediately to an over 90% reduction in plastic bag consumption, from 328 to 21 bags/person/year. By 2007 this had risen back to 33 bags/person/year, but the increase in the levy brought it down again to 26 bags/person/year. In 2010, the figure was down to 18 bags/person/year. Plastic bags as a proportion of litter arisings decreased from 5% to 0.32% when the levy was first introduced. By mid-2007 this figure had risen back to 0.52%, but decreased again to 0.25% of visible litter in 2011.

Source: Department of the Environment, Community and Local Government (2011)

²¹³ E.g. Alice Ferguson Foundation (2011), Beverage Industry Environment Council (2009), Sustainability Victoria (2007)

²¹⁴ E.g. Beverage Industry Environment Council (2009)

²¹⁵ E.g. Lewis, A., Turton, P. & Sweetman, T. (2009), Hansmann, R. & Scholz, R. (2003)

²¹⁶ E.g. Beverage Industry Environment Council (2009), Sustainability Victoria (2007)

²¹⁷ Sibley, C. & Liu, J. (2003), Beverage Industry Environment Council (2009)

²¹⁸ E.g. Environmental Campaigns Ltd [ENCAMS] (2008), Sustainability Victoria (2007), Keep Scotland Beautiful (2008)

²¹⁹ E.g. Sustainability Victoria (2007)

²²⁰ E.g. Sustainability Victoria (2007), Environmental Campaigns Ltd [ENCAMS] (2008)

²²¹ E.g. Keep Scotland Beautiful (2008)

²²² E.g. Environmental Campaigns Ltd [ENCAMS] (2008), Sustainability Victoria (2007)

²²³ Beverage Industry Environment Council (2009)

Cost-effectiveness

The reviewed literature does not generally report on the cost-effectiveness of interventions, and where such data is given it is presented in different formats between sources – for example, implementation cost²²⁴, the cost savings from reduced cleaning needs²²⁵, or the cost per item of litter prevented²²⁶ – again making it difficult to make comparisons or draw conclusions about the relative cost-effectiveness of different approaches.

Wider outcomes

Some of the reviewed reports touch on other positive benefits resulting from the interventions in addition to reductions in littering. These are, again, not consistently reported, and those that do mention wider outcomes tend to focus on only one or two. The kinds of benefits that have been recorded include greenhouse gas emissions savings, landfill space savings²²⁷, revenue generated²²⁸, awards won²²⁹, stakeholder support garnered, partner capacity building achieved, and new projects funded²³⁰.

²²⁴ Lewis, A., Turton, P. & Sweetman, T. (2009)

²²⁵ Sharp Hartwig, Inc. (2001)

²²⁶ Gershman, Brickner & Bratton, Inc. (2005)

²²⁷ Lewis, A., Turton, P. & Sweetman, T. (2009)

²²⁸ Department of the Environment, Community and Local Government (2011)

²²⁹ Cialdini, R. B. (2003)

²³⁰ Sustainability Victoria (2007)

Table 2 Outputs, outcomes and impacts

Source	Organisation responsible	Activity / engagement method	Outputs	Outcomes	Impacts
Lewis, A., Turton, P. & Sweetman, T. (2009)	New York State	Deposit return scheme for beverage containers	Not reported	65-80% redemption rates	70-80% reduction in container litter, 70% reduction in roadside litter, over 25 years. Litter in NY state declined by 30%
Lewis, A., Turton, P. & Sweetman, T. (2009)	Policy Exchange/CPRE	Flyers handed out outside cinema screens before early evening showings (testing two alternative messages)	Not reported	Not reported	32.2% reduction in litter in experiment condition
Sharp Hartwig, Inc. (2001)	State of Texas	TV, radio and outdoor advertising using celebrities; website; t-shirts, bumper stickers, flags; clean-ups; incorporation of litter prevention information in drivers' education and license programme; personalised license plates with campaign logo	Not reported	Not reported	72% reduction in visible roadside litter, over 6 years
Alice Ferguson Foundation (2011)	Alice Ferguson Foundation	A pilot campaign using posters, brochures, Decals, banners and presentations	Not reported	Not reported	No conclusive impact as litter appeared to be too situation-dependent (0 and 10 pieces of litter per 100 ft of road surveyed in both target and control areas)
Environmental Campaigns Ltd [ENCAMS] (2008)	ENCAMS, in partnership with 10 local authorities and ASDA	Advertisements at bus shelters Pocket ashtrays and posters	250,000 pocket ashtrays distributed; 212 Fixed Penalty Notices issued for smoking litter offences	40% recall of cigarette litter posters	Up to 35% reduction in cigarette litter, timescale not given
Environmental Campaigns Ltd [ENCAMS] (2008)	ENCAMS, in partnership with 12 local authorities and Tesco	Advertisements at bus shelters, billboards, telephone boxes and lamp posts; posters in washrooms; beer mats; Sale of 'Ashcan' portable ashtrays	£1.6m of media coverage; 225,000 Ashcans distributed; 292 cigarette bins installed; 26,000 posters distributed	40% awareness of advertising; 43% awareness of portable ashtrays (up from 24% in 2006)	33% reduction in cigarette litter

Source	Organisation responsible	Activity / engagement method	Outputs	Outcomes	Impacts
Environmental Campaigns Ltd [ENCAMS] (2008)	ENCAMS, in partnership with 10 local authorities	Advertising campaign including posters and window vinyls; beer mats; cigarette bins and portable ashtrays	£1.2m media advertising equivalent; 60 Fixed Penalty Notices issued;	43% awareness of campaign; 47% awareness of portable ashtrays (up from 24% in 2006)	23% reduction in cigarette litter
Belfast City Council (2008)	Belfast City Council	TV, radio and outdoor advertising	Not reported	Recall of litter advertising stable at 75%; 55% are familiar with the Council's advertising unprompted	The number of people who say they have engaged in any form of littering behaviour in the past six months decreased from 52% to 38% between Jan 2004 - Feb 2008
Environmental Campaigns Ltd [ENCAMS] (2004)	ENCAMS	Rewards (e.g. non-uniform days, CD tokens and mobile phone extras) for returning a set number of crisp packets	Not reported	Not reported	Unsuccessful
Environmental Campaigns Ltd [ENCAMS] (2004)	ENCAMS	Ban on eating and drinking in certain areas of school	Not reported	Not reported	Unsuccessful
Environmental Campaigns Ltd [ENCAMS] (2004)	ENCAMS	Sixth formers as litter wardens	Not reported	Not reported	Unsuccessful

Source	Organisation responsible	Activity / engagement method	Outputs	Outcomes	Impacts
Department of the Environment, Community and Local Government (2011)	Irish Government	Plastic bag levy (15c in 2002, increased to 22c in 2007)	Not reported	Over 90% reduction in plastic bag use, from 328 to 21 bags/pp/year, increased to 33 in 2007 and decreased again to 18 in 2010	Plastic bags as a proportion of litter arisings decreased from 5% to 0.32% immediately, increased to 0.52% in 2007 and decreased again to 0.25% of visible litter in 2011
Beverage Industry Environment Council (2009)	Beverage Industry Environment Council	Installation of anti-littering signs; installation of new bins; installation of new recycling facilities	Not reported	Slight increase in the use of street litter bins, increase in the proportion of objects people took with them	Reduction in overall littering behaviour; increase in surreptitious types of littering behaviour; inclusion of ashtrays decreased the proportion of cigarette litter
Hansmann, R. & Scholz, R. (2003)	Authors (experiment)	Cinema advertising	Not reported	Not reported	28.3-71.7% less litter by weight per person in the experimental conditions, compared to the control
Sibley, C. & Liu, J. (2003)	Authors (experiment)	Banner with information about littering rates on the previous day, article in student magazine, followed by introduction of litter bins and ash trays	Not reported	Not reported	Reduction in cigarette littering rates from 99% (baseline) to 82% (post-feedback) and further to 17% (post-ashtrays and additional litter bins) with subsequent increase to 46.2%; reduction in packaging littering rates from 35% (baseline) to 16% (post-feedback) and further to 8.8% (post- environmental design intervention), subsequent increase to 18.5%
Cialdini, R. B. (2003)	Not stated	Televised public service announcement	Not reported	Not reported	Not reported

Source	Organisation responsible	Activity / engagement method	Outputs	Outcomes	Impacts
Sustainability Victoria (2007)	Sustainability Victoria	Mainstream advertising campaign (radio and bus stop advertisements); posters, stickers, personal ashtrays; launch event	212 media items; 60 successful applications to the Butt Bin Rebate Scheme; 8,000 toolkits sent out to establishments; over 4,000 personal ashtrays handed out; 50 A4 campaign posters, 50 bumper stickers and 1-3 t-shirts sent to local governments and regional waste management groups (each); \$9,000 of free air time	62% campaign awareness after 2.5 months; 62% of over 18s heard the radio advert an average of 14 times; 54% of 35 councils surveyed had made use of campaign materials	Decrease in proportion of smokers littering cigarette butts from 58% to 33%; increase in proportion of smokers binning cigarette butts from 40% to 66%; decrease in proportion of smokers who report they litter from 63% to 47%; in 2.5 months

Source	Organisation responsible	Activity / engagement method	Outputs	Outcomes	Impacts
Keep Scotland Beautiful (2008)	Falkirk Council, in partnership with Eco-Schools, Keep Scotland Beautiful, Education Services, Community Services, Environmental Enforcement Officers, Street Cleansing Teams, Community Wardens and individual schools and groups	Educational materials, resources (including workbooks and website) and incentives; Litter Education Support Officer; Kaptain Kleen (Falkirk's litter superhero); competition	Not reported	2,500 views of the Litterzone website per month; 22 schools participated in awareness sessions with the Litter Education Support Officer	Not reported
Keep Scotland Beautiful (2008)	TIDY Northern Ireland	Advertising, public relations and media campaign; posters and pocket ashtrays	20,000 pocket ashtrays distributed	Not reported	70% decrease in smoking-related litter
Gershman, Brickner & Bratton, Inc. (2005)	New Jersey Department of Transportation	Adopt-a-highway program.	Not reported	985 (55%) miles of state-maintained roads were adopted by 2004	9.5% less litter compared to non-adopted sites
Gershman, Brickner & Bratton, Inc. (2005)	New Jersey Department of Environmental Protection, Keep America Beautiful	Comprehensive litter control programme including voluntary cleanups, school education, enhanced enforcement, hotlines, beautification projects, media events	Not reported	Not reported	74-76% decrease in litter

Source	Organisation responsible	Activity / engagement method	Outputs	Outcomes	Impacts
Gershman, Brickner & Bratton, Inc. (2005)	Unknown	Television advertising using football stars, singers and musicians; bumper stickers, T-shirts, mural posters	Not reported	Not reported	Reduction in deliberate rural littering by 40% (after 1 year), rising to 54% (after 2 years) and 67% (after 6 years); reduction in urban littering by 54% (after 1 year) rising to 67% (after 5 years)

5.1.6 Lessons learned

The reviewed literature suggests a number of lessons that were learned from the experience of these interventions. Some of these are general, but others are highly specific to the contexts in which the interventions were run and what they aimed to achieve. Whilst some of these lessons relate directly to ensuring the intervention has an impact, many focus on effective delivery – which can be a key success factor in achieving impact, but does not alone guarantee it. There is a notable gap with respect to key lessons on which behavioural drivers to target for maximum impact.

Key lesson 1: Careful design contributes to effective interventions

Although, as noted above, the reviewed evidence rarely reported on the background research that had gone into intervention development, Sustainability Victoria (2007) suggest that pre-testing, for example of campaign messages and materials, is key to success. In addition, some of the reports²³¹ also note that simple schemes are easier to implement and enforce than complex ones.

With respect to incorporating normative influences in interventions, Hansmann and Scholz (2003) suggest that simply focusing on the injunctive anti-littering norm (i.e. stressing that people *should not* litter) is not sufficient to achieve a change in behaviour. Cialdini (2003) similarly warns against relying on injunctive norms, stressing instead the importance of descriptive norms (i.e. what most other people are doing) and arguing that these may, in fact, be more powerful of the two types of norms. However, the reviewed literature offers no examples of descriptive norms having been harnessed in anti-litter interventions.

The literature also highlights the importance of ensuring that the intervention will be acceptable or even appealing to the target audience. A DoECLG report²³² notes, specifically with respect to the plastic bag levy, two factors which played a role in ensuring public acceptability of the new measure: ring-fencing the proceeds of the levy for specific public goods, and the ready availability of alternatives to the plastic bags. The experiences of ENCAMS (2004) highlight the need to ensure that if using rewards, these must appeal to the target audience.

In terms of selecting appropriate communication channels – bearing in mind that the body of the reviewed literature is biased towards large-scale communication campaigns – Gershman, Brickner & Bratton, Inc. (2005) argue that radio and television messages, targeted directly at primary littering age groups, have rapid impacts on litter levels, and in fact more so than comprehensive litter control programmes with wider scope.

Key lesson 2: Strong partnerships can help deliver effective interventions

A number of the reviewed reports emphasise the importance of partnership working in delivering successful interventions²³³. DoECLG (2011)²³⁴ also report that advance stakeholder consultation has value in gaining buy-in to new interventions before implementation.

In working in partnership with communities, it is crucial to understand and appreciate any existing work in the target area, and to streamline new interventions with that work where possible – linking up with existing activities can also provide a ‘foot in the door’ for new initiatives. A local presence can be extremely beneficial when working with local communities (rather than ‘parachuting’ in from the outside).²³⁵

Of the reviewed interventions, the few unsuccessful ones tend to be school-based interventions. The Alice Ferguson Foundation (2011), reporting on school-based interventions in the US, notes that even where schools are enthusiastic about litter prevention interventions, it can be difficult to fully engage and effectively collaborate with them. ENCAMS

²³¹ Department of the Environment, Community and Local Government (2011), Sustainability Victoria (2007)

²³² Department of the Environment, Community and Local Government (2011)

²³³ E.g. Gershman, Brickner & Bratton, Inc. (2005). Sustainability Victoria (2007)

²³⁴ Department of the Environment, Community and Local Government (2011)

²³⁵ The Alice Ferguson Foundation (2011)

(2004) note that the policing and enforcement of school-based interventions can be difficult and time consuming for staff.

Case study 3

Partnership working between ENCAMS, local authorities and supermarkets

The ENCAMS 'No Butts' campaign²³⁶ worked in partnership with 32 local authorities, as well as two major supermarket chains in order to deliver their targeted messages. The supermarkets provided a venue for local people to be given pocket ashtrays, and 250,000 pocket ashtrays were distributed through ASDA stores. In addition, the intervention utilised posters and Fixed Penalty Notices. This intervention resulted in up to 35% reductions in cigarette litter in key locations throughout the country.

Source: Environmental Campaigns Ltd [ENCAMS] (2008)

Key lesson 3: Selecting an appropriate evaluation method helps determine whether interventions have been effective

A fit-for-purpose monitoring and evaluation strategy is key to determining the impact of any intervention. The selected methodology needs to be one that is suited to the context and the intervention's targets, as well as being feasible given the resources available. Beverage Industry Environment Council (2009) note that litter surveys tend to be vulnerable to variability, due to weather conditions, but that they require less resource than other methods, as well as having the benefit of being relatively unobtrusive. They go on to suggest that bin audits are relatively ineffective in determining the impact of anti-littering signs, as well as being complex to implement and requiring significant logistics and resources, while observations provide reliable and consistent information on behaviours by different social grouping, but are resource intensive.²³⁷

Key lesson 4: Sufficient resources and funding are required for effective interventions

Gershman, Brickner & Bratton, Inc. (2005) and Sustainability Victoria (2007) stress the importance of sufficient funding to run an effective campaign. Gershman, Brickner & Bratton, Inc. (2005) also note that long-term campaigns in particular can be very costly and require a significant amount of resources. Nevertheless, the authors argue that employing a range of professional agencies with the skills and capacity to design, deliver and evaluate anti-litter campaigns is recommended, in order to ensure the production of high-quality materials and effective delivery.

²³⁶ Environmental Campaigns Ltd [ENCAMS] (2008)

²³⁷ Beverage Industry Environment Council (2009)

6 Discussion and overall observations

This section summarises the research team's interpretative conclusions. Key factors influencing littering behaviour appear to include a sense of personal responsibility for litter, knowledge about what counts as litter, social norms as inferred from other people's behaviour, and the characteristics of the site. Littering behaviour is influenced by a number of factors acting in conjunction, and should in fact be seen as a by-product of other behaviours rather than as a behaviour in itself. Drawing on this conceptualisation of litter, the most effective way to tackle litter may be a two-strand approach: raising awareness of what 'counts' as litter and targeting specific "occasions" which generate litter. A number of evidence gaps remain, namely around the deep psychological and cognitive individual-level influences on littering behaviour, success factors in anti-litter interventions, and incorporation of descriptive norms in such interventions. There may be scope to tie further research in these areas into trial or pilot interventions.

6.1 Key factors influencing littering behaviour

There is a wide range of factors which influence littering behaviour, including those which motivate people to litter, prevent them from disposing of litter correctly, or motivate correct disposal. While the numerous influences on littering behaviour can be picked apart, categorised and described, they are interlinked, often operating together or moderating each other's effects, as the evidence shows.

The reviewed evidence has not attempted to prioritise these influencing factors in order of importance, but in the research team's judgement, the following factors appear to be the most important:

Personal factors

- The degree to which an individual feels that it is their personal responsibility to dispose of their litter properly, as opposed to someone else's responsibility to clean it up, influences their behaviour. This sense of personal responsibility for litter varies between situations and locations, and appears to be stronger where the individual has a sense of ownership, respect for and a desire to care for the place or space in question.
- The individual's knowledge (or opinion) as to what counts as litter and how severe its impact is affect behaviour. Biodegradable litter and small items – including cigarette butts – are less likely to be seen as litter, and less likely to be perceived to have a negative impact on the environment or on people's health.
- The 'ick' factor can drive littering behaviour, especially where people have a strong desire to keep their personal space clean. Items that are considered unpleasant to carry around (e.g. due to being seen as dirty or messy, such as food or damp items) are in particular more likely to be littered.
- The convenience of littering and laziness when it comes to proper disposal come together to influence behaviour and make littering more likely.

Social factors

- Descriptive social norms (i.e. what other people are observed to be doing or deduced to be doing) can send strong signals about 'expected' or 'accepted' behaviours. If most other people are seen to be littering, or if a littered environment suggests that littering is a standard behaviour, then this can encourage further littering – while the opposite is the case where other people are not littering.
- The behaviour of family and friends with respect to littering similarly provides important social cues. People 'learn' behaviours from those close to them, and therefore individuals will often follow their friends' and families' examples when it comes to littering.

- An individual's perceptions as to how their immediate company will react to littering or proper disposal behaviour affect their decision as to what to do. If an individual feels that the people they are with would disapprove of littering, they are less likely to litter, and if an individual feels that the people they are with would find it 'amusing' if they sought out a bin, they are more likely to litter.

Material factors

- The characteristics of site can provide cues for littering behaviour. If the existing litter levels are high and/or the general appearance of the site is uncared-for, then littering tends to be seen as 'more acceptable' – and vice versa for clean and well-tended sites (as per the point on descriptive norms above), while the provision of a cleaning service can reduce individuals' sense of responsibility for their litter, making littering more likely.
- There is a tension between these two influences, where, on the one hand, a clean site appears to deter littering but the provision of a cleaning service appears to encourage littering. Whilst the literature has not delved in great detail into this apparent contradiction, it seems that familiarity with the site and the visibility of the cleaning service moderate the effects of the two influences. Simply knowing that a site is normally littered or gets regularly littered, even if it has been recently cleaned, can be enough to make littering behaviour the norm. In addition, a high-visibility cleaning service can send a signal that someone else is taking responsibility for litter, encouraging littering even on a clean site.
- Locations that provide a sense of anonymity – such as large crowds or moving vehicles – can encourage littering by making individuals feel that they cannot be seen or 'caught'.
- The (real or perceived) availability and state of bins affects behaviour. The number of bins and their spacing interact with laziness and convenience to influence instances of littering or proper disposal. If bins are (or are perceived to be) dirty then they are less likely to get used.

Habitual factors:

- Littering can become an automatic 'default' behaviour that is carried out without thought.

6.2 Understanding littering behaviour

Litter, as noted in [chapter 2](#), is a social construct: litter is simply waste in the 'wrong' place, and littering behaviour is the process by which that waste ends up in the wrong place. What is understood by 'litter' and 'littering' therefore varies between individuals, and even between situations and contexts.

As noted above, one of the key factors influencing littering behaviour is individuals' understanding of what 'counts' as litter. This can be affected by the type of item in question – with, for example, food waste being less likely to be considered as litter because it is biodegradable, and similarly smaller items being less likely to be seen as litter because of their lower visual impact compared to larger items. The context – both social and material – also influences individuals' perceptions of whether an item counts as litter. For example, something that is seen as litter in, say, a rural context may not be considered in the same light in an urban context that is known to be regularly cleaned. This fluidity in the definition of litter provides people with opportunities to find excuses for their littering behaviour, as well as opportunities for simply denying that they litter.

Littering behaviour, in turn, comes about as the result of interactions between individuals and items that have the potential to become litter, and the social and material contexts in which those interactions take place. Individuals use the social and material contexts to look for cues on the behaviours that are 'expected' of them – in other words, the behaviours that are in line with the prevailing norms in particular social groups and in particular locations. The sheer importance of social cues is demonstrated by the 'herd behaviour' phenomena described in the literature, whereby

individuals follow the examples set by others, littering in already-littered environments or using an overflowing bin even if an empty one is available nearby. The degree of visibility of the social and material cues – of peers and their behaviour, and of the existing litter in a location – seems to be an important factor in influencing individual behaviour.

Social and material cues also tell individuals something about whose responsibility it is to deal with litter. Individuals are less likely to litter if they consider it their own responsibility to properly dispose of their litter, and more likely to do so if the environmental cues – such as the presence of professional cleaners – suggest to them that it is someone else's responsibility to collect litter. Attribution of responsibility may also affect whether or not an item is considered to 'count' as litter in the first place. For example, in locations that are known to be regularly cleaned – such as train carriages or event venues – individuals may not consider it littering if they leave their litter behind.

All of this suggests that the concept of 'litterers' may be a misleading one. A dichotomy between 'people who litter' and 'people who do not litter' may not be helpful in tackling the littering problem – not to mention the fact that 'non-litterers' may well not exist. This is reflected in the segmentation models reviewed, none of which contain a clear 'non-litterer' segment. Given the variation in possible definitions of what constitutes litter, and the opportunities for excuses and denial, it seems likely that the vast majority of people do litter some items in some social and material contexts – whether or not they themselves consider it littering.

Instead of thinking about litterers, then, it may be more constructive to think about 'littering incidents' where individual littering behaviour is activated by the cues received from the social and material contexts. Litter, therefore, can be seen as a by-product of particular types of "occasions", where an "occasion" is made up of a particular combination of people, place and activity. Some particularly relevant activities may be eating on the move, smoking and chewing gum, all of which are predecessor behaviours that generate potential litter items. Other things that may require consideration include, for example, whether the users of places are regular or transient, what kinds of relationships exist between places and activities, and what the potential is of different activities to form predecessors to littering behaviour.

Understanding people's interactions with "occasions", including the relevant people, places and activities, can therefore open up new avenues to understanding and tackling litter, through providing behavioural cues that are tailored to specific "occasions".

6.3 Overall observations

Focusing on 'the litter problem' and using messages that urge people 'not to litter' may only go so far towards addressing the litter issue. The evidence shows that specific calls to action (e.g. "bin your butts") appear to be more effective than generic anti-littering messages, and conceptualising litter as a by-product of "occasions" constitutes a shift towards such specific approaches. People are likely to be more responsive to messages that are salient to them, focusing on the activities that they perceive themselves to be engaged in – such as going to the cinema, eating on the move, or smoking – rather than messages about litter, when they do not consider themselves to be littering. If litter is the by-product of "occasions" then interventions will need to focus directly on these "occasions", in order to better target the underlying causes of litter.

Based on this analysis, the most effective approach to tackling littering may be a two-strand intervention, as follows:

1. An overarching awareness-raising strand to improve people's understanding of what 'counts' as litter, covering a broad range of items, situations and locations, together with messaging that stresses the injunctive norm that these littering behaviours are not acceptable. Explaining why these littering behaviours are not acceptable by highlighting their negative impacts could increase acceptance of the message and help internalise this new understanding. A large-scale mass media campaign may be the most effective way of getting these messages across, as the evidence suggests media campaigns have in the past been successful and they are known to have wide reach.

2. Complementary sub-strands which focus on specific “occasions”, targeting identifiable ‘bundles’ of item-situation-location combinations. In practice, this might mean developing interventions that specifically focus on, for example, commuter litter on trains, or littering at events in public places by transient visitors. Deciding which ‘bundles’ to target should start by identifying priority categories of litter (whether by item type, location, or both) and then working backwards from these priority categories to identify the “occasions” which generate that litter, which then defines the target audience. The interventions and messages developed need to be salient to the “occasion” rather than simply to litter. There is scope here to learn lessons from the Love Food Hate Waste campaign, which focuses on the antecedent behaviours of food waste, rather than simply asking people to ‘waste less food’.

6.4 Evidence gaps

Although the evidence base on the factors that influence behaviour provides broad coverage of most areas of interest, some evidence gaps were identified through this review. In addition, easily accessible published evidence on policy-led interventions appears to be skewed mainly towards successful, large-scale campaigns. The following four areas would benefit from additional research:

1. There is a gap in terms of qualitative research that explores the deep individual-level factors that influence littering behaviour, including values, personal norms and, crucially, cognition, which affects individuals’ understanding of what counts as litter. A key strand here would be to develop an understanding of how to encourage a sense of personal responsibility among those who currently feel guilty for littering but rationalise their behaviour through justifications and excuses. These individual-level factors need to be considered in the context of different types of items, situations and locations.
2. There is also a need to develop a clearer understanding, through qualitative as well as quantitative evaluation, of the factors that influence the success or otherwise of interventions to tackle litter. Future interventions need to set clear, measurable aims at the outset, monitor appropriate indicators, and evaluate impacts, whilst paying particular attention to success factors – which may require qualitative as well as quantitative research. Thorough and robust evaluation will also help in understanding whether and how interventions can be replicated in different contexts to deliver scaled-up impacts, increasing their cost-effectiveness.
3. Given the lack of thorough intervention evaluations in the reviewed evidence, it could also be worthwhile to carry out some small-scale qualitative interview research with key organisations who have recently run anti-litter interventions (e.g. campaigns, enforcement), to explore messaging and success factors. This could generate valuable up-to-date insight for campaign development.
4. Descriptive norms, both in terms of places and social networks, have been shown to have a significant influence on people’s littering behaviour, but these were rarely addressed in the interventions reviewed as part of this study. There may be value in further desk research to explore the ways in which other interventions – drawing on topics beyond as well as including littering – have influenced or capitalised on the role of descriptive norms in changing behaviour.

There is scope for tying these research areas in to new interventions by, for example, running trial or pilot projects which not only aim to test new approaches to reducing littering, but also set out to explore some of these questions and to add to the existing knowledge base.

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Annex B – Methodology

Introduction

This annex describes the methodology used for the Rapid Evidence Assessment (REA) carried out for this project. The methodology entailed two phases:

1. An initial scoping phase to identify a longlist of sources, assess them for relevance and select a shortlist of documents for detailed review.
2. A detailed review phase to review the selected documents against an assessment framework and extract information relevant to the research topics.

Scoping Phase

The following points are worth noting about the scope of the project:

- Litter was defined at the outset of this project as 'rubbish on the ground', but this definition was interpreted very broadly while seeking out evidence
- The long-listing process kept a record of but did not seek out sources which relate to later modules of the overall research programme
- International sources were included, with a particular interest in any that give best examples of interventions in practice
- Fly-tipping was outside the project scope
- Carrier bags, weeds/detritus or needles related literature was not actively sought out in this project
- Recycling on the go was not considered directly in the scope of this project (unless there was evidence of impact on littering behaviours)
- All types of interventions – not only 'policy interventions' – were of interest, provided they had been evaluated and gave impact data
- No strict quality boundaries were set: e.g. non-peer-reviewed material was included and quality scoring used to make a judgement on source quality

The primary source of documents for the longlist was the Zero Waste Scotland (ZWS) project team and steering group who were invited to recommend documents. This was complemented by online searches using Google and Google Scholar. Key search terms are shown in table 3 below. Note that the aim was not to work through every possible combination of search terms (the most productive combinations are a matter of experience once the search is underway) but to use this list as a springboard for searching and a checklist to ensure that all broad topic areas had been covered.

The websites of key organisations were also searched for key documents. In addition, a 'snowballing' technique was used, whereby reports which were referenced in the shortlisted literature were also considered for inclusion. The longlist remained 'live' throughout the review process, so new documents could be added to it for ZWS's records after the review phase began.

Table 3 Key search terms

<i>The following keywords were used as required throughout the searches for each of the research questions: Litter, littering, rubbish</i>		
Research aims	Keywords	Notes
<p>Research aim 1 – Identifying and mapping existing evidence on littering behaviours, motivations and barriers</p> <p>TARGET: To locate studies or documents which give evidence on drivers and motivators for and against littering</p> <p>OBJECTIVE: To reveal possible opportunities for changing behaviour</p>	<p>[dog-fouling, cigarette butts, fast food, picnics, chewing gum, on-the-go, cars]</p> <p>&</p> <p>[Urban, rural, highway, beach, coast, park, school, event, 'stalled spaces' (private land)]</p> <p>&</p> <p>[Behaviour/s, attitudes, motivations, drivers, barriers, anti-social]</p> <p>&</p> <p>[Segmentation, model, type, audience, social, group] Local environmental quality – detritus, weeds, vandalism, plastic bags]</p>	<p>Combinations of key words will be used to find source of evidence on littering behaviour for a range of litter types and contexts</p> <p>Additionally, search terms are included here which should identify any segmentation models or similar approaches.</p>
<p>Research aim 2 – Identify existing anti-litter policy interventions and, where possible, review evidence on the impacts of those measures</p> <p>TARGET: To find documents describing policy interventions with the primary or secondary aim of reducing littering behaviours and their impacts where possible</p> <p>OBJECTIVE: To identify examples and case studies of successful and less successful policy interventions in order to ascertain possible options for the Scottish context</p>	<p>[dog-fouling, cigarette butts, fast food, picnics, chewing gum, cars]</p> <p>&</p> <p>[Urban, rural, highway, beach, coast, park, school, event]</p> <p>&</p> <p>[Behaviour/s, attitudes, motivations, drivers, barriers]</p> <p>&</p> <p>[intervention, communication, campaign, engagement, market(ing), advert(ise)/(ising), 'awareness raising', education, information, programme, community safety, enforcement, fines, prosecution]</p> <p>&</p> <p>[impact, cost-effective(ness), effective(ness), success(ful), lessons, evaluate, evaluation, assess(ment)]</p>	<p>In addition to the litter type and context issues described for research aim 1, this section will use a range of words to describe the type of policy interventions which might have been used to reduce littering behaviour.</p> <p>In addition, search terms which might reveal evidence on the impact of those policy interventions are suggested.</p>

Research aims	Keywords	Notes
Research aim 3 – Highlight evidence that will be relevant to other work packages within the wider programme of work	None; this research aim is secondary, and these sources will be logged where they are found but will not be specifically searched for in this review.	

In total, 124 documents were identified, of which 71 were excluded on the basis of one or more of the factors listed in table 4 below.

Table 4 Exclusion criteria

Exclusions	Reasons for exclusion
Sources that pre-date 1995	To maintain the relevance of the findings, sources were only considered for inclusion if they had been published since 1995. However, some evidence in those documents does refer to interventions or research conducted prior to that cut-off
Later sources which summarise documents already included	In some cases, there were documents which summarised one or more documents which were already selected for inclusion; these documents were excluded in favour of the original sources
Documents which are not specifically related to litter <i>behaviours</i>	There is a large body of evidence on the physical amount of litter in different contexts which looks at the littering <i>outcome</i> rather than the littering behaviour specifically. These were excluded as they do not target the specific research questions for this review
Documents assessed to be of very poor quality or not based on robust evidence	Some documents appeared to be making claims based on little or no actual evidence, or to be very poor quality in their actual approach to an extent which would add no good evidence to the research aims, so these were also excluded.

Table 5 below lists the information that was recorded about each document in the scoping database at the longlisting stage. This information was, as a rule, not recorded for the 71 excluded documents (unless they were deemed to meet the exclusion criteria after information had already been recorded in the database).

Table 5 Information recording during scoping phase

Information recorded
Unique identifier (ID)
How document was sourced/found
Author(s)
Full title of article
Year of publication
Journal/organisation/periodical title
Type of research (e.g. academic, industry, policy)
Country of research origin/focus
Research abstract or equivalent
Summary of the paper and its relevance to the research questions
Subject focus of the research (e.g. young people, smokers, dog fouling)

In addition, documents on the long-list were rated according to their relevance to the research questions, and an assessment made of the overall methodological robustness. The research questions and scoring mechanisms are shown below in table 6.

Table 6 Relevance and quality scoring

Research topic	Research question	Scoring mechanism	
Identify, summarise and map existing evidence on littering behaviours, motivations and barriers, and possible opportunities for changing behaviour;	Q1 : Littering behaviours: their extent and nature	Document helpfulness: 5 - this source answers the RQ 4 - this source is very helpful 3 - this source is quite helpful 2 - this source is slightly helpful 1 - don't know how helpful this is 0 - this source is no help	Description of relevance to RQ Details of whether a segmentation model is included
Identify, summarise and map existing evidence on littering behaviours, motivations and barriers, and possible opportunities for changing behaviour;	Q2: Drivers for littering behaviour change	Document helpfulness: 5 - this source answers the RQ 4 - this source is very helpful 3 - this source is quite helpful 2 - this source is slightly helpful 1 - don't know how helpful this is 0 - this source is no help	Description of relevance to RQ

Research topic	Research question	Scoring mechanism	
Identify, summarise and map existing evidence on littering behaviours, motivations and barriers, and possible opportunities for changing behaviour;	Q3a: Barriers to proper disposal	Document helpfulness: 5 - this source answers the RQ 4 - this source is very helpful 3 - this source is quite helpful 2 - this source is slightly helpful 1 - don't know how helpful this is 0 - this source is no help	Description of relevance to RQ
Identify, summarise and map existing evidence on littering behaviours, motivations and barriers, and possible opportunities for changing behaviour;	Q3b: Motivations not to litter	Document helpfulness: 5 - this source answers the RQ 4 - this source is very helpful 3 - this source is quite helpful 2 - this source is slightly helpful 1 - don't know how helpful this is 0 - this source is no help	Description of relevance to RQ
Review evidence to identify existing anti-litter policy interventions and, where, possible, review evidence on the impacts of those measures.	Q4: Existing interventions	Document helpfulness: 5 - this source answers the RQ 4 - this source is very helpful 3 - this source is quite helpful 2 - this source is slightly helpful 1 - don't know how helpful this is 0 - this source is no help	Description of particular relevance and type of campaign or intervention Evidence of impacts outlined
Methodological quality		Quality of approach (Low, Medium, High), e.g. did the research use leading survey questions or conduct research with a biased sample?	Methodology type Methodology robustness Assessment of source viability and/or bias

A total of 39 were selected from the longlist for detailed review. The criteria used to select documents are set out in table 7 overleaf.

Table 7 Selection criteria

Criterion	Rationale
All documents rated 3/5 or above in relevance to any of the four research questions included	The documents with the most useful evidence on each research question were sought out systematically
All documents with a combined total rating of 8.5/20 or above	Other documents which did not have a high amount of evidence on a particular research question but which had some useful evidence across multiple research questions were felt relevant enough to the review overall to include
Documents which cover a specific topic which is not adequately covered elsewhere	Some documents were included as they had good specific evidence on a particular sub-part of a research question, which was not covered by the evidence elsewhere
Documents with evidence based on a very small sample or small number of research participants	A small number of documents were drawing conclusions on very small sample sizes, and it was felt that these conclusions could not be considered as a robust finding on those samples

Detailed review phase

During the detailed review phase, evidence was sought under three broad categories:

1. Evidence relating to littering behaviours, including motivations and barriers;
2. Evidence on segmentation models; and
3. Evidence on interventions.

In order to record the evidence, a database was created which consisted of an Excel spreadsheet, using a separate tab for each of the above categories. The information recorded under each category is set out in tables 8, 9, and 10.

Table 8 Evidence relating to littering behaviours

Research headline	Information included
Behaviours: who litters and how much?	<ul style="list-style-type: none"> Who is or isn't littering, how much and how often What is being littered and where Variations in littering behaviour between different groups of people
What are the motivations/drivers for littering behaviour?	<p>As outlined in the report, these were recorded in each of the following four categories:</p> <ul style="list-style-type: none"> Personal cognition and identity Social factors/norms External conditions/context Breaking and embedding habits
What are the barriers to proper disposal?	<p>As outlined in the report, these were recorded in each of the following four categories:</p> <ul style="list-style-type: none"> Personal cognition and identity Social factors/norms External conditions/context Breaking and embedding habits
What are the motivations/drivers for proper disposal?	<p>As outlined in the report, these were recorded in each of the following four categories:</p> <ul style="list-style-type: none"> Personal cognition and identity Social factors/norms External conditions/context Breaking and embedding habits
General influences on littering and disposal behaviours	<p>As outlined in the report, these were recorded in each of the following four categories:</p> <ul style="list-style-type: none"> Personal cognition and identity Social factors/norms External conditions/context Breaking and embedding habits
Associations and links	Evidence on relationships between littering attitudes and behaviours and other factors or behaviours

Table 9 Evidence on segmentation models

Segmentation model information	Description
Segment name	The moniker assigned to each group by the authors, along with their estimated proportion of the group where available
Segment characteristics	Demographics and lifestyle factors, such as age, gender, social segments, employment type, interest in different media types
Segment littering attitudes and behaviours	For example, perceptions of littering behaviours and levels of guilt; frequency of littering; types of litter.

Table 10 Evidence on interventions

Type of information	Intervention detail	Description
Background information	Who ran it	Who undertook the campaign and evaluation e.g. charity, local authority, larger organisation, research group
	Target audience	For example, residents in a particular area, users of a specific space, an age group, smokers
	Time period	When the intervention ran and for how long
Engagement and delivery	Description of overall objectives	
	Engagement methods	Specific tools used including TV/radio, press campaigns, posters, events, doorstepping
	Use of carrots & sticks	Details of any incentives or enforcement mechanisms used
	Message or slogans used	What 'slogan' or message was the intervention sending out
	Background and development of campaign	What research or background work was behind the design of the intervention?
Monitoring and evaluation	Specific evaluation aims	Regarding changes to attitudes, behaviours, volumes of litter, or types of litter
	Overview of monitoring and evaluation methods	For example focus groups or questionnaires, litter surveys
	Campaign outcomes	Campaign reach, recognition of the campaign
	Impacts on litter, attitudes, behaviours	Changes in the awareness of litter, attitudes and behaviours to litter, volumes of litter, types of litter
	Wider outcomes	Other outcomes of the campaign, for example social cohesion, improved health
	Cost & cost-effectiveness	Any information as calculated in the report
Learning	Key lessons learnt	Any lessons or recommendations reported in the document, including notable success factors and barriers or weaknesses



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