

Wrigley Intervention Project



“Carrot and Stick” Project report

February 2017

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Executive summary

Wrigley approached us to develop a project to test the relative effect of people's behaviour around littering and to monitor changes in behaviour during periods of intervention. A series of interventions were run to test whether people are more likely to correctly dispose of litter if compelled to do so by a good cause, or when visibility of enforcement is increased.

Through regular monitoring, data was gathered around the demographics of people correctly and incorrectly disposing of litter over a 15-week period. During the observation periods, litter on eight streets surrounding the observation area was also counted in order to determine whether interventions had an impact on behaviour beyond the immediate area.

The project took place over a core period of four months (September to December) in Paisley town centre, with five phases of intervention each lasting three weeks. Five methods of monitoring, based on our experience of street monitoring, behaviour monitoring and nudge methodology were employed to evaluate the success of the project. These five methods were:

1	On street monitoring of litter levels
2	Bin weight monitoring
3	Bin use observation
4	Enforcement observation (around bins)
5	Public questionnaires

The street monitoring conducted at the end of each observation period resulted in a total of 120 litter counts over the 15-week period. This was to determine whether interventions had a wider spread effect on people's behaviour beyond the immediate observation area.

Our research showed that the introduction of interventions during the project had a positive effect on the use of public bins and the disposal of litter items. To build upon the findings of this project we recommend that further research is carried out. Increasing the time frame of the project and a focus on bin visibility would both increase confidence in the project outcomes.

Introduction

Wrigley asked us to develop and test people's behaviour around bin use and littering over a 15-week period whilst running a series of interventions. The interventions were to determine whether people are more likely to correctly dispose of litter if compelled to by means of a good cause (in this case by adding charity logos to bins) or if visibility of enforcement is increased.

Litter context

We have been collecting data on local environmental quality and cleanliness across Scotland for the past twelve years using LEAMS (Local Environmental Audit and Management System). We originally designed this approach to help individual local authorities meet their obligations under the Environmental Protection (Scotland) Act 1990 and it is now a vital element for improving the health and well-being of all of Scotland's communities.

Results published in our recent report¹ confirmed that after many years of improvement, we are now seeing a decline in local environmental quality. 80% of streets surveyed were found to be littered and with more than £1million spent weekly in Scotland addressing litter and flytipping, litter remains a costly and unsightly issue.

Behaviour change theory and research

Using behaviour change tools, we have the ability to increase our understanding of the wide variety of factors that influence choice and behaviour. Behavioural theories and research are fundamental to informing the design and delivery of any intervention and the importance of grounding behaviour change interventions in current theory and research is becoming increasingly recognised.²

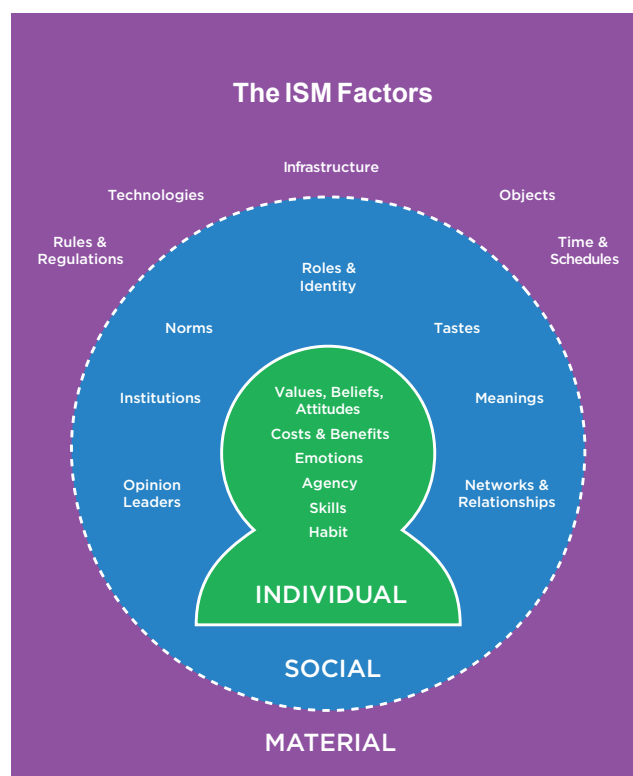
Nudge

A nudge intervention can be defined as “any aspect of choice architecture that alters people's behaviour in a predictable way without forbidding any options or significantly changing their economic incentives.”³ Simply, a nudge is a soft measure that encourages alternative behaviours; it is optional and carries none of the penalties associated with traditional enforcement approaches to littering.

ISM

Effective interventions can be developed using the ISM (Individual, Social, Material) model. It encourages a holistic approach and collaboration on specific challenges to generate more creative and insightful ideas for interventions. ISM avoids the inherent problems of traditional approaches to behaviour change which tend to focus on only the material or individual contexts, generally ignoring social factors.⁴

Nudge and ISM are discussed in further detail in the ‘intervention design’ section of this report as they were used to inform the interventions implemented.



¹Local Environmental Quality in Decline, (Keep Scotland Beautiful, March 2016).

²Darnton, A, Practical Guide: An overview of behaviour change models and their uses, (Government Social Research Unit, 2008b).

³Thaler and Sunstein, C. Nudge. (Penguin Books, 2008).

⁴<http://www.keeptoscotlandbeautiful.org/sustainability-climate-change/sustainable-scotland-network/using-ism-for-sustainable-change/>

Aims and objectives

The aim of the Wrigley intervention project was to gather data to examine whether positive reinforcement is a more powerful nudge in relation to bin use and littering than increased enforcement.



The objectives of the project were to:

1

Develop and implement a bespoke methodology for evaluating techniques using a series of intervention and non-intervention periods.

2

Evaluate the immediate impact of the interventions in prompting desired behaviour.

3

Evaluate the impact of each individual intervention on behaviour in the immediate and surrounding areas and compare their effectiveness.

4

Assess public perception of littering in Scotland's town centres and the effect of intervention techniques.

Methodology

Monitoring process

An area in Paisley town centre with two visible litter bins was selected as the intervention area. People's behaviour towards litter disposal was observed over a 15-week period by two auditors. In order to conduct accurate litter monitoring and provide evaluation, 50 metre transects on eight streets surrounding the observation area were also identified and litter was counted on these transects every week.

In the intervention area the individual demographics of people were recorded to gain an understanding of intervention effects on different groups. The bins were emptied before and after the four hour observation period and the litter collected in this time was weighed to determine the impact of interventions on bin usage. Monitoring litter on the surrounding eight transects was completed at the end of each observation period in order to assess the impact of interventions on littering beyond the observation area.

Monitoring techniques

Bin use observation

Two auditors observed the use of the bins, ashtrays and littering incidents and recorded the demographics of people including age range and gender. The bins were specifically chosen to monitor different activities around cigarette litter, one with an ashtray on top (bin 1), and one without (bin 2). Correct and incorrect disposal can be split up in to its two categories, as shown in Table 1 below.

Correct disposal	Incorrect disposal
Fully depositing litter in either bin 1 or bin 2.	Litter leaving the possession of a person anywhere other than into a litter bin.
Disposing of cigarettes in ashtray of bin 1.	Extinguishing cigarettes on top of bin 2 and leaving them on top.

Table 1: Litter disposal

Bin weight monitoring

The bins were emptied before and after the four hour observation period and the litter collected in this time was weighed to determine the impact of interventions on bin usage and calculate funding for the charities.

Public questionnaires

Public questionnaires were carried out post project so as not to influence behaviour change around bin usage and littering. The questionnaire gathered data on people's perceptions about visibility of bins in Paisley town centre and increased enforcement in relation to littering. The results from the public questionnaires can be found later in the report.

Project interventions

Over the 15-week period, on a three week cycle, two interventions were delivered with periods of no intervention before, after and during in order to gain a comparison with baseline results. This cycle was designed to measure the short term impact of specific interventions against a robust baseline, and to determine if there is any long term impact, while providing additional information on the littering activities of a variety of demographics. Throughout each intervention the same methodology for observation and monitoring were used to ensure consistency.

Week	Phase	Intervention
Week 1-3	Phase 1	Baseline audit
Week 4-6	Phase 2	Charitable bin wraps
Week 7-9	Phase 3	No intervention
Week 10-12	Phase 4	Increased enforcement
Week 13-15	Phase 5	No intervention

Table 2: Project intervention timetable



Phases 1, 3 and 5: No intervention

During phase 1 a robust baseline was established to facilitate comparison in the following intervention periods.

Phases 3 and 5 of no intervention, assessed whether the interventions had an impact on littering behaviours even after they had been removed.

Phase 2: Charitable bin wraps

This phase was designed to examine whether positive reinforcement is a powerful nudge to encourage people to use litter bins. The bins were wrapped with the logos of three local charities and a positive reinforcement message.

In previous studies we have found that increasing the visibility of bins is an effective nudge for correct waste disposal. The local charity element aimed to increase the incentive to dispose of litter correctly.

Phase 4: Increased enforcement

In this phase, two enforcement officers patrolled the intervention area to determine whether people are less likely to litter if there is increased risk of being caught and issued with a fixed penalty notice.

This intervention lends itself more to the ISM model of behaviour change rather than being a “nudge” technique. Individual factors around litter can include a lack of education about littering and a social norm where littering is accepted. We would expect to see a decrease in the instances of littering, but not necessarily an increase in bin usage, because despite not wanting to be fined for littering, the impulse still isn't there to deposit correctly.

Demographics

The demographics recorded during the monitoring period were based on the observations of auditors. The demographic information recorded includes gender and age groups (12-19, 20-39, 40-59 and 60+).



Limitations of the research

This project was not designed to be extensive in nature. The purpose of it was to observe littering behaviour within very specific parameters, context, setting and timeframe. Therefore, the project only provides a snapshot of the impact of behaviour change interventions on individual behaviour in relation to littering.

Taking into account these parameters, the findings from this project are limited in their settings and contexts. It is important to note that it was not the intent to apply the results of this project to all settings and contexts, rather as useful for informing practice which can be further tested in other locations.

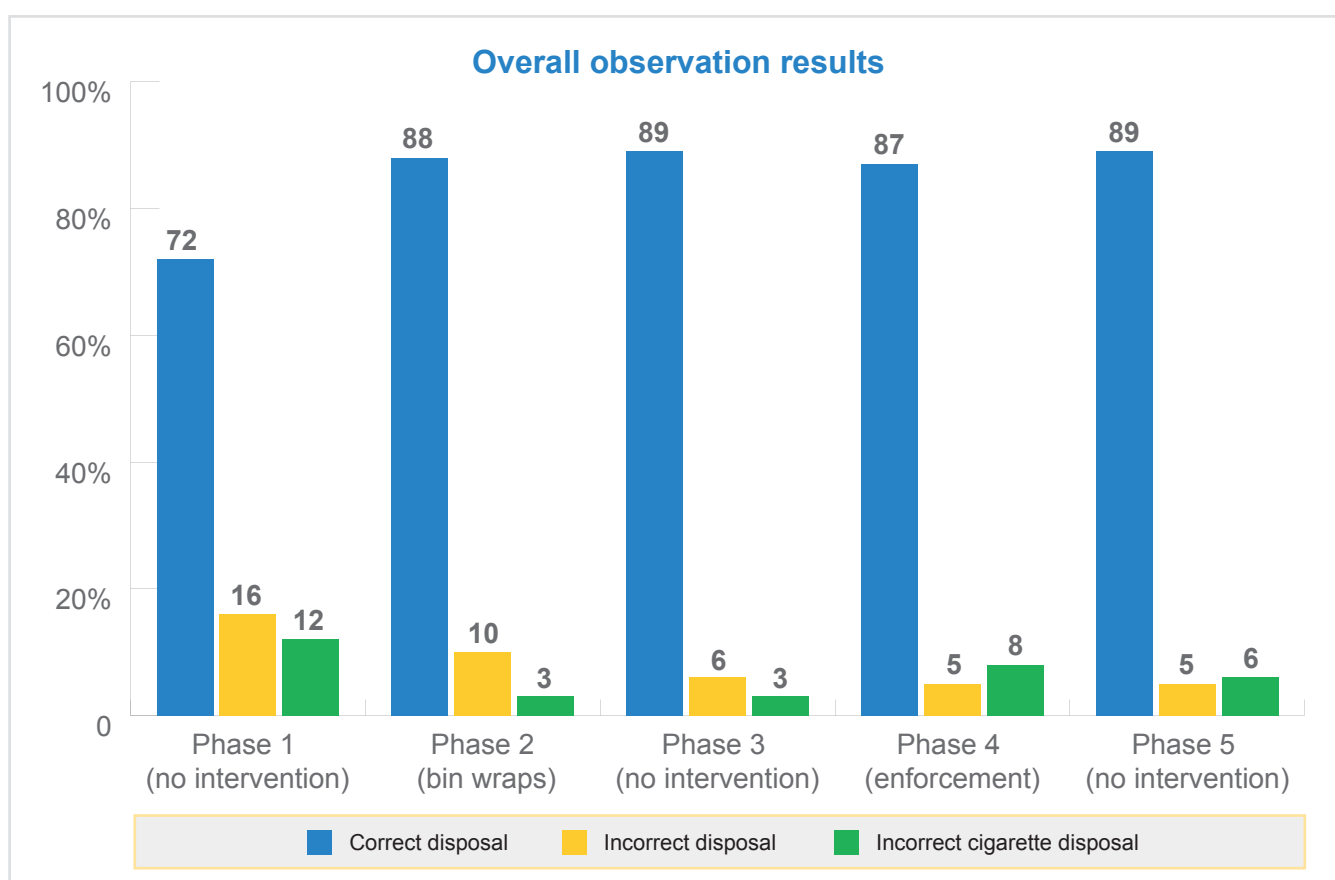
It is recognised that there are many other factors that have an impact on both littering behaviour and volume of litter on the streets, that were not captured during the monitoring period.

The monitoring approach, especially in relation to the recording of population demographics, used during this project was dependent on observation and auditor experience and therefore provides results that are indicative in nature.

Results

Overall observation results

The results have been collated to reflect correct disposal, incorrect disposal of litter items and the incorrect disposal of cigarettes on top of bin 2 (the bin with no ashtray). We deemed it necessary to differentiate between the two because people may not be aware this is littering, or that they are doing anything wrong. The Environmental Protection Act 1990 states “If any person throws down, drops or otherwise deposits in, into or from any place to which this section applies, and leaves, anything whatsoever in such circumstances as to cause, or to contribute to, or tend to lead to, the defacement by litter of any place to which this section applies, they shall, subject to subsection (2) below, be guilty of an offence”.⁵



The graph above shows the percentage breakdown of correct disposal, incorrect disposal and incorrect disposal of cigarettes on top of the bin (bin 2).

Overall results show that correct disposal increased from 72% in phase 1 to 88% in phase 2 and stayed consistently high throughout the remaining phases.

Incorrect disposal reduced from 16% in the first phase to 10% in phase 2 (bin wraps) and dropped again to 6% in phase 3. It remained at 5% for the following two phases, showing a reduction of 31%.

Depositing cigarettes on top of bin 2 was at a high of 12% in phase 1, but dropped by 75% in phase 2 and remained at 3% through to phase 4. It rose in the enforcement phase to 8%, but dropped in the final phase to 6% which shows an overall reduction of 50% from first to final phase.

⁵Section 87, The Environmental Protection Act 1990.

Demographics across the phases

The following graphs and results look at the activities of specific demographics across the intervention phases. Breaking it down into demographics provides us with the opportunity to assess whether individual demographics are more influenced by particular interventions than others.

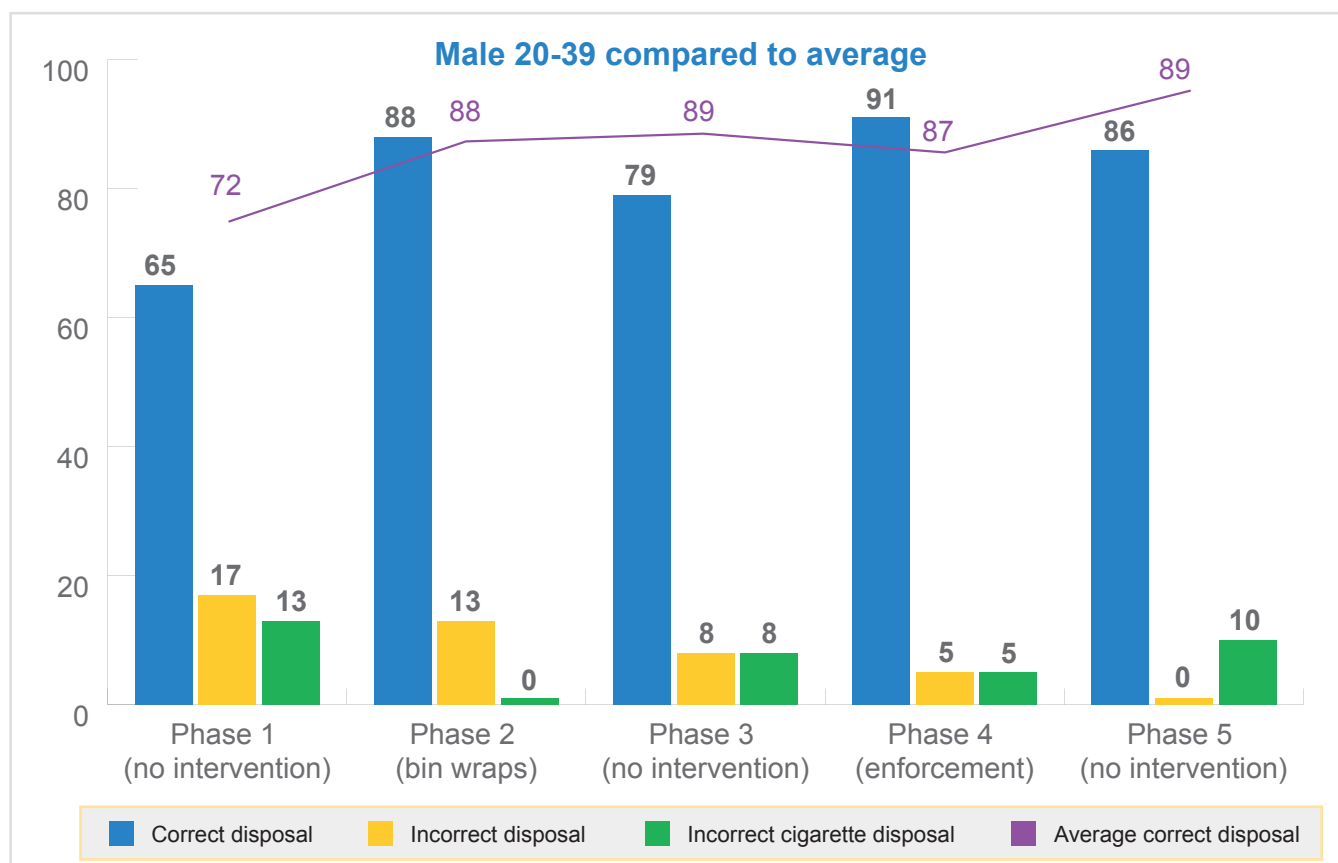
Male 12-19

Results show that during phase 1, 75% of males aged 12-19 disposed of their litter correctly. This dropped to 50% during the bin wrap phase, improved over the following two phases, but returned to 50% during the final phase of no enforcement.

There were no recorded incidents of cigarettes being disposed of incorrectly on top of the bin.

Male 20-39

Our results show there was a large improvement in correct disposal throughout the project with an increase from just 65% in phase 1 to 86% in the final phase. This peaked in the enforcement phase with 91% on average disposing of their litter correctly, 4% higher than the overall average.

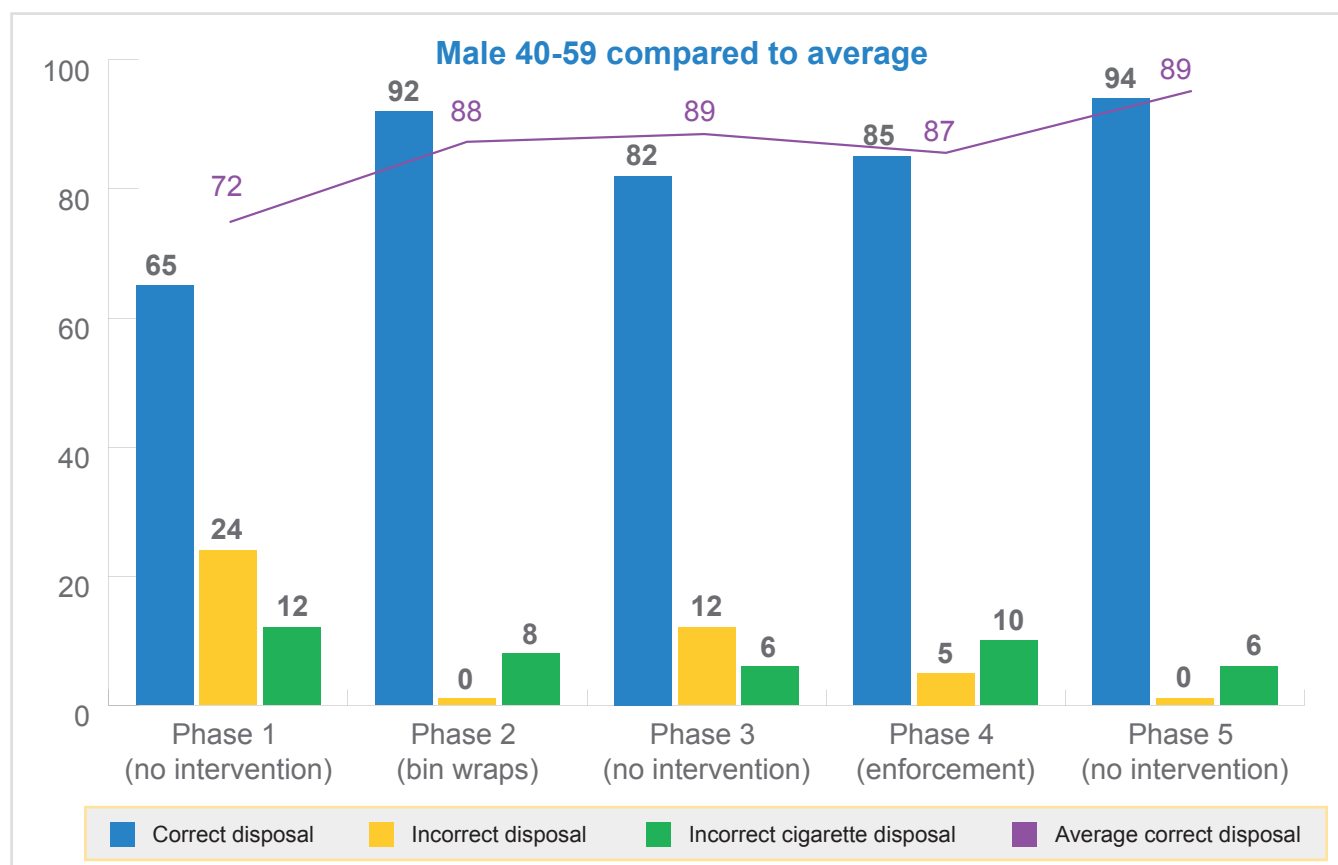


The percentage of males aged 20-39 incorrectly disposing of litter reduced with each intervention phase. This is an extremely positive reduction in littering, although this age group and gender remained above average for littering at each intervention phase.

The incorrect disposal of cigarettes on top of the litter bin showed less of a trend, however was also at its lowest in the enforcement (phase 4) at 5%, 3% less than the overall average for that phase.

Male 40-59

Our results show an initial sharp increase in correct disposal from 65% in phase 1 to 92% in the bin wrap phase, falling to below the average in phase 3 (no intervention) and enforcement phase, but peaking at 94% in phase 5. It should also be noted that during the bin wrap phase, correct disposal was 4% above the average.



Incorrect disposal reduced by half from the first intervention phase to the third with no incidents recorded in phase 2. It dropped again from an initial 24% to 5% in the enforcement phase.

The incorrect disposal of cigarettes on top of the litter bin was at its highest in the first phase at 12%, then reduced throughout the next two phases. However it went up to 10% during the enforcement phase which was 2% above the average.

Male 60+

Correct disposal was above average at every phase in this age range. During the enforcement phase, 100% disposed of their litter correctly. The bin wrap phase was the next highest, at 6% above average.

Incorrect disposal was 14% during the first phase and reduced to 6% in bin wrap phase. During the next two phases there were no recorded incidents, but this did rise to 9% in the final phase.

Phase 1 had the highest recorded incident of cigarettes left on top of the bin at 14%, 2% above the average. During the bin wrap and enforcement phases there were no recorded incidents.

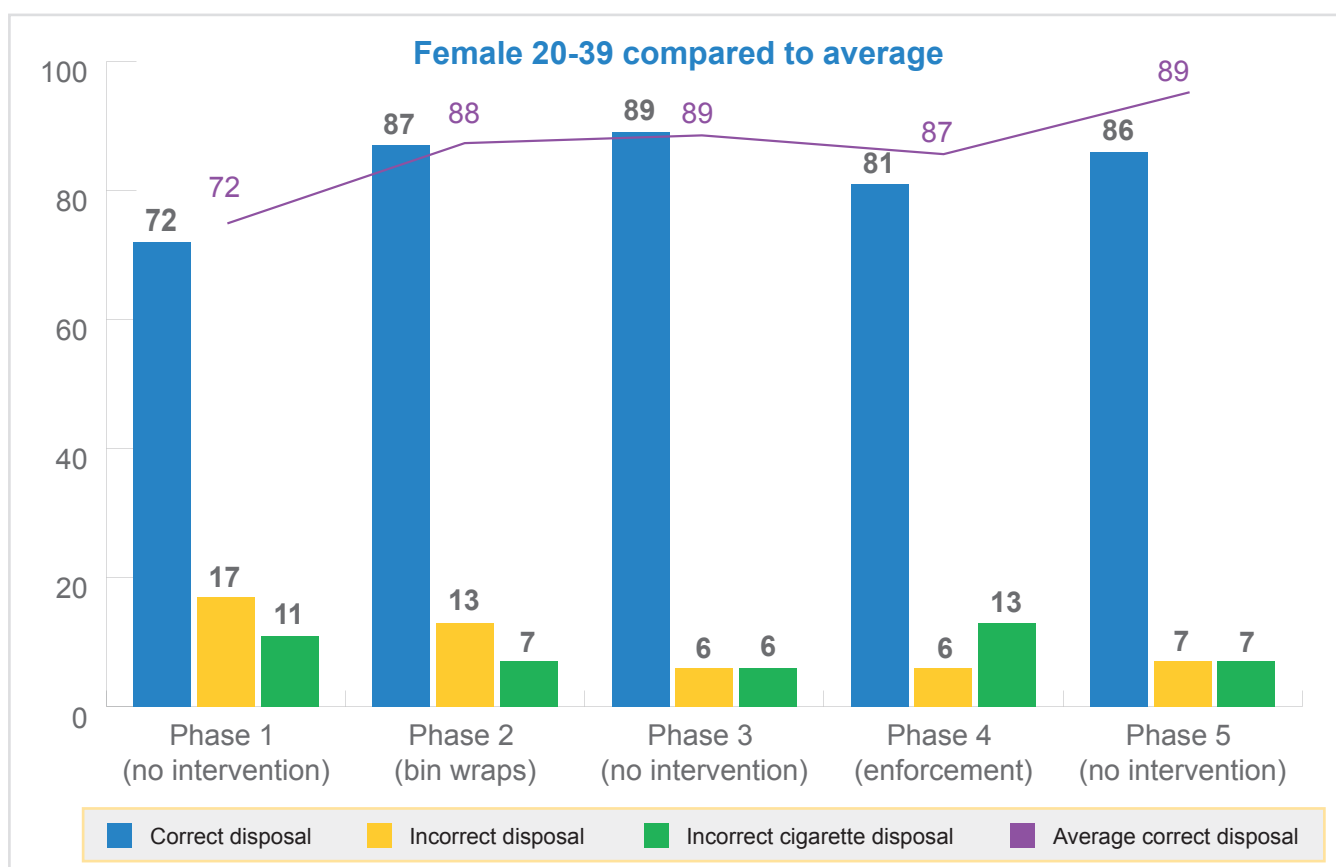
Female 12-19

Intervention phases 1, 4 and 5 all saw 100% correct disposal. The enforcement phase saw the lowest result at just 75%, 12% below the average for this phase.

There were no recorded incidents of cigarettes being disposed incorrectly on top of the bin.

Female 20-39

Correct disposal rose by 15% from phase 1 of no intervention to the bin wrap phase. It dropped during the enforcement phase to 6% below the average.



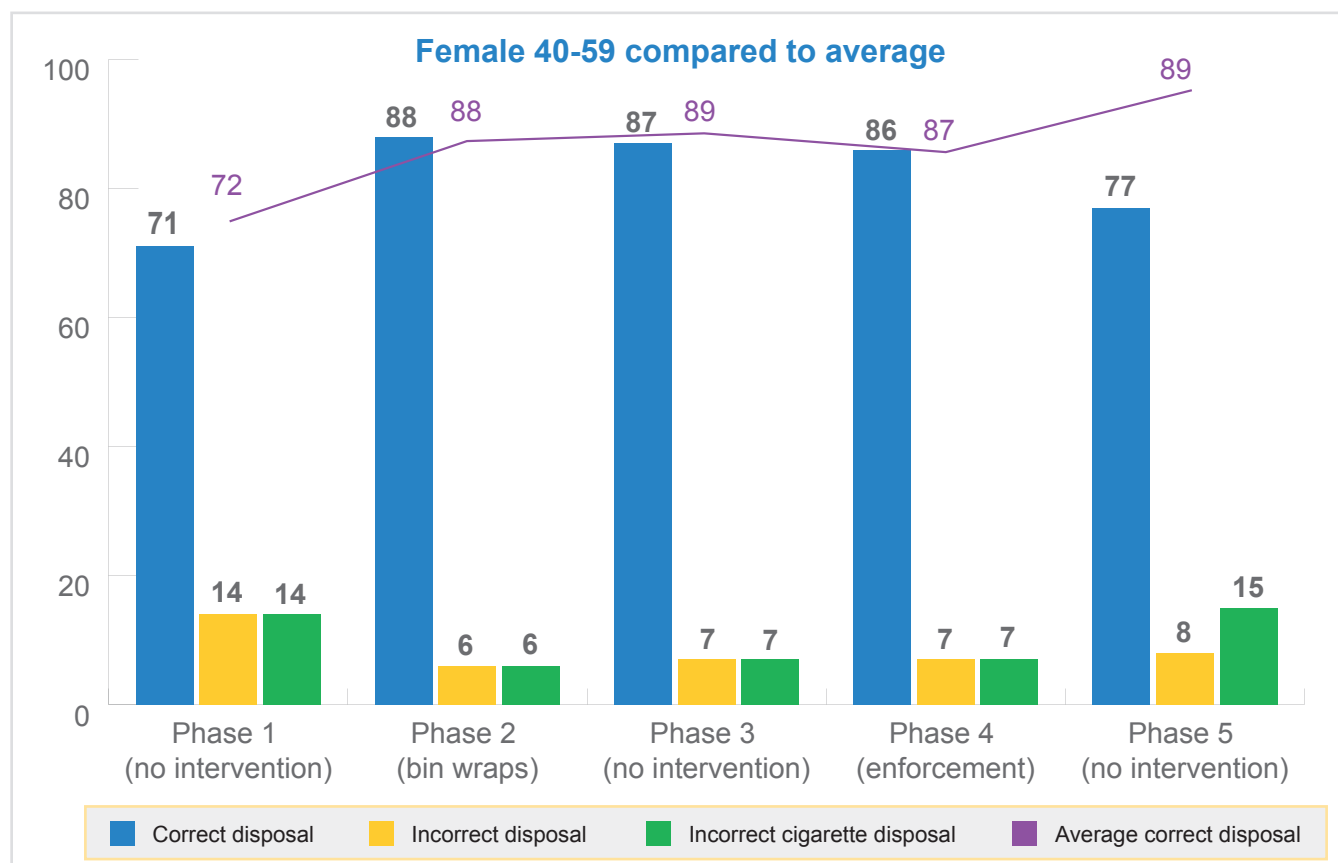
Correct disposal rose by 15% from phase 1 of no intervention to the bin wrap phase. It fell during the enforcement phase to 6% below the average.

Incorrect disposal was also at its highest in phase 1, remained high in the bin wrap phase, but dropped by half in the following weeks. Although it showed an overall improvement, incorrect disposal was higher than the average during each phase.

The enforcement phase saw the highest percentage of cigarettes left on top of bin 2, with the first intervention phase being the only one below the average.

Female 40-59

Correct disposal was at its lowest in the first phase of no intervention at 71%, but rose to 88% in the bin wrap phase. It was 1% below average during enforcement phase and dropped to a low of 77% in the final intervention phase.



Incorrect disposal was at its highest during the initial intervention phase and at its lowest during the bin wrap phase at 4% lower than the average. It gradually rose throughout the remaining phases.

The bin wrap phase saw the lowest number of cigarettes left on top of the bin. However, the final intervention phase was the highest of all the demographics at 15%, 9% above the average.

Female 60+

Phase 2 had the lowest recorded correct disposal compared to the other intervention phases. This was lower than the average during the bin wrap and enforcement phases, however higher than average during the three phases of no intervention, including 100% correct disposal during the final phase.

Incorrect disposal was below the average during phase one and the bin wrap phase and there were no recorded incidents during the following phases.

The highest recorded incidents of cigarettes left on top of the bin were recorded in the first phase at 15%, this reduced during the following two phases but rose to 14% in the enforcement week. This is 6% above the average.

Street litter monitoring results

The results from the monitoring of the eight transects are shown in the table below.

Intervention phase	Average items counted across each phase per week	% Compared to average across all weeks
Phase 1 – no intervention	1,016	-2.5
Phase 2 – bin wraps	1,197	14.9
Phase 3 – no intervention	967	-7.2
Phase 4 – increased enforcement	973	-6.7
Phase 5 – no intervention	1,056	1.4

The table above shows that phase 2 had the highest recorded number of litter items. The lowest recorded litter items were in phase 3 of no intervention, followed closely by phase 4 of enforcement.

These results show that there is little evidence that the interventions had an effect on people's behaviour outside of the intervention area. Other factors that will potentially have contributed to this are changes in local authority cleansing schedules and footfall differences.

Bin weights and usage

The table below shows the bin weights recorded during the monitoring period.

Intervention phase	Average weight (kg) per week across the phase	Average time bins were used across the three weeks
Phase 1 – no intervention	4	72
Phase 2 – bin wraps	2	90
Phase 3 – no intervention	4.2	101
Phase 4 – increased enforcement	3.4	80
Phase 5 – no intervention	3.5	76

Looking at the table above, the weight in the bins is not reflective of the number of times the bins were used across the intervention phases. For example, in the first week of monitoring, someone was witnessed depositing a pair of shoes in the bin adding a substantial amount of weight. During the bin wrap phase, despite it being the lowest recorded weight, the average number of deposits was the second highest across all of the phases, again proving no correlation between the two.

Public surveying results

Results from the public survey are shown in the table below.

Demographic	Total people	Do you think there is a problem with litter in Scotland's town centres?			Do you think making bins more prominent encourages use?			Do you think increasing the presence of enforcement officers decreases littering?		
		Yes	No	% Yes	Yes	No	% Yes	Yes	No	% Yes
Male 20-39	40	37	3	93	24	16	60	30	10	75
Female 20-39	20	16	4	80	17	3	85	14	6	70
Male 40-59	16	14	2	88	15	1	94	13	3	81
Female 40-59	38	29	9	76	17	21	45	25	13	66
Male 60+	19	19	0	100	11	8	58	15	4	79
Female 60+	17	14	3	82	4	13	24	14	3	82

Subsequent to the project, we asked members of the public three questions in order to capture their perception of littering in Scotland and the interventions conducted. By keeping the survey short, we aimed to capture as many results as possible.

The results show that of the total people asked, **86%** said there is an issue with littering in Scotland's town centres. **61%** said that making bins more prominent would increase usage and **76%** felt that increasing the presence of enforcement officers would deter people from littering.



Conclusions and key findings

Overall, we found an increase in correct disposal of litter during phase 2 of the project rising from the baseline average figure from phase 1. This increase then remained consistent throughout the project.

Therefore the introduction of interventions during the project had a positive effect on the use of public bins and the correct disposal of litter items.

However, it is unclear whether the bin wraps increased usage because people felt connected to the charities, or simply the visibility and repositioning of the monitored bins. 61% of people asked during the survey said they thought increasing the visibility of bins acts as an incentive to the correct disposal of litter.

Results show that certain demographics of people responded more to the increased enforcement in phase 4 as described below.

Males 20-39 showed the biggest behaviour change during the intervention phases, particularly the enforcement phase. During the enforcement phase, 91% disposed of their litter correctly, 4% above the average and the incorrect disposal of cigarettes on top of bin 2 was also at its lowest during this phase at 3% below the average. They also responded well to the bin wrap intervention showing an increase of 23% in correct disposal from the first phase. This demographic responded well to the short term intervention project. Males 40-59 also responded well to the intervention phase with 92% disposing of litter correctly during the bin wrap phase, 4% above the average and an increase of 27% from the first intervention. There were also no recorded incidents of dropping litter in this phase. During the enforcement phase, incidents of littering dropped by more than half from previous

phase. However, cigarettes on top of bin 2 rose to above the average. This could be attributed to people thinking that they have done the "right thing" by stubbing out their cigarette on the bin and not perceiving it as littering. More research around this theory would be beneficial.

Females between across the age ranges 20-60+ were all below the average for correct disposal during the enforcement phase and either below or equal to the average during bin wrap phase. From these results, females were less responsive to the intervention.

It should also be noted, that the weight of bins is not a good indicator of usage due to the differing weight of individual litter items. For example, one plastic bottle will weigh substantially more than a crisp packet. Therefore, the bin usage data collected is essential to this report.

The purpose of this project was to determine whether people are more likely to correctly dispose of litter if compelled by means of a good cause or if there is an increased risk of enforcement, the 'carrot' or 'stick'.

Results suggest that increasing the visibility of bins had a significant effect generally on correct disposal while increased visibility of enforcement had an effect on certain demographics but was less effective overall. Increasing the visibility of bins is a relatively cheap and easy process compared to increasing enforcement capacity so therefore can be not only more effective but also more sustainable.

Recommendations

Increasing the time frame of the project and, for example time, location and day of the week of observation would allow for a wider range of demographics to be observed and more robust data collected. Affluence, population density and SIMD areas will all influence results and the response to interventions, therefore changing the regularity of observation periods could allow a greater percentage of the population to be observed.

The results show that increasing the visibility of the bins influences people's behaviour towards correct disposal, but it is unclear whether this is down to positioning, colour or charitable incentive. It can be seen in town centres across Scotland that the positioning of bins often reflect the aesthetics of the area and street furniture, so it could be as simple as moving the bins into the public line of sight to encourage more usage. A standalone project focusing on bin visibility would provide more robust data.

Partners and funders

Thanks to Wrigley, Renfrewshire Council, ACCORD Hospice, Street Pastors and Quarriers.



Appendix

Street litter monitoring data - provided separately
Bin observation data - provided separately
Littering demographics data - provided separately
Bin weight data - provided separately

Keep Scotland Beautiful is the charity that campaigns, acts and educates on a range of local, national and global environmental issues to change behaviour and improve the quality of people's lives and the places they care for. We are committed to making Scotland clean, green and more sustainable.



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