



Beverage
Industry
Environment
Council

ACN 008 542 765

Understanding Littering Behaviour in Australia

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**Prepared for the
Beverage Industry Environment Council
A Community Change Consultants Report**

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June 1997

ISBN 0646326678

Printed on recycled paper

Acknowledgments

This report was funded by the Beverage Industry Environment Council and is the result of much hard work and perseverance on the part of Mr Peter Shmigel and the state managers and staff of the Beverage Industry Environment Council. The staff of Keep Australia Beautiful in every state and territory have given generously of their time and support in the identification of suitable litter sites. In particular Mr Phil Hurst has been encouraging and supportive throughout the development and implementation of the study.

The authors acknowledge that the report is the outcome of extensive data analysis undertaken by Ms Kim Burgess of Datatab. She conducted analyses on nearly 9000 observations and over 2,500 surveys, and her expertise and assistance in interpretation was invaluable. Kim was assisted by staff from Deakin University.

Others were important to the data gathering process. Ms Georgia Quinn conducted almost half of the interviews, while Ms Kim Abbott and Lisa Burgess provided assistance when it was required.

The authors wish to thank their families for putting up with the absences and the returns required by a national study.

Finally, the people of Australia gave of their time and themselves in responding to the survey. We believe their contribution has already made a difference, by improving our understanding of littering behaviour and the strategies required to prevent littering.

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Understanding Littering Behaviour in Australia

Executive Summary

Background

The national study of Australian littering behaviour reported here is the world's largest study of littering behaviour. It is also the first major study in any country to compare what people say about their littering behaviour with what they really do.

Once again the Beverage Industry Environment Council (BIEC) has continued to be the leading sponsor in the development of more effective litter reduction strategies. BIEC commissioned Community Change Consultants (CCC) to research these issues and increase our understanding of littering behaviour. CCC is a firm specialising in applying principles of psychology to connect people's attitudes and their behaviour in environmental issues.

CCC began their research with a review of the literature on littering behaviour using both Australian and overseas sources. This report should be read in conjunction with the review, because many of the predictions identified in the literature review have been tested in the research reported here. (Copies of the review 'Understanding Littering Behaviour: A Review of the Literature' by Curnow, Williams and Streker, 1997, are available from BIEC or CCC).

The review identified that the most serious gaps in research lay in the links between attitudes and behaviour, and in the development and assessment of strategies used to change littering behaviour.

Previously, strategies have been based on the findings of focus groups, questionnaires and interviews - methodologies which involve people talking about their littering. Almost no checks have been used to ensure that people's behaviour actually matched their reports.

The methodology used in this study was designed to address these issues, by using a combination of observational, attitudinal and behavioural approaches to research.

Between February and May of 1997, a research team visited the capital city of each Australian state and territory to look at littering behaviour in public places.

The team included observers and interviewers who recorded behaviour and attitudes, respectively. The team visited the locations selected for each city, such as parks and outdoor shopping malls, each was chosen because it was known to attract a large amount of litter.

In each site, when observers saw someone disposing of rubbish - either by littering or by putting it into a bin - they contacted the interviewers by two-way radio and described the person and their location. To reduce interviewer bias, they did not tell the interviewer whether the person had used the bin or had littered.

The interviewer intercepted the person and requested a four minute interview on environmental attitudes and littering behaviour. Among other things, the interviewer asked about the last occasion people had littered. (The interviewer did not reveal that their behaviour – either littering or disposing in a bin - had already been observed.)

Meanwhile, the observer recorded as much as possible about the incident, noting the object(s) involved, the location and time, the person's behaviour immediately before and after the incident, and the context in which the incident occurred.

A total of 8,968 observations were made during the study, with 23% of people observed being litterers. 2,694 interviews were conducted; 19% of these were with people who had been observed littering.

Major Findings

Littering Behaviour

Key findings on littering behaviour included:

- The process of disposing of unwanted items - either by binning or by littering - is more complex than has been previously recognised.
- While some people simply left litter behind, many litterers deliberately placed objects in a certain location.
- Many people do not seem to be consciously aware of the behaviours they exhibit with disposable objects.
- Australians use bins just over twice as often as they litter.
- There is no such thing as a littering 'type'. People of all ages and social backgrounds were observed littering and using bins appropriately.
- Women and men were equally likely to litter.
- The people least likely to litter were those aged under 15; all adults of all ages littered more than this group.
- People under the age of 25 were most likely to litter if they were in a group; people over the age of 25 were most likely to litter when they were alone.
- People aged 15 to 24 had slightly higher littering rates than other adults. However, when not in a group, people aged 15 to 24 had lower littering rates than other adults.
- Students and people who were not in current employment had higher than average littering rates.
- People with tertiary and post-graduate education had lower than average littering rates.
- A lack of bins was not a major factor in littering; most littering occurred within five metres of a bin. This was particularly the case for cigarettes.
- Bin use was most common between 11.00am and 2.00pm; littering was most common about 4:00pm.

- The most common disposable items observed were food wrap and containers, beverage containers, paper products and cigarettes. Of these, cigarettes were the most likely to be littered, while beverage containers were least likely to be littered.
- People were three times as likely to litter a cigarette as they were to put one into a bin. Conversely, they were three times as likely to put newspapers and other paper products into a bin as they were to litter them, and they were seven times as likely to put beverage containers into bins as they were to litter them.
- Over two hundred people were observed using a bin and littering. In most cases, this behaviour followed one of three patterns:
 - some of these ‘dual disposers’ littered before anyone spoke to them about environmental issues - afterwards, they changed their behaviour;
 - others binned the bulk of their items but appeared to forget or accidentally misplace small, light items (eg. putting an empty bottle into the bin but leaving the bottle cap on the bench); and,
 - the largest number appeared to consistently litter one type of object while binning other objects. Overwhelmingly, in these cases, it was cigarette butts that were littered while other objects were put into the bin.
- The study identified a large number of behavioural types associated with littering, including ‘wedgers’ (who stuff disposable objects into small spaces where they will not be seen, such as behind a seat), ‘undertakers’ (who bury disposable objects under sand or leaves) and ‘foul shooters’ (who aim for the bin but miss, and leave the object on the ground).

One of the most significant findings was that a simple two way split between ‘people who litter’ and ‘people who use bins’ is not the best way to characterise people’s disposal behaviour. In many cases, there appear to be greater differences between different sorts of littering and binning behaviour than there are between some people who litter and those who use bins.

Reported Behaviour and Attitudes Toward Disposal

The study's key findings on attitudes include:

- There were often major differences between the attitudes people expressed to interviewers and their disposal behaviour, as noted by the observers.
- There were also large differences between the way people reported and described their behaviour and their actual behaviour, as seen by the observers. 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 littered.
- People were asked if they considered cigarette butts to be litter. More than four out of five people observed littering cigarettes said that they did consider them to be litter.
- Young people were the group most likely to be frank about their littering behaviour, and women of all ages were a little more likely to be frank than men.
- Three quarters of people observed littering said that littering was a 'very important' or 'extremely important' environmental issue.
- Three quarters of all respondents said that it was 'never' acceptable to litter. However four out of every five respondents indicated they had littered at some time in their lives.

Respondents were asked the reasons why they littered; the most common response was 'laziness'.

Towards A New Agenda For Litter Prevention

The findings of this study give a number of clear indications for the future. Strategies based solely on increasing the number of available bins will not decrease most littering behaviour because most of the littering in this study occurred within five metres of a bin.

Equally, strategies based solely on making people feel guilty about littering are unlikely to affect most litterers. The study shows that guilt did not appear to be an effective deterrent for litterers.

However, a number of findings indicate the type of approaches which might be helpful, many coming from people interviewed in the study. Respondents were asked to think of ways to prevent littering, and they came up with a wide variety of suggestions, including:

- fines,
- improved parenting skills,
- advertising campaigns and
- people taking on more personal and community responsibility for littering. Some people said they were already trying to prevent people littering by personally challenging those they saw littering around them.

Recommended Framework for the Development of Prevention Strategies

Clearly, a range of approaches for preventing littering behaviour needs to be developed and implemented, to address the range of people, behaviours and contexts involved in littering.

Specifically, litter prevention strategies must:

- address littering behaviour in men and women of all ages and from all social groups;
- recognise the different littering patterns associated with different objects;
- recognise the different behavioural types associated with littering, from people who simply leave rubbish behind to those who carefully place it in some way; and,
- recognise that much littering behaviour occurs while the person is not fully aware of their actions.

Litter reduction strategies should be designed and implemented with behavioural change as a goal, and the success of strategies should be assessed by measuring changes in actual, observed behaviour rather than attitudes or self-reported behaviour.

Recommended Actions to Prevent Littering

Specific recommendations arising from the report include that:

- **Programs be developed to make people more aware of the processes involved in disposing of their objects and the behaviours associated with them (eg. 'wedging, foul shooting'), to better enable them to recognise and monitor their own behaviour.**
- **A media and public education campaign be developed which uses Australian cultural norms, harnessing the willingness of people to challenge the behaviour of their peers, and building on the Australian tradition of listening to mates.**
- **Initiatives be developed to address the proportion of littering which occurs at 'transition points', eg. when people are getting onto trams or buses. Such initiatives would include strategically placed bins and ashtrays at bus and tram stops etc. in conjunction with an attitude and education program.**
- **Special initiatives and campaigns be designed to target the littering of cigarettes, which were the objects most commonly littered in the study, and were associated with behavioural patterns which differed in important ways from all others observed. Such programs would require further understanding of the factors which differentiate cigarette smokers and their behaviour from other litterers.**
- **The design and placement of bins and ashtrays be re-examined to take into account the impact of collection frequency and 'herd' behaviour. (This study found many instances where bins were filled to overflowing, only a few metres away from bins that were almost empty.)**
- **Programs be piloted and effectively monitored to increase the effectiveness of away from home and public place recycling facilities, including improved signage, bin design, public education programs and the evaluation of contamination levels.**
- **The behavioural types identified in this report be further investigated, to determine the attitudinal and social factors associated with them, and to develop appropriately targeted litter reduction strategies to address them.**

- **Programs be established to assist parents to teach their children good binning habits. These were seen by many binners as having been critical in the formation of their good disposal behaviour.**
- **Litter prevention and reduction programs be evaluated using a combination of approaches to assessments including observationally measuring change in actual behaviour (given that there are often large differences between people's attitudes or self-reported behaviour and their real littering behaviour).**
- **Further research is required to develop and refine a number of the findings of this study, including further development of the model of disposal behaviour. Our understanding of disposal behaviour as a continuum is at a very early stage of development, and important work remains to be done in establishing the relationships between factors that influence littering and binning behaviour.**
- **Research is also required in areas which this study identified as important, but could not address adequately, such as the littering behaviour of people in rural areas or smaller centres throughout Australia, and the littering behaviour of people in vehicles and on beaches.**

Understanding Littering Behaviour in Australia

Background To The Report

- ***The national study reported here is the world's largest study of littering behaviour.***
- ***It is also the first major study to compare what people say about their littering behaviour with what they actually do.***
- ***The research team consisted of observers and interviewers, communicating with each other by two-way radio. Observers noted people's actual behaviour.***
- ***Interviewers investigated people's attitudes on environmental issues and self-reports of their littering behaviour. At the time of the interview, they did not know whether the person they were interviewing had littered or had used a bin.***
- ***At the end of the observation period, the interview and observations were linked, allowing comparison of attitudes, self-reported behaviour observations, and actual behaviour.***
- ***The research team spent six days in each capital city in Australia between February and May of 1997.***
- ***A total of 8,968 observations were recorded over the course of the study; 2,694 interviews were conducted.***

How This Study Began

The Beverage Industry Environment Council (BIEC) - a national organisation formed in 1978 by major Australian beer and soft drink producers and suppliers of glass, aluminium and plastic containers - continuously sponsors the development of more effective litter reduction strategies. It has supported a number of innovative programs for litter reduction and has continually led the field by sponsoring objective research and program evaluations.

The BIEC commissioned Community Change Consultants (CCC), a firm specialising in applying principles of psychology to connect people's attitudes and their behaviour in environmental issues, to research these issues and increase our understanding of littering behaviour.

CCC began their research with a review of the literature on littering behaviour using both Australian and overseas sources. The review should be read in conjunction with this report, which provides evidence for many of the predictions identified in the literature review. (Copies of the review 'Understanding Littering Behaviour: A Review of the Literature' by Curnow, Williams and Streker, 1997, are available from BIEC or CCC).

The review identified that the most serious gaps in research lay in the links between attitudes and behaviour, and in the development and assessment of strategies used to attempt to change littering behaviour.

Many strategies were based on findings from focus groups and surveys whose methodology involved getting people to talk about their behaviour. Almost no checks were conducted to ensure that people's behaviour matched their reports.

The research showed that most previous work on littering in Australia had either measured litter (the outcome of littering behaviour) or concentrated on attitudes to littering and the environment. Little work had focussed on littering behaviour. Ideas on who litters and why were obtained by asking people about their own beliefs and behaviour, although such information is not always reliable.

To determine facts about people's behaviour, it was necessary to actually observe it. While some observational studies of littering had been conducted overseas, there had never been a major observational study conducted in Australia, and most of the studies conducted overseas had been relatively small.

Many of these smaller studies had come up with conflicting findings. Some found that younger people littered more than older people, or that women littered less than men, while others found that older people littered more, or that there was no difference in the littering rate of men and women.

None had established whether there were specific days of the week or times of day when littering was more likely, and few provided the sort of information needed to devise effective strategies for litter reduction or prevention.

More importantly, there were few applied studies and these were of little use in developing effective litter reduction strategies in the Australian context.

Following the literature review, BIEC decided to fund a study of littering behaviour in Australia. It would be the largest and most comprehensive national study of its type in the world.

The study was to look at both behaviour and attitudes, and at the relationship between them. Furthermore, the study would look at a range of disposal behaviours and importantly would study people who used bins, as well as, people who littered, to determine the attitudinal and behavioural differences between them.

People would be observed in public places, primarily located in the downtown areas of the Australian capital cities. Observers would attempt to be inconspicuous to ensure that the behaviour they observed was as natural as possible.

The results would provide a statistical benchmark of littering behaviour, against which the effectiveness of future litter reduction strategies could be measured.

Methodology

The methodology designed to meet these goals involved a team of four people: two observers and two interviewers.

Observers placed themselves in a variety of locations in each city, such as parks and outdoor shopping malls, looking for places where they would not be noticeable. When they observed someone disposing of rubbish - either by littering it or by putting it into a bin, they contacted the interviewers by two-way radio, describing the person and their location. To reduce interviewer bias, they did not tell the interviewer whether the person had used the bin or had littered.

The interviewer intercepted the person and conducted a four minute interview on environmental attitudes and littering behaviour. Among other questions, people were asked about the last occasion they had littered. (The interviewer did not reveal that their behaviour had already been observed – either littering or disposing in a bin).

Meanwhile, the observer recorded as much as possible about the incident, noting the object(s) involved, the location and time, the person's behaviour immediately before and after the incident, and the context in which the incident occurred.

Two months were spent in piloting and refining the methodology and the questionnaire; over forty pilot interviews were conducted.

One of the biggest challenges for the methodology was finding a balance between the need to observe from a good vantage point and to provide interviewers with as many people as possible, with the need to remain inconspicuous so that the 'naturalness' of the site was undisturbed.

Observers and interviewers worked out a number of strategies to achieve this balance which included:

- carrying the interviewers' radios in backpacks so that only the earpieces showed (making it look as if the interviewers were listening to music);
- putting number keys on the observers' radios so that they looked more like mobile telephones;
- hiding the observer sheets where observations were recorded inside tourist brochures and novels; and,
- observers wearing sunglasses (whenever possible) to conceal the direction of their glances.

The observers field-tested their observational strategy in a variety of sites in Brisbane, Mornington and Melbourne. By the time they went into the field for the study, they had achieved an inter-observer reliability rate of 95%, ensuring that events would be recorded in the same way by each observer.

The interviewers also conducted litter counts at each site immediately before and after the observation period. By the time they went into the field, they had also achieved a reliability rate of 95% in litter counts.

The research team spent six days in each city. Five days were spent conducting observations and interviews. The first day was taken up with site selection and in determining any local factors which might affect the research.

For example, certain sizes of soft drink bottles were made of plastic in some states and of glass in other states. Since the observers coded glass and plastic bottles separately, they had to determine such factors in advance. Also, as certain sites contained recycling bins, observers had to determine in advance which sorts of recyclable containers were appropriate for each bin, so that they could note in their observations whether objects were disposed of appropriately.

Ten sites were used as observation sites in each city. Six of these were 'core sites', observed for three hours each:

- two shopping precincts;
- one mall;
- a park;
- a waterfront site; and,
- a public building. (Further details of these sites are in Appendix A.)

Whenever possible, each site was observed at different times of day; for example, one hour in the morning, one at lunchtime and one late in the afternoon.

Four 'special sites' in each city were observed for a single one hour period. They tended to be:

- local markets,
- sporting events such as an Indy race in Brisbane or a football match in Adelaide, and,
- scenic locations emblematic of each city, such as Mount Nelson in Hobart, the Botanic Gardens in Canberra or Bondi Beach in Sydney.

The choice of sites required balancing a number of factors, including the likelihood of finding litterers at a site, the ease of getting to a site and its distance from other sites, and whether it would be possible to interview people at the site. (Sites such as closed markets and indoor malls would have involved interviewing on private property and consequently were eliminated.)

The observers conducted two types of observations. As well as observing disposal patterns, they also estimated the age and noted the gender of all people present in the observation site during the hour. This enabled them to determine whether certain types of people were more likely to have disposable objects at particular times of the day.

A total of 8,968 observations were made, and 2,694 interviews were recorded over the course of the study. The state by state breakdown of the data collected is shown below in Table 1.

People responded very well to the request for an interview and a high overall response rate was recorded. The rate of refusals for people observed littering was 21% while the rate for people observed using bins was 20%.

Table 1 Summary of Key Features of the Research

CITY	MONTH	# OF OBS'NS	# SURVEYED	SPECIAL EVENTS
Hobart	February	1,050	321	Labour Day
Melbourne	March	1,142	301	Moomba
Canberra	March	1,143	362	Canberra Festival
Sydney	March	1,144	359	none
Brisbane	April	1,262	397	Indy races
Adelaide	April	1,122	382	Football derby
Perth	April	1,041	332	Anzac Day
Darwin*	May	1,064	240	May Day
8 Cities	3 months	8,968	2,694	

*Prorated Darwin figures. The research team in Darwin consisted of only one observer and one interviewer; numbers have been doubled to compensate.

Findings One: State Summaries

The main features of the research findings for each state have been described in order for people to gain a greater insight into essential issues and factors in each region of Australia.

The order of reporting the most important environmental issues and the groups considered most likely to litter in each state reflects the priority given by the people interviewed in each state.

State Summary Tasmania - Hobart

Observers and interviewers visited Tasmania between 26 February and 3 March. Ten sites were observed, for a total of 22 hours.

Six sites were observed for three hours, spread over five days: Constitution Dock, the park at Salamanca Place, shopping areas on Liverpool and Murray Streets, the Elizabeth Street Mall, and the main transit centre outside the GPO.

Four sites were observed for one hour each: Salamanca Market, the Mount Nelson lookout, Kingston Beach during a special festival, and Franklin Square.

Table 2 shows the proportion of people interviewed and observed in Tasmania - with their gender, age, activity, employment status and educational background.

The most important environmental issue cited in Tasmania was 'water pollution' or 'loss of forests'; 78% of people also felt that littering was a 'very' or 'extremely' important issue, and 81% said it was 'never' acceptable to litter. 59% of respondents thought Hobart was less littered than other cities.

When asked who was most likely to litter, Tasmanians were most likely to reply 'teenagers' or 'anybody at all'. They suggested that 'improved bins'(ie. bins cleared more often or more bins), 'community education programs' and 'fines' would be the best ways to stop people from littering.

In Tasmania 21% of people observed were observed littering. When interviewers asked them to tell about the last time they littered, 50% said that they had not littered in the last 24 hours and 4% said that they could not remember the last time they littered.

People who admitted littering at some point in their lives were most likely to say that 'no bins nearby' or 'laziness' was the reason they had littered.

Table 2 Research Summary for Tasmania

	Observed	Interviewed	Observed littering	Observed using a bin
Total	1050	321	224	368
Males	53%	50%	59%	49%
Females	47%	50%	41%	51%
<15	3%	1%	1%	4%
15-24	38%	39%	45%	36%
25-34	19%	21%	15%	18%
35-44	15%	14%	15%	14%
45-54	14%	13%	14%	15%
>54	12%	13%	10%	13%
Eating	26%	17%	12%	35%
Drinking	17%	13%	4%	23%
Smoking	26%	24%	70%	9%
Mixed, other**	30%	45%	14%	33%

Figures below refer only to people interviewed.

Employed *	60%	60%	57%	64%
Not employed	8%	8%	16%	6%
Retired	6%	6%	1%	7%
Student	25%	25%	26%	24%
Secondary education	66%	66%	81%	60%
Tertiary education	33%	33%	19%	37%

* Includes full and part-time employment, self-employment and home duties

** Includes people doing any combination of the above, as well as people doing none of these activities

State Summary Victoria - Melbourne

Observers and interviewers visited Melbourne between 5 March and 10 March, during Moomba. Ten sites in the city were observed, for a total of 22 hours.

Six sites were observed for three hours, spread over five days: Flinders Street Station, the Bourke Street Mall, the area outside the GPO, an area on the banks of the Yarra where waterskiing competitions were going on, an area of Alexandra Gardens filled with takeaways and children's rides, and the steps opposite Melbourne Central Station.

Four sites were observed for one hour each: Victoria Market, City Square, Southgate and Lygon Street.

Table 3 shows the proportion of people interviewed and observed in Victoria - with their gender, age, activity, employment status and educational background.

People in Melbourne were most likely to say 'water pollution' or 'air pollution' was the most important environmental issue in the state.

Around 84% of people also felt that littering was a 'very' or 'extremely' important issue, and 79% said it was 'never' acceptable to litter. 52% of respondents felt that Melbourne was less littered than other cities.

When asked who was responsible for most likely to litter, Victorians were most likely to reply 'teenagers' or 'could be anybody'. They suggested that 'improved bins' (ie. bins cleared more often or more bins), 'community education programs' and 'fines' would be the best ways to stop people from littering.

Nearly 26% of people observed in Melbourne were observed littering. When interviewers asked them to tell about the last time they littered, 54% said they had not littered in the last 24 hours, and 3% said that they could not remember the last time they had littered. (The interviewers did not reveal that their behaviour had been observed.)

People who admitted littering at some point in their lives were most likely to say that 'no ashtray/bins nearby' or 'laziness' was the reason that they had littered.

Table 3 State Summary for Victoria

	Observed	Interviewed	Observed littering	Observed using a bin
Total	1142	301	296	553
Males	57%	56%	61%	56%
Females	43%	44%	39%	44%
<15	7%	1%	2%	12%
15-24	27%	36%	25%	23%
25-34	25%	29%	28%	23%
35-44	22%	21%	24%	23%
45-54	12%	9%	13%	11%
>54	7%	5%	8%	7%
Eating	34%	27%	9%	54%
Drinking	17%	15%	5%	19%
Smoking	26%	27%	68%	7%
Mixed, other**	23%	31%	18%	21%

Figures below refer only to people interviewed.

Employed*	65%	65%	63%	59%
Not employed	6%	6%	9%	5%
Retired	4%	4%	5%	4%
Student	25%	25%	23%	31%
Secondary education	45%	45%	52%	46%
Tertiary education	54%	54%	46%	54%

* Includes full and part-time employment, self-employment and home duties

** Includes people doing any combination of the above, as well as people doing none of these activities

Summary Australian Capital Territory - Canberra

Observers and interviewers visited Canberra between 12 March and 17 March, during the Canberra Festival. Ten sites were observed for a total of 22 hours.

Six sites were observed for three hours each, spread over five days: Garema Place and two other shopping areas in Civic, the Woden transit centre, Glebe Park, and the shore of Lake Burley Griffin.

Four sites were observed for one hour each: Gorman House Market, the National Botanic Gardens, the Food and Wine Festival and the balloon festival breakfast on the lawns between Lake Burley Griffin and Old Parliament House.

Table 4 shows the proportion of people interviewed and observed in the ACT - with their gender, age, activity, employment status and educational background.

People in Canberra were most likely to say that 'water pollution' or 'litter' was the most important environmental issue in the Territory.

Nearly 80% of people also felt that littering was a 'very' or 'extremely' important issue, and 72% said it was 'never' acceptable to litter, while 80% of respondents felt that Canberra was less littered than other cities.

When asked who was most likely to litter, Canberrians were most likely to reply 'teenagers' or 'could be anybody'. They suggested that 'improved bins' (ie. bins cleared more often or more bins), 'fines' and 'community education programs' would be the best ways to stop people from littering.

25% of people observed in Canberra were observed littering. When interviewers asked them to tell about the last time they littered, 44% said they had not littered in the last 24 hours, and 5% said that they could not remember the last time they had littered. (The interviewers did not reveal that their behaviour had been observed.)

People who admitted littering at some point in their lives were most likely to say that 'laziness' or 'inconvenience' was the reason that they had littered.

Table 4 Research Summary for the Australian Capital Territory

	Observed	Interviewed	Observed littering	Observed using a bin
Total	1143	362	292	512
Males	49%	44%	49%	52%
Females	51%	56%	51%	48%
<15	5%	1%	3%	6%
15-24	30%	40%	38%	21%
25-34	29%	30%	27%	30%
35-44	19%	16%	16%	22%
45-54	10%	6%	9%	12%
>54	6%	7%	7%	7%
Eating	28%	18%	8%	41%
Drinking	21%	19%	5%	22%
Smoking	23%	25%	67%	6%
Mixed, other**	29%	38%	19%	31%

Figures below refer only to people interviewed

Employed*	60%	60%	59%	61%
Not employed	11%	11%	13%	11%
Retired	5%	5%	2%	6%
Student	24%	24%	26%	21%
Secondary education	50%	50%	59%	50%
Tertiary education	42%	42%	39%	48%

* Includes full and part-time employment, self-employment and home duties

** Includes people doing any combination of the above, as well as people doing none of these activities

State Summary New South Wales - Sydney

Observers and interviewers visited Sydney between 19 April and 24 April. Ten sites were observed for a total of 22 hours.

Six sites were observed for three hours each, spread over five days: Circular Quay, Darling Harbour, Hyde Park, Martin Place, the Pitt Street Mall and a shopping area on Alfred Street.

Four sites were observed for one hour each: Paddington Market, Bondi Beach, Centennial Park and a particularly littered area on George Street.

Table 5 shows the proportion of people interviewed and observed in New South Wales - with their gender, age, activity, employment status and educational background.

People were asked to name the most important environmental issue in their state. People in Sydney were most likely to say 'air pollution' or 'water pollution'.

Nearly 69% of people also felt that littering was a 'very' or 'extremely' important issue, and 79% said it was 'never' acceptable to litter. Overall, 51% of respondents felt that Sydney was less littered than other cities.

When asked who was most likely to litter, Sydneysiders were most likely to reply 'could be anybody' or 'teenagers'. They suggested that 'improved bins' (ie. bins cleared more often or more bins), 'fines' and 'community education programs' would be the best ways to stop people from littering.

21% of people observed in New South Wales were observed littering. When interviewers asked them about the last time they littered, 31% said they had not littered in the last 24 hours, and 2% said that they could not remember the last time they had littered. (The interviewers did not reveal that their behaviour had been observed.)

People who admitted littering at some point in their lives were most likely to say that 'laziness' was the reason that they had littered.

Table 5 State Summary for New South Wales

	Observed	Interviewed	Observed littering	Observed using a bin
Total	1144	359	243	607
Males	56%	52%	56%	57%
Females	44%	48%	44%	43%
<15	2%	0%	0%	2%
15-24	18%	25%	16%	18%
25-34	35%	44%	36%	33%
35-44	20%	16%	22%	21%
45-54	12%	7%	14%	14%
>54	12%	9%	12%	13%
Eating	25%	21%	7%	36%
Drinking	24%	23%	5%	27%
Smoking	24%	19%	67%	10%
Mixed, other**	24%	31%	19%	24%

Figures below refer only to those people interviewed

Employed *	69%	69%	65%	75%
Not employed	15%	15%	4%	2%
Retired	8%	8%	10%	11%
Student	16%	16%	15%	14%
Secondary education	41%	41%	50%	41%
Tertiary education	59%	59%	50%	59%

* Includes full and part-time employment, self-employment and home duties

** Includes people doing any combination of the above, as well as people doing none of these activities

State Summary Queensland - Brisbane

Observers and interviewers visited Queensland between 2 April and 7 April. Ten sites were observed for a total of 22 hours.

Six sites were observed for three hours each, spread over five days: a small park facing the GPO, two areas within the Elizabeth Street Mall, the area surrounding the corner of Albert Street and Queen Street, Southbank, and Surfers Paradise Beach.

Four sites were observed for one hour each: Riverside Market, the Mount Coot-Tha Botanical Gardens, and two sites within the Indy car race track - one near the front gate where there were a number of takeaways, and another on a hill overlooking the track where many people were having drinks.

Table 6 shows the proportion of people interviewed and observed in Queensland - with their gender, age, activity, employment status and educational background.

People were asked to name the most important environmental issue in their state. People in Queensland were most likely to say 'air pollution' or 'water pollution'.

Nearly 71% of people also felt that littering was a 'very' or 'extremely' important issue, and 72% said it was 'never' acceptable to litter. 66% of respondents felt that Brisbane was less littered than other cities.

When asked who was most likely to litter, Queenslanders were most likely to reply 'could be anybody' or 'teenagers'. They suggested that 'improved bins' (ie. bins cleared more often or more bins), 'fines' and 'community education programs' would be the best ways to stop people from littering.

Around 26% of people observed in Queensland were observed littering. When interviewers asked them to tell about the last time they littered, 35% said they had not littered in the last 24 hours, and 16% said that they could not remember the last time they littered. (The interviewers did not reveal that their behaviour had been observed.)

People who admitted littering at some point in their lives were most likely to say that 'laziness' or 'no bin nearby' was the reason that they had littered.

Table 6 State Summary for Queensland

	Observed	Interviewed	Observed littering	Observed using a bin
Total	1262	397	323	662
Males	52%	46%	51%	56%
Females	48%	54%	49%	44%
<15	5%	1%	1%	7%
15-24	29%	36%	35%	26%
25-34	28%	29%	31%	27%
35-44	22%	21%	20%	24%
45-54	10%	9%	8%	10%
>54	5%	5%	5%	5%
Eating	20%	19%	7%	28%
Drinking	28%	23%	13%	29%
Smoking	23%	22%	50%	11%
Mixed, other**	29%	35%	29%	32%

Figures below refer only to people interviewed

Employed*	60%	60%	54%	59%
Not employed	10%	10%	15%	9%
Retired	4%	4%	2%	4%
Student	27%	27%	29%	29%
Secondary education	56%	56%	58%	54%
Tertiary education	41%	41%	40%	43%

* Includes full and part-time employment, self-employment and home duties

** Includes people doing any combination of the above, as well as people doing none of these activities

State Summary South Australia - Adelaide

Observers and interviewers visited Adelaide between 16 April and 21 April. Ten sites were observed for a total of 22 hours.

Six sites were observed for three hours each, spread over five days: Hindmarsh Park, two areas at opposite ends of the Rundle Street Mall, the area outside the State Library and War Memorial, Glenelg foreshore and a shopping area in Glenelg.

Four sites were observed for one hour each: the East End market, a site on the banks of the river, and two areas by the football stadium on the day of the Crows-Port Power match - one area in the car park where many people were having picnics and barbecues, and another close to the front gate where a radio station was giving away hot dogs and cans of soft drinks.

Table 7 shows the proportion of people interviewed and observed in South Australia - with their gender, age, activity, employment status and educational background.

People were asked to name the most important environmental issue in their state. People in South Australia were most likely to say 'water pollution' or 'air pollution'.

Overall 77% of people felt that littering was a 'very' or 'extremely' important issue, while 70% felt that Adelaide was less littered than other cities.

Nearly 75% of respondents in South Australia said it was never acceptable to litter. However, 82% admitted littering at some point during their lives.

When asked who was most likely to litter, South Australians were most likely to reply 'could be anybody' or 'teenagers'. They suggested that 'fines', 'improved bins' (ie bins cleared more often or more bins) and 'community education programs' would be the best ways to stop people from littering.

Around 20% of people observed in South Australia were observed littering. When interviewers asked them to tell about the last time they littered, 35% of them said they had not littered in the last 24 hours, and 13% said that they 'didn't know' when they had last littered. (The interviewers did not reveal that their behaviour had been observed.)

Few people who admitted littering at some point in their lives were able to come up with a reason; a few said that 'laziness' was the explanation for their littering.

Table 7 State Summary for South Australia

	Observed	Interviewed	Observed littering	Observed using a bin
Total	1121	382	229	589
Males	49%	49%	55%	48%
Females	51%	51%	45%	52%
<15	6%	1%	2%	8%
15-24	28%	37%	27%	27%
25-34	23%	23%	31%	21%
35-44	22%	21%	24%	22%
45-54	11%	10%	11%	12%
>54	9%	8%	6%	10%
Eating	29%	24%	13%	37%
Drinking	20%	16%	7%	22%
Smoking	19%	20%	51%	20%
Mixed, other**	31%	38%	28%	30%

Figures below refer only to people interviewed

Employed*	54%	54%	64%	49%
Not employed	9%	9%	7%	11%
Retired	5%	5%	1%	9%
Student	32%	32%	27%	32%
Secondary education	58%	58%	68%	51%
Tertiary education	42%	42%	32%	49%

* Includes full and part-time employment, self-employment and home duties

** Includes people doing any combination of the above, as well as people doing none of these activities

State Summary Western Australia - Perth

Observers and interviewers visited Western Australia between 22 April and 28 April. Ten sites were observed for a total of 22 hours.

Six sites were observed for three hours each, spread over five days: Esplanade Park in Fremantle, the area outside the Perth GPO, the beach area of Rottnest Island, and shopping areas on Hay, Murray and Barrack Streets.

Four sites were observed for one hour each: Fremantle Market, Cottesloe Beach, Scarborough Beach and the shopping area of Rottnest Island.

Table 8 shows the proportion of people interviewed and observed in Western Australia - with their gender, age, activity, employment status and educational background.

People were asked to name the most important environmental issue in their state. People in Western Australia were most likely to say 'water pollution' or 'air pollution'.

Around 76% of respondents thought that Perth was less littered than other cities. 84% of people felt that littering was a 'very' or 'extremely' important issue, and 77% felt that it was 'never' acceptable to litter.

When asked who was most likely to litter, Western Australians were most likely to reply 'teenagers' or 'could be anybody'. They suggested that 'improved bins' (ie. bins cleared more often or more bins), 'fines' and 'community education programs' would be the best ways to stop people from littering.

Nearly 23% of people observed in Western Australia were observed littering. When interviewers asked them about the last time they littered, 21% said they had not littered in the last 24 hours, and 18% said they could not remember the last time they littered. (The interviewers did not reveal that their behaviour had been observed.)

People who admitted littering at some point in their lives were most likely to say that 'laziness' or 'no bin nearby' was the reason they had littered.

Table 8 State Summary for Western Australia

	Observed	Interviewed	Observed littering	Observed using a bin
Total	1041	332	236	605
Males	53%	48%	57%	53%
Females	47%	52%	43%	47%
<15	7%	1%	2%	9%
15-24	34%	42%	37%	34%
25-34	21%	23%	25%	21%
35-44	22%	23%	20%	21%
45-54	8%	6%	8%	9%
>54	6%	5%	7%	6%
Eating	34%	31%	12%	43%
Drinking	18%	15%	5%	23%
Smoking	21%	17%	67%	8%
Mixed, other**	26%	36%	16%	26%

Figures below refer only to people interviewed

Employed*	54%	54%	39%	61%
Not employed	10%	10%	20%	8%
Retired	4%	4%	1%	4%
Student	32%	32%	39%	27%
Secondary education	58%	58%	68%	47%
Tertiary education	42%	42%	32%	53%

* Includes full and part-time employment, self-employment and home duties

** Includes people doing any combination of the above, as well as people doing none of these activities

Summary Northern Territory - Darwin

Observers and interviewers visited the Northern Territory between 30 April and 5 May.

Six sites were observed for three hours each, spread over five days: Wandil Beach, an area on Knuckey Street, Darwin Plaza and another area within the Smith Street Mall, Tamarind Park and a Saturday Market.

Four sites were observed for one hour each: the Rapid Creek Market, the esplanade park and beach area, the wharf and a shopping and eating area on Smith Street.

Table 9 shows the proportion of people interviewed and observed in the Territory - with their gender, age, activity, employment status and educational background.

People were asked to name the most important environmental issue in their state or territory. People in Darwin were most likely to say 'water pollution' or 'air pollution'.

Nearly 69% of respondents thought that Darwin was less littered than other cities. However, 94% of people also felt that littering was a 'very' or 'extremely' important issue, and 73% said that it was 'never' acceptable to litter. 72% of Territorians interviewed did admit littering at some point in their lives.

When asked who was most likely to litter, people in Darwin were most likely to reply 'could be anybody' or 'teenagers'. The most common suggestion for preventing littering was 'community education programs', followed by 'improved bins' and 'fines'.

Around 25% of people observed in Darwin were observed littering. When interviewers asked them about the last time they littered, 22% said they had not littered in the last 24 hours, and 22% said that they could not remember the last time they littered. (The interviewers did not reveal that their behaviour had been observed.)

People who admitted littering at some point in their lives were most likely to say that they 'didn't know' or that 'laziness' was the reason they had littered.

Table 9 State Summary for the Northern Territory

	Observed	Interviewed	Observed littering	Observed using a bin
Total	1064	240	268	692
Males	58%	64%	57%	58%
Females	42%	35%	43%	52%
<15	3%	0%	1%	4%
15-24	18%	25%	13%	21%
25-34	31%	38%	33%	28%
35-44	24%	22%	32%	23%
45-54	15%	8%	12%	17%
>54	7%	7%	7%	7%
Eating	27%	19%	12%	35%
Drinking	22%	19%	7%	23%
Smoking	18%	17%	43%	10%
Mixed, other**	34%	44%	38%	31%

Figures below refer only to people interviewed

Employed*	70%	70%	58%	77%
Not employed	17%	17%	27%	10%
Retired	5%	5%	0%	10%
Student	7%	7%	15%	4%
Secondary education	70%	70%	65%	69%
Tertiary education	30%	30%	35%	31%

* Includes full and part-time employment, self-employment and home duties

** Includes people doing any combination of the above, as well as people doing none of these activities

Findings Two: Littering Behaviour

The findings of the observational portion of the study provide information to indicate who litters, what is littered, where and when littering occurs and the processes involved in littering behaviour. The section does not focus exclusively on littering, but looks at a number of disposal strategies.

One of the key findings of this study is that making a rigid two-way distinction between 'littering' and 'using a bin' may not be the most useful approach to developing effective litter reduction strategies.

Who Litters? Who Uses Bins?

- ***Australians of all ages (male and female) were more likely to use bins than to litter.***
- ***There were no significant differences in littering behaviour between females and males.***
- ***The people least likely to litter were those aged under 15 years; all adults in all age groups littered more than this group.***
- ***People under 25 years were likely to litter if they were in a group.***
- ***People over 25 years were most likely to litter if they were alone.***
- ***People aged 15 to 24 years had slightly higher littering rates than all other adults. However, when not in a group, people aged 15 to 24 had lower littering rates than other adults.***
- ***Tertiary and post-graduate education were associated with lower rates of littering; primary and secondary education with higher rates of littering.***
- ***Full and part-time employment, home duties and retirement were associated with lower rates of littering; being a student and being without current employment were associated with higher rates.***
- ***There is no clear line between 'litterers' and 'binners'. Many people both littered and used bins in the space of an hour.***

People have long speculated as to whether men or women were more inclined to litter, and whether certain age groups were likely to litter than others. Some studies based on people talking about littering indicated that certain types of people were more likely to litter than others. Young people, males and blue-collar workers have often been cited as litterers.

A number of researchers overseas who conducted observational studies had expressed doubts about these findings. However, their studies were too small to establish definitively which (if any) groups based on age, gender, etc. were more likely to be the type to litter.

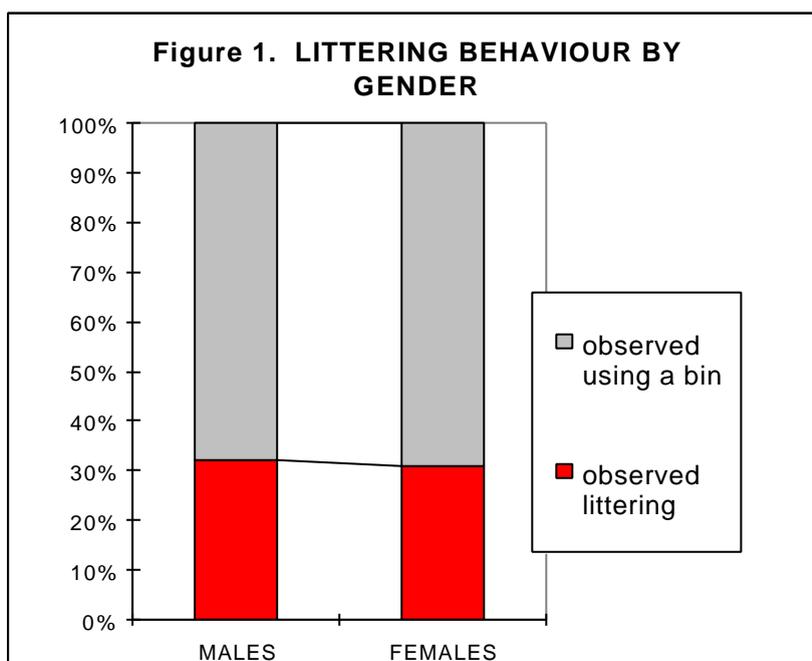
A key finding of this study was that there is no such thing as a littering 'type'. Observers saw executives littering, while skinheads with tattoos carefully packed up all of their items and carried them to a bin when one was not near their picnic spot.

There were, however, a number of patterns that did emerge from the data.

Australians of all ages - both male and female - were more likely to use bins than to litter. This held true for people occupied with home duties, for those who were employed full or part-time or were not currently employed, and for people of all educational backgrounds.

This is an important finding, given that much of the attention from people involved in the field focuses only on the litterers. Overall, people were just over twice as likely to put objects into bins as they were to litter them.

Men and women were equally likely to litter, as shown in the chart below.

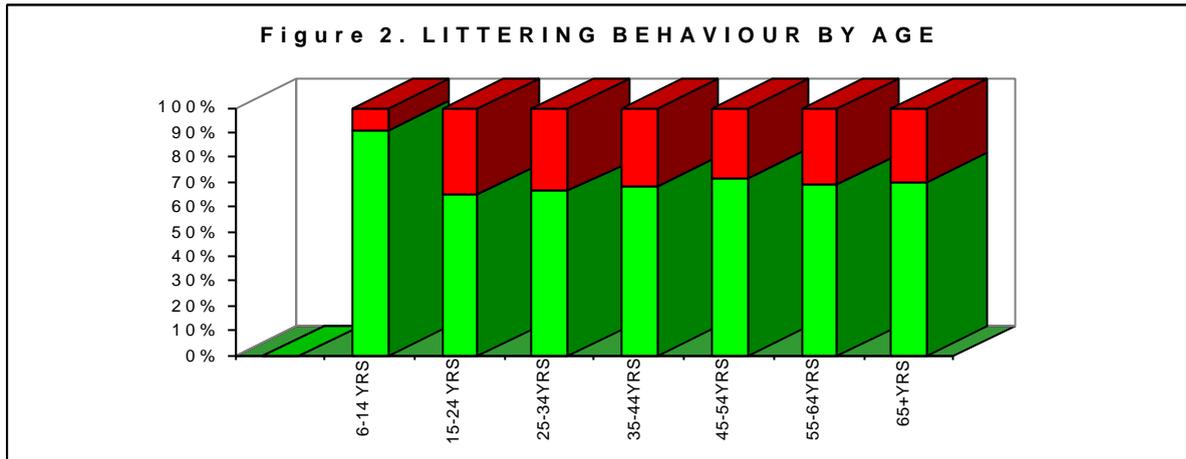


There were age differences in littering behaviour, although these were not what might have been expected based on some of the previous research studies and public opinion.

Although almost a third of people interviewed said that 'anyone' was likely to litter, 'teenagers' were nominated by 26% of people as the group next most likely to litter.

In fact, the observations showed that teenagers and children aged less than 15 were the group least likely to litter; even people aged over 65 littered more often than this group.

The chart below shows the relative proportions of littering and binning observed in people of different ages.



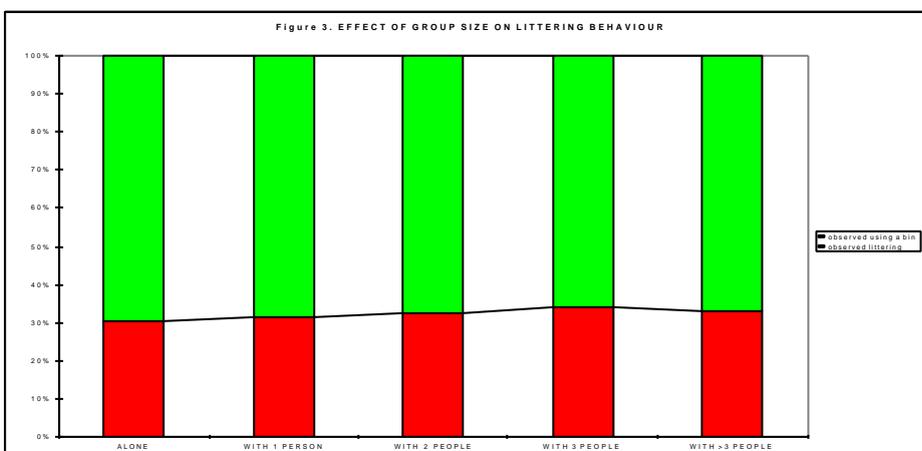
Studies from other countries indicated that people were more likely to litter when they were in groups, particularly large groups. This study showed that the same phenomenon occurs in Australia, but not in all cases.

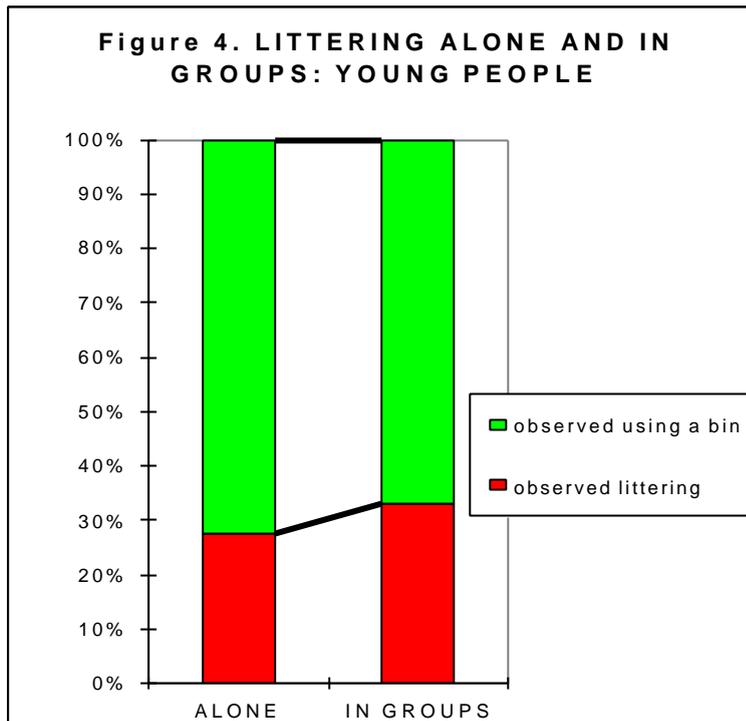
As the following charts demonstrate, the rate of littering overall seems to remain almost constant, no matter the size of the group. The apparent lack of variation of littering actually conceals two opposing patterns which almost cancel each other out.

Young people, as shown in the bottom chart, are more likely to litter when in groups. The chart above shows that people aged 15 to 24 were slightly more likely to litter than other adults. Interestingly, this seems largely due to the 'group' effect. People in this age group were less likely than other people to litter if they were alone when they disposed of objects, but were more likely to litter if they were with other people.

However, people over the age of 25 are less likely to litter when they are in the company of others. They are most likely to litter when no-one is with them.

The charts below contrasts the behaviour of young people (Figure 4) and people of all ages (Figure 3) disposing of objects by themselves and as part of a group.

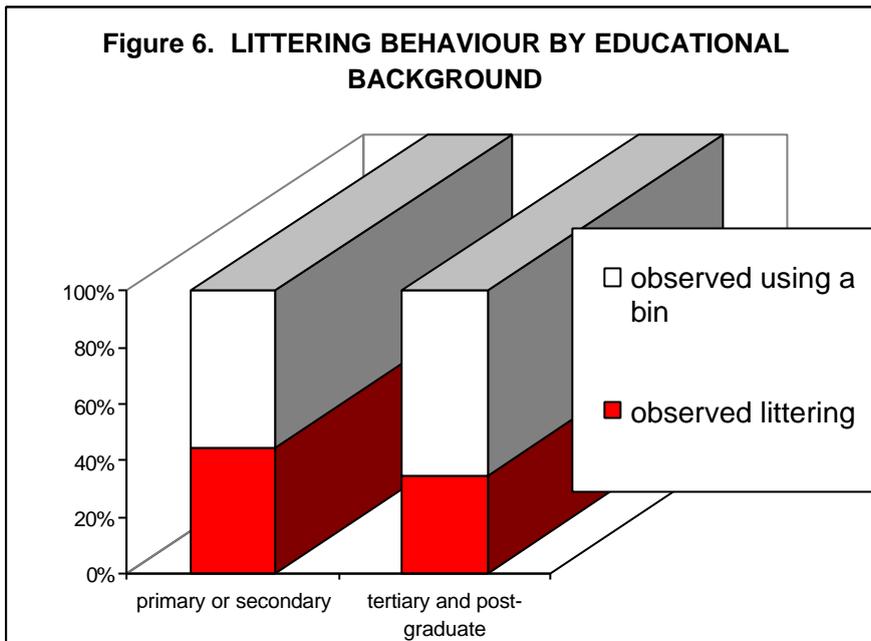




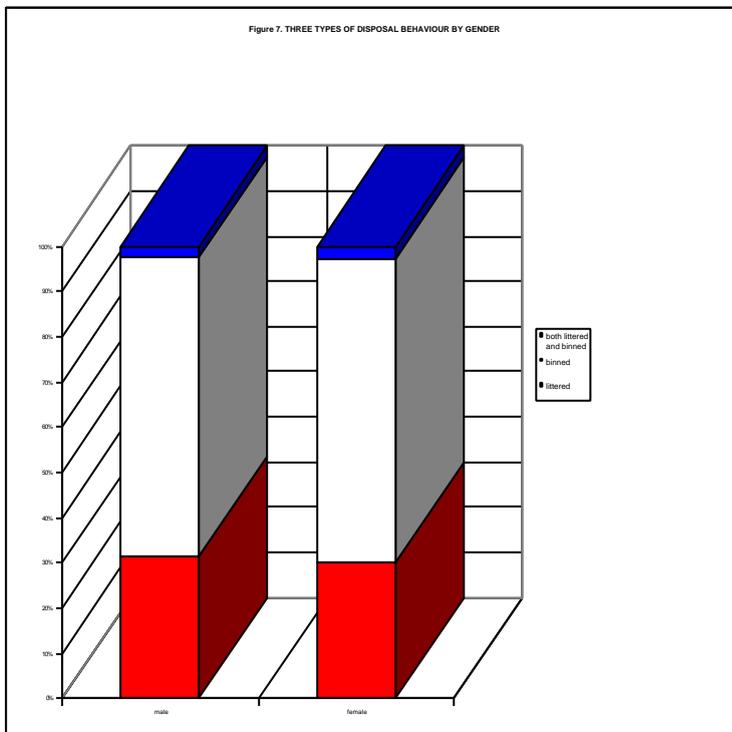
Groups consisting of parents with small children were particularly interesting. While some parents littered in front of their children (and some children cleaned up after their parents), most parents followed one of two strategies. Some took all of the children's rubbish to the bin, while others accompanied children to the bin, lifting up those who were too small to reach the opening, and assisting them in binning their own litter.

Other factors - such as education and employment levels - could only be determined with people who were interviewed. The numbers in each group are therefore smaller, but the differences between groups were statistically significant.

Being retired, having home duties, and being in full or part-time employment were associated with lower littering rates. Not being currently employed and being a student were associated with higher littering rates. On the other hand, people involved in tertiary and post-graduate education were more likely to be associated with lower littering levels.

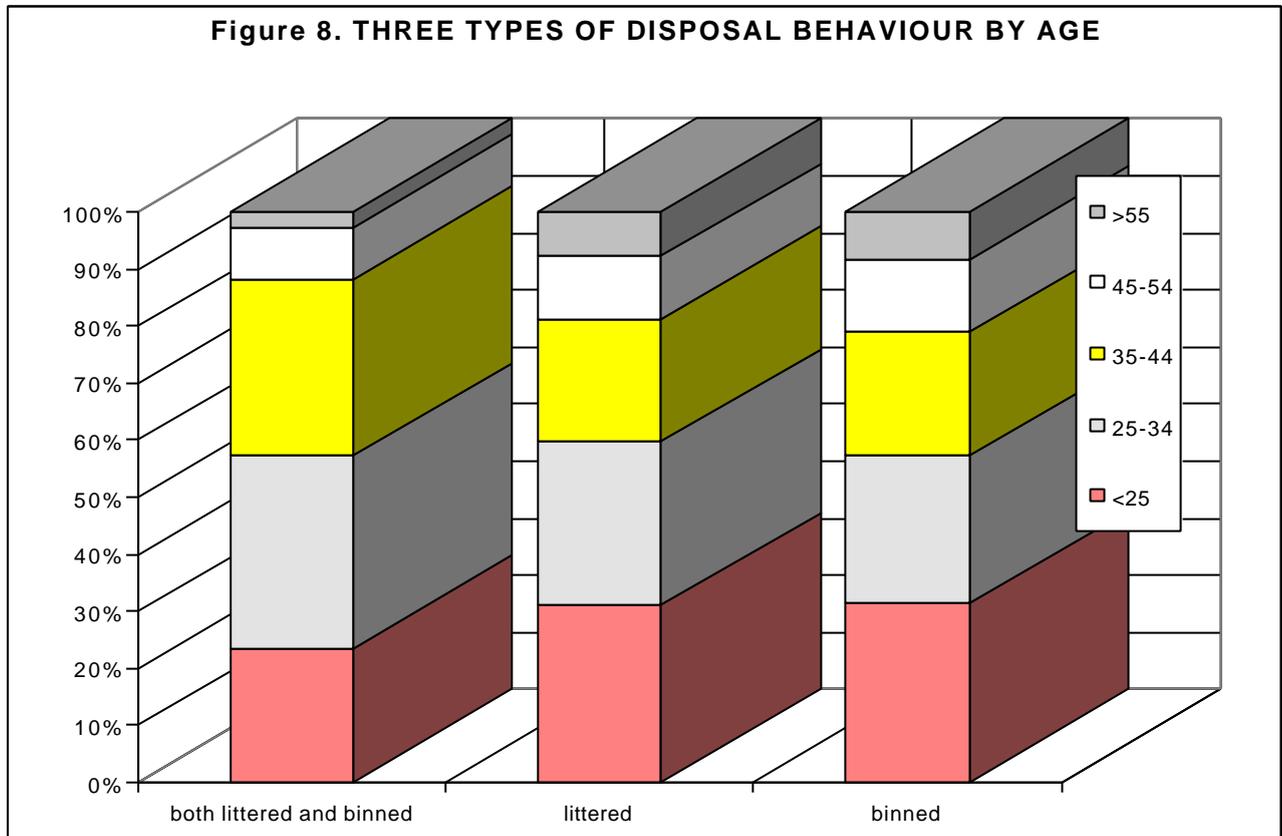


Finally, one of the major findings of this study is that there is no clear distinction between people who litter and people who use bins. Over two hundred people were observed both littering and using bins, both of these dual disposal behaviours occurring within the space of an hour. The gender breakdown of all three disposal types is shown below.



As with people who only littered or only used a bin, both men and women were equally likely to be 'dual disposers'.

However, the ages of dual disposers (people who used a bin as well as littered) is quite different from either binners or litterers. People who both binned and littered objects were more likely to be aged 25-44, as shown in the chart below.



Interestingly, some thirty people who had been observed littering before an interview were later observed using bins. In some cases, after the interview, people went back to where they had littered an object and - still not realising they were being observed - picked it up and took it to a bin.

In more than one case, after an interview, people who had earlier been observed littering went around the site cleaning up other people's litter.

Some people consistently littered certain types of objects while binning all others and this is further discussed in the next section.

What Do People Put In Bins? What Do They Litter?

- **People were seven times as likely to put beverage containers into bins as they were to litter them.**
- **People were three times as likely to put newspapers and other paper products into a bin as they were to litter them.**
- **On the other hand, people were three times as likely to litter a cigarette as they were to put one into a bin.**
- **Of those interviewed, 7% said that they did not consider that cigarette butts were litter. However, 87% of people who littered a cigarette said that they did think that cigarette butts were litter.**
- **Many people put some types of objects in bins, but littered other things; most often, they littered cigarettes but took everything else to a bin.**

Not everyone agrees on the definition of litter. Interviewees were asked whether they considered a range of objects to be litter, including newspapers, cigarette butts, dog droppings and apple cores.

The objects least likely to be considered litter were organic items, such as apple cores and dog droppings. Over one third of people (38%) interviewed said that apple cores could not be considered litter. Almost one in four people (23%) said that dog droppings were not litter.

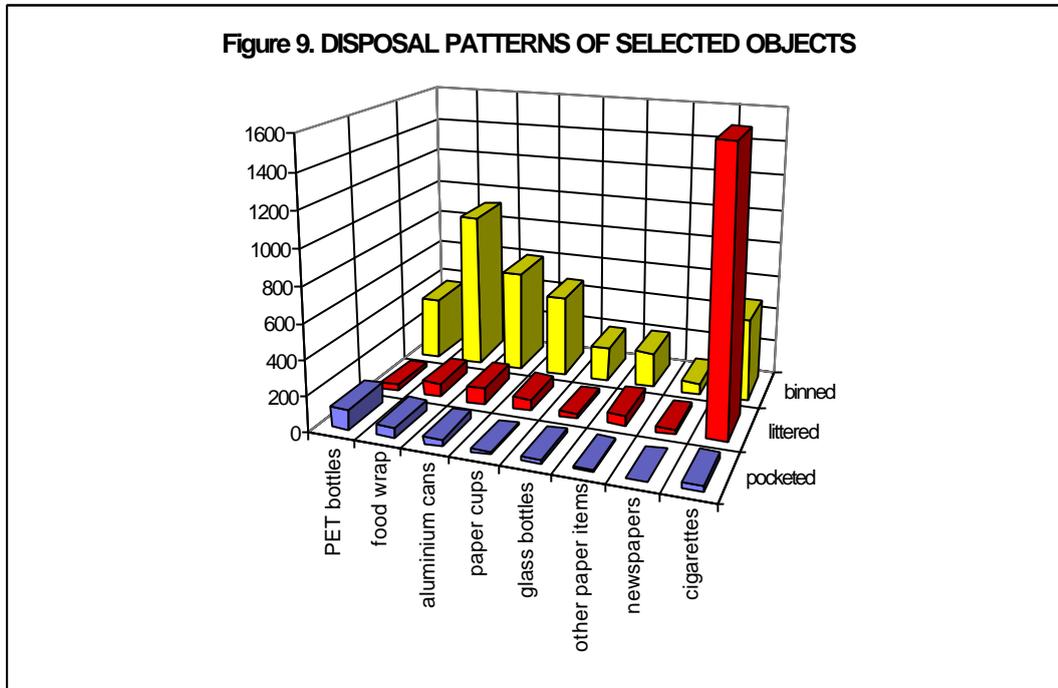
Glass and PET bottles, aluminium cans and food wrappers were considered litter by virtually all people, while newspapers and cigarette butts were seen as litter almost as often.

Of those interviewed, 94% said that newspapers and cigarette butts were both considered as litter. Interestingly, 87% of people who littered cigarettes said that they believed cigarette butts were litter.

Some types of objects observed by the researchers were much more likely to be littered than were others.

This differences in littering rates was partly due to some objects being used more often than others. For instance, smokers may smoke many cigarettes in a day, while food and beverages are consumed less often.

As shown in the chart below, of those common disposable objects - cigarettes, aluminium cans, plastic bottles, paper cups, newspapers and other paper items, food wrap and glass bottles - cigarettes were most likely to be littered and plastic bottles were least likely to be littered. This chart has been designed to factor out the number of times these objects are used, and shows genuine differences in littering behaviour.



Beverage containers were more than seven times as likely to be binned as they were to be littered.

Newspapers and other paper objects were more than three times as likely to be binned as littered.

Cigarettes reversed this pattern. Cigarettes were more than three times as likely to be littered as they were to be put into bins.

The third category shown in the chart is for pocketed items placed 'in pocket'. A considerable number of people put empty disposable objects into their pockets or into handbags. In most cases, this would presumably have led to disposal later. In some cases, the object may have been re-used.

The re-use of objects, while not a focus of the current study, was noted in the data. The observers found that some plastic bottles were being used to carry water, although they had originally been sold when filled with soft drinks. Plastic utensils such as forks and spoons, and clean paper serviettes were also observed being stored in pockets and handbags, presumably for later re-use.

One of the most interesting findings of this study was the high rate of people who consistently littered some types of objects while putting others in bins. Two patterns of this sort of 'dual disposal' were observed.

The first was putting large items in the bin but forgetting - or ignoring - smaller objects. For example, a number of people put bottles into the bin but left bottle caps behind, or put beverage containers into bins but left behind their straws.

It was particularly common for people using other containers - such as fruit juice boxes - which were produced with their own straws attached, to litter the bit of plastic which attached the straw to the container.

The second pattern of dual disposers was shown by people who littered cigarettes, but who put all other objects into the bin. The cigarettes were often littered while people were on their way to the bin with other objects.

Where Do People Litter? Where Do They Use Bins?

- ***Often litter is not simply left, but is deliberately placed in a certain location.***
- ***A high proportion of littering occurs in locations where the rubbish can be hidden or in places resembling litter bins, such as in bushes or pot planters, under leaves or behind benches.***
- ***More than half of all littering occurred within five metres of a bin, with 10% of all littering occurring within arm's length of a bin.***
- ***A higher rate of littering occurred in sites that were perceived as being already littered, but we do not know what tends to cause the initial litter.***

Overall, there were more similarities than differences between the behaviour of people in different regions of Australia. In all states and territories, many more people used bins than littered.

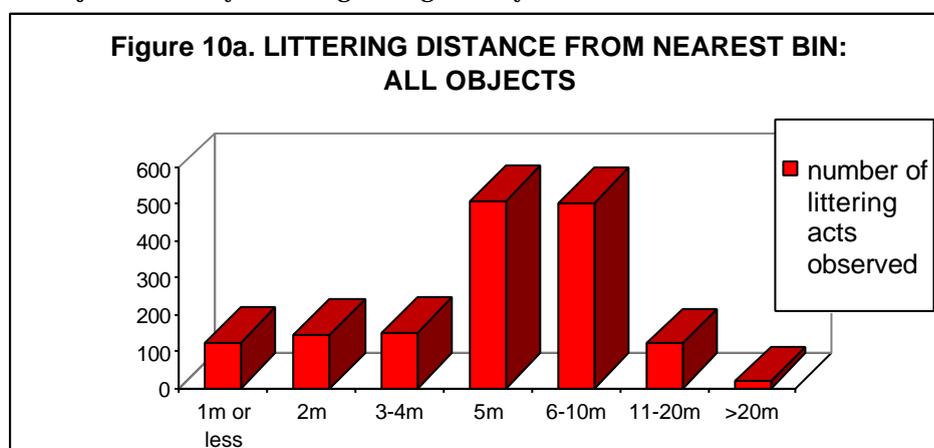
There were also similarities in opinions. Interviewers asked respondents if they thought that their city was 'better', 'worse' or 'about the same' in terms of litter than other cities. A majority of people in all cities believed that their city was less littered than others.

The study revealed information on the types of locations in which litter was likely to be found.

Some of these findings contradict conventional beliefs. For instance, a high proportion of litter was not simply left behind, but was carefully placed in chosen locations.

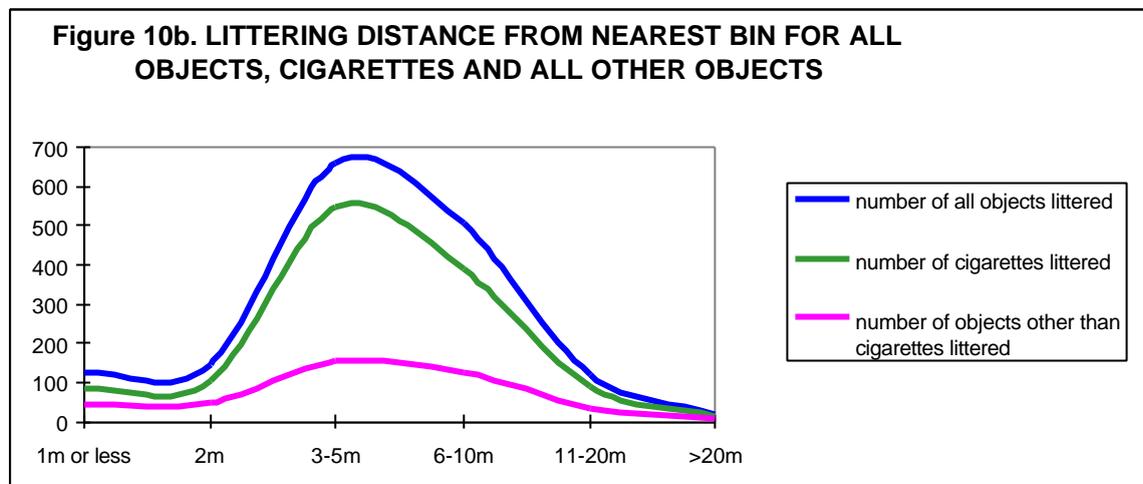
Most often, it was placed in locations where it would be hidden, such as in bushes or planters, under leaves or behind benches.

This was all the more surprising since often people went to a good deal of trouble to place the object carefully, while ignoring nearby bins.



As shown in the chart above, most littering occurred less than five metres from a bin.

The availability of bins did not appear to be the major factor in the littering observed in this study.



Cigarettes were particularly likely to be littered close to bins. The chart above contrasts the distance from a bin that cigarettes were littered from the distance at which all other objects were littered.

There was some indication, both with cigarette disposal and with the disposal of other items, that the design of bins may have been one factor in their pattern of use. For example, some smokers said they did not want to use bins with plastic linings, while bins with ashtrays attached appeared more useful in attracting smokers.

In one Canberra site, people with plastic plates struggled with depositing their rubbish in bins which had only small openings in the top, not large enough for a plate. Consequently sometimes plates were littered although the intended disposal may have been different.

Interestingly, when people littered, they often did it in objects which resembled bins, such as planters and light reflectors, as shown in the photograph. Such behaviour occurred in areas where bins were located nearby, and further research is needed to establish the reasons for this pattern of behaviour.

More research is also needed on bin design and placement, and the reasons leading people to use some bins more than others.

One of the most puzzling findings of the study was the tendency to fill one bin to overflowing while another nearby bin (often identical or at least superficially similar) was almost empty and left that way, as shown in the picture. It seemed that people adopted a 'herd' approach to their disposal, using the bin that everyone else used.

When asked, most people said that if bins were not available, they would put an empty can or bottle into their car or carry it away with them. In support of these assertions, in one site where the closest bin was over 50 metres away and very difficult to find, the majority of people did take their litter with them.

A number of these people were followed by observers for over 200 metres to ensure that they did not litter the objects in bush areas, but none of the people observed did this. Some put the objects into their cars; others walked over a quarter of a kilometre with objects in their hands seemingly waiting to find a bin.

On the other hand, where bins were present and were overflowing, many people did not take their rubbish with them but littered their objects around the overflowing bin (as shown in the photograph). Interestingly, approximately half of respondents to the survey said that they did not consider it littering to put items next to a bin that was overflowing.

Paradoxically, this may mean that - unless bins are regularly cleared - it may be better not to have any. Overflowing bins tend to attract litter and unfortunately, for reasons further discussed below, litter attracts more litter.

However, the research team also came across extremely littered patches in sites which had no bins - in bushes and other 'concealed' locations, so that the litter was not readily apparent unless one looked for it. Simply removing bins did not appear to be any better a solution than simply adding more bins.

One of the strongest findings from the international literature is that people tend to litter more in sites which are already littered. Several types of evidence from this study supported this finding, although the situation was not as simple as it appeared from academic studies.

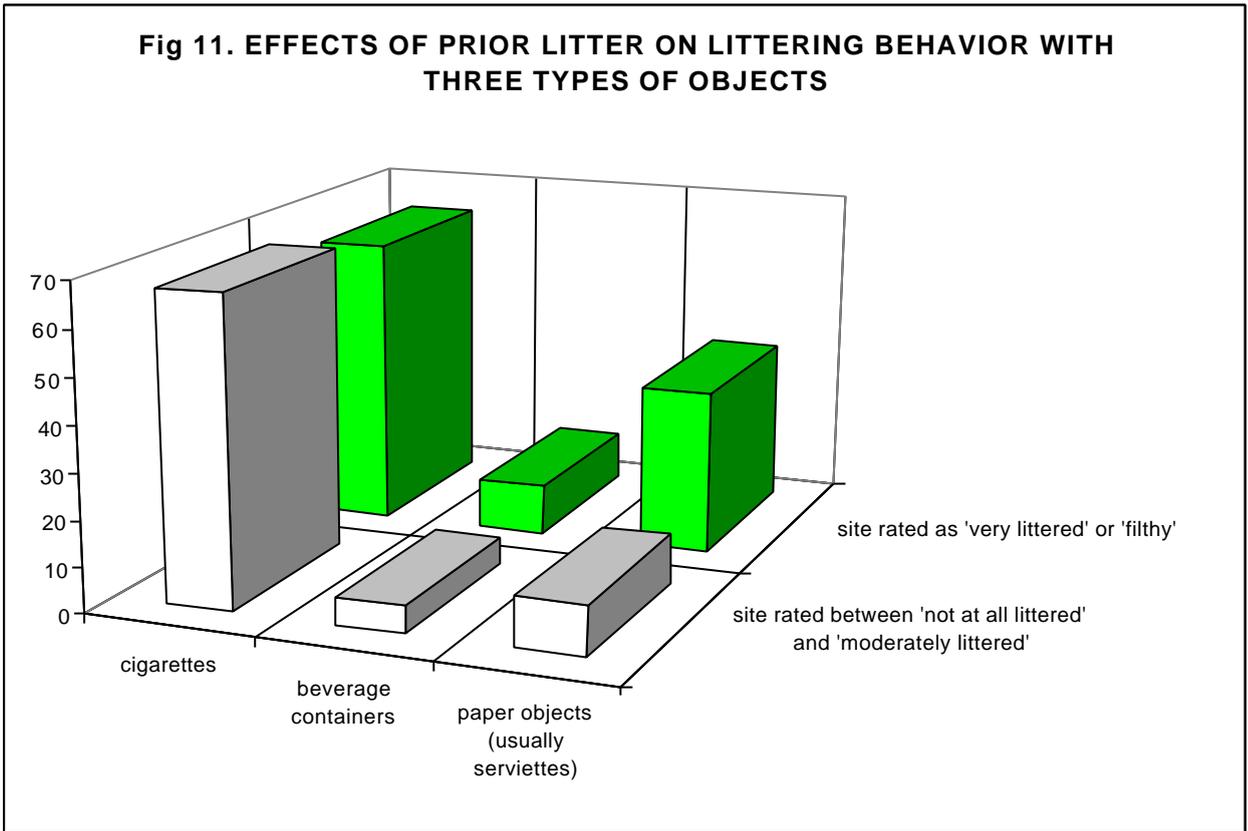
In studies done overseas, researchers artificially littered sites in enclosed spaces - usually by filling them with a large amount of paper such as, handbills of similar sizes, left in the open as obvious as possible. In contrast, in the real world, much litter is carefully placed so that it is not easily visible. Comparing the number of littering acts with inconspicuous litter showed no significant relationship.

Also, in contrast to the overseas studies, the amount of litter varied from place to place within each site so that there were some mini-sites which were very littered while others contained no litter at all.

In one case, a woman moved from one location to another within the observation site. In the first area, which had little litter visible, she used the bin. In the other area, which had a great deal of visible litter, she simply added her object to the litter present. Both of these actions occurred at similar distances from the closest bin, and occurred only a few minutes apart.

In order to test the effect of highly visible litter on individual littering behaviour, survey respondents were asked to look at the site and rate it on a scale from 'not at all littered' to 'filthy'. The results of this question provided an indicator of obvious litter at the site, from the vantage point of the respondent. This individual rating was then correlated with the same individual's littering behaviour.

The results (in Figure 11) appeared to show that the disposal of certain types of objects is affected by prior litter at the site, although further analysis would be required to tease out all of the factors operating in relation to prior litter in the real world.



It is clear, however, that the littering of cigarettes is not affected by the amount of litter present at a site, while other objects like beverage containers and paper products appeared more likely to be affected, as shown in the chart below.

Further analysis of these patterns is needed. Although we know that litter tends to attract litter, we still do not know why certain sites appear to act as 'litter magnets', consistently generating the initial litter, which then attracts more litter. More research is needed in this area.

This study indicated three ways in which this might occur.

In sites with overflowing bins, many people felt it was acceptable to place objects in the open beside the bin.



Also, preliminary analysis indicates that certain groups are more likely to litter if they are in the presence of someone else who is littering. In this case, it appears that it is the presence of prior littering behaviour, rather than prior litter, which leads to further littering. Further investigation is needed of this point.

The researchers noted that littering seemed to be more accepted at certain times in certain sites. Local people knew when these sites would become littered and the littering followed a well-defined pattern. Comments were often made to interviewers that while a site was not littered now (at the time of the interview) it would be later in the day.

It was often young people in groups who littered at these sites which appeared to have their own littering traditions. In these cases, 'prior litter' may include not just the litter visible at the site (many of these sites were cleaned regularly, and sometimes several times within the hour), but the litter which people know was discarded on previous days (and was likely to accumulate again later in the day), that made it more acceptable to litter.

Such sites may require specifically targeted interventions which focus on changing the 'culture, and traditions' associated with those particular sites.

Finally, this study did not focus on away-from-home or public place recycling. However, a number of the sites did contain recycling bins as well as regular bins. In these cases observers noted whether people used them appropriately - or whether they placed inappropriate objects in the recycling bins or put recyclable objects into regular bins. (Observers only noted this if the recycling bin and the regular bin stood side by side).

Many people did not seem to recognise the function of the recycling bins.

Almost one out of every three objects observed being put into the recycling bins was a non-recyclable object, or an object which was not meant to go into that bin (eg. a glass bottle going into a container designated as being only for aluminium cans).



More surprisingly, even when the recycling bin was sitting beside the regular bin, the regular bin received almost as many recyclable objects than the recycling bin. In situations where a regular bin and a recycling bin stood side by side, people were observed to place recyclable objects in the regular bin 43% of the time.

The trend for those who did use recycling bins appropriately was that they were slightly more likely to be young people and - to a lesser extent - males, as shown in the chart below.

Figure 12. USE OF PUBLIC PLACE RECYCLING BINS BY GENDER

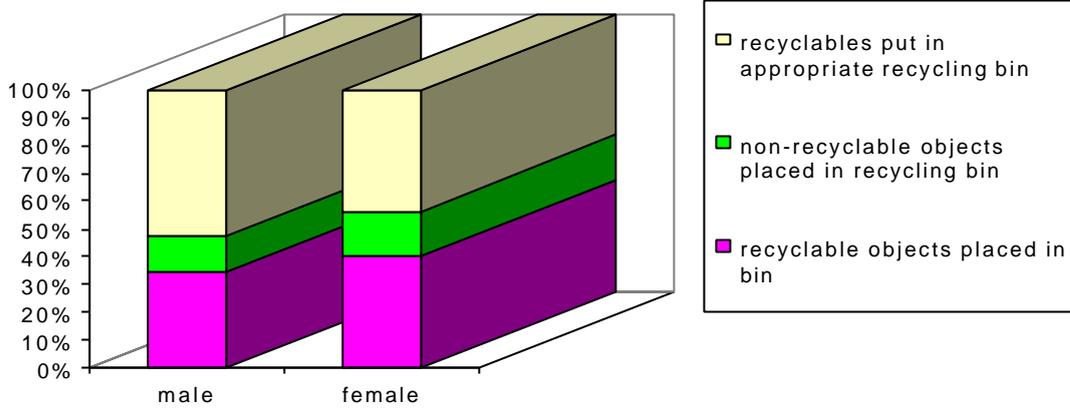
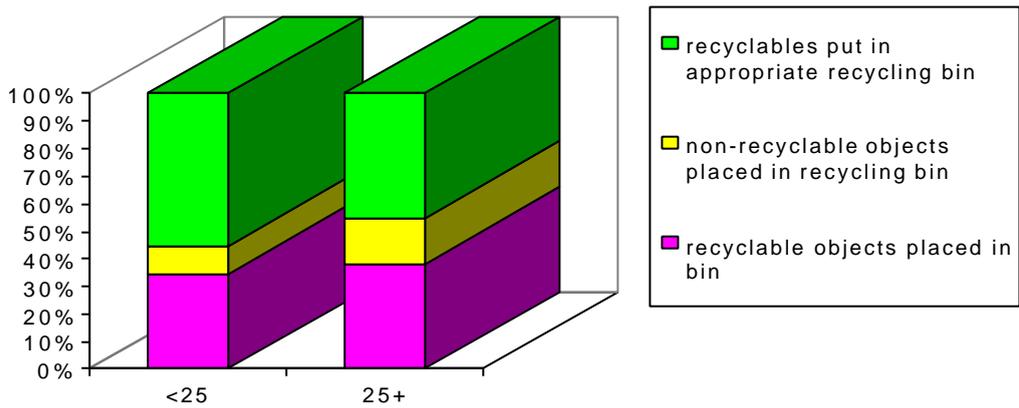


Figure 13. USE OF PUBLIC PLACE RECYCLING BINS BY AGE



When Do People Litter? When Do They Use Bins?

- ***Littering was most likely to occur at times when large numbers of people were eating and/or drinking out of doors in public places.***
- ***At such times, people were also likely to use bins more frequently.***
- ***The difference between the rate of littering behaviour compared to binning behaviour, was smallest between 3.00pm and 5.00pm when people were less likely to use the bins and more likely to litter.***
- ***37% of littering occurred at 'transition points', when people were switching from one type of activity to another.***
- ***Beverage containers appeared to be the type of object most likely to be disposed of after a transition point.***

Overseas studies had not found any times when people were more or less likely to litter. In contrast, this study found a number of clear patterns for both the use of bins and littering.

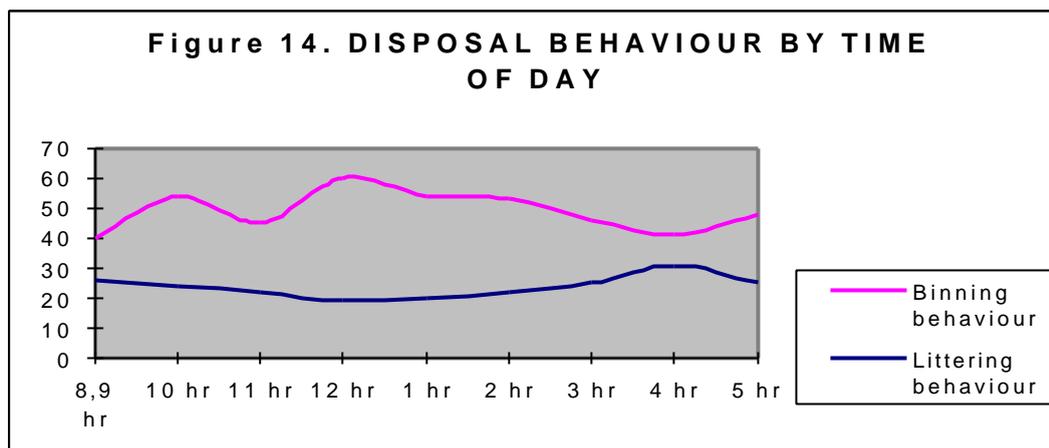
The conventional wisdom, originating primarily in America, was that the amount of littering at any time was always proportional to the number of people in the site at that time. Instead, this study found that littering was more likely to be proportional to the number of people present at a site who were carrying disposable objects, such as food wrap, beverage containers, etc.

In retrospect it seems obvious that disposal behaviour would be most likely to occur during those times of day when people were most likely to eat or drink out of doors rather than when they were present in greatest numbers, such as in peak hour.

Lunchtime on weekdays, when many people eat in public places and out of doors, proved to be the best time to observe a high number of littering incidents. Special activities on weekends involving food and drink, such as group picnics or food festivals, also provided good observation opportunities.

However, while these proved the best times to see littering behaviour, they also provided observations of a high proportion of people using bins.

A more interesting question was whether there were certain times of day when people were more likely to litter than they were to use bins. The rate of people using bins always exceeded the rate for people littering but the study found a clear pattern for these two types of disposal behaviour, as shown in the chart below.



The rate of people using bins was highest from 11:00am to 1:00 pm, while the littering rate remained reasonably constant. Interestingly the littering rate increased between 3.00pm and 5.00pm and significantly, the binning rate decreased, indicating that people were more likely to litter during this time of the day.

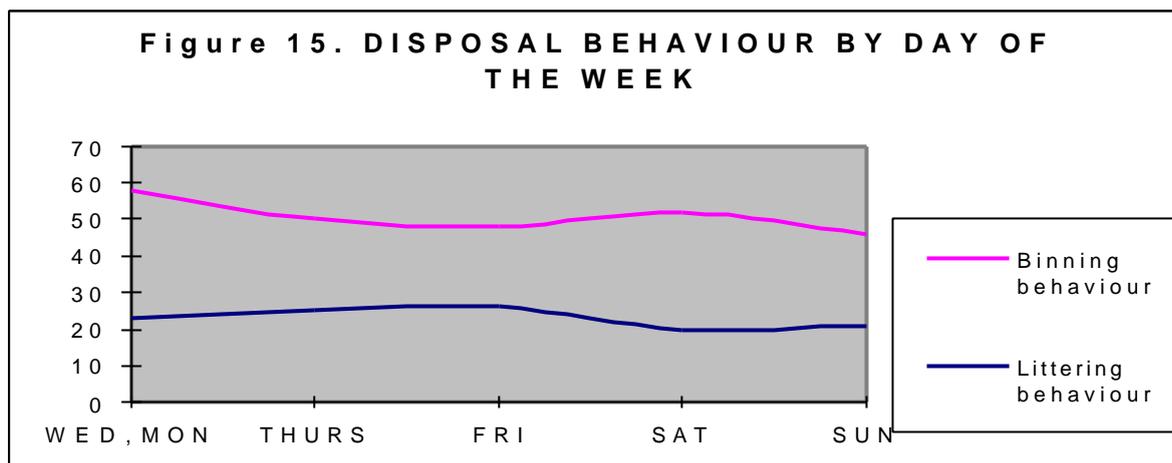
Although the difference in littering rates was not statistically significant from other times of the day, there was a statistically significant trend for a reduced rate of people using bins during that time period.

The reasons for this are still under investigation. It is a time that many young people head home from school in groups which is a factor associated with them being more likely to litter. Also at this time, adults are heading home from work and may be travelling alone which would mean they were also more likely to litter. In contrast most adults observed eating lunch were with other people which was a factor associated with them being less likely to litter.

Finally, many people are moving through transition points in the late afternoon and early evening, waiting for buses and trains. Litter bins may not be readily available in these areas and commuters may be reluctant to seek out a bin for fear of missing their connection.

All of these are plausible ideas and match the experience of the observers, but further investigation is required to establish the relationships between these and other contributing factors which might be involved.

The proportion of littering to binning appeared to be relatively constant throughout the week. The chart below compares the rate of people littering and using bins by day of the week.



More importantly over one third of all littering (37%) occurred at 'transition points'. Transition points occurred as people were moving from one activity to another, such as going from sitting on a bench to walking off, or making the transition from waiting for a bus, train, taxi or tram to actually getting into the vehicle.

The littering rate increased for all objects (other than cigarettes); with approximately 40% of all objects which were not cigarettes (eg. beverage containers, paper packaging) being littered when people were moving from one activity to another.

Littering occurring at transition points requires further investigation and almost certainly will require specifically designed intervention strategies if littering is to be prevented.

The observers noticed large numbers of people waiting for trams in the middle of the road who were smoking, eating or drinking. There were no bins available unless people crossed the intersection, running the risk of missing their tram. On the other hand, when bins were nearby, people waiting for their transport did not use them and often littered where they had been waiting.

Finally, beverage containers appear to be the objects most likely to be disposed of after a transition point. When people finished an outdoor meal and disposed of other objects such as leftover food, paper packaging, etc. they were likely to take their beverage container with them. Beverages, particularly those in large sizes, appeared to take longer to consume than food, and many people appeared to feel comfortable consuming beverages while they were walking, a situation less often encountered with food.

This finding has obvious relevance for the disposal of beverage containers. While food wrap and containers were often disposed of near seating areas, beverage containers may be deposited over a wider range of sites, and the transition points associated with their disposal may be different.

This point deserves further investigation.

Findings Three: How Do People Dispose of Objects?

- ***Disposing of objects - either by binning or by littering - involves a more complex process than has been recognised to date.***
- ***Factors affecting disposal include:***
 - ***the person's attitudes,***
 - ***their skill at monitoring their own behaviour and the disposable objects,***
 - ***the type and placement of bins at the site,***
 - ***the nature and distance of other 'bin-like' objects near the person,***
 - ***the type of object, and***
 - ***the context in which the disposal occurs.***
- ***People who manage to successfully bin all of their disposable objects typically use one or more strategies, including putting objects into bins as soon as they have finished using them, maintaining physical contact with objects, etc.***
- ***Some people try to find a place for their disposable object which will leave the site looking tidy but does not involve a bin; people using these strategies may be 'wedgers' and 'undertakers'.***
- ***Other people seek out a bin but do not ensure that all of their disposable objects reach it; these people may be 'dual disposers', '90% ers' and 'foul shooters'.***
- ***It is not clear how many of these are conscious choices, but it appears that many occur without the person being fully aware of their actions.***
- ***In other cases, people appear to be making a deliberate choice to litter - in some cases, they use time and energy to increase the impact of their litter on a site. These people may be 'flagrant flingers'.***
- ***It is likely that the attitudes and beliefs of some types of litterers (especially those whose strategies leave a site looking superficially tidy) may resemble the attitudes and beliefs of people who use bins, rather than the beliefs and attitudes of other litterers.***

This study found indications that people do not make a simple choice between littering and not littering. Instead, disposal is a complex process with many possible outcomes.

The model of disposal behaviour which was derived from the study is currently being developed into a 'disposal behaviour map' which at present describes the relationships between factors that have been identified as influencing disposal behaviour.

As the model demonstrates, factors affecting disposal include:

- the person's attitudes and personal history;
- their skill at monitoring the disposable objects and their own behaviour;
- the type of object(s) to be disposed of;
- the type, placement and condition of bins at the site;
- the nature and distance of other 'bin-like' objects or areas near the person; and,
- the situation (including the culture of the site) in which the disposal occurs.

There is a complex interaction between these factors which we are only at an early stage of understanding and describing.

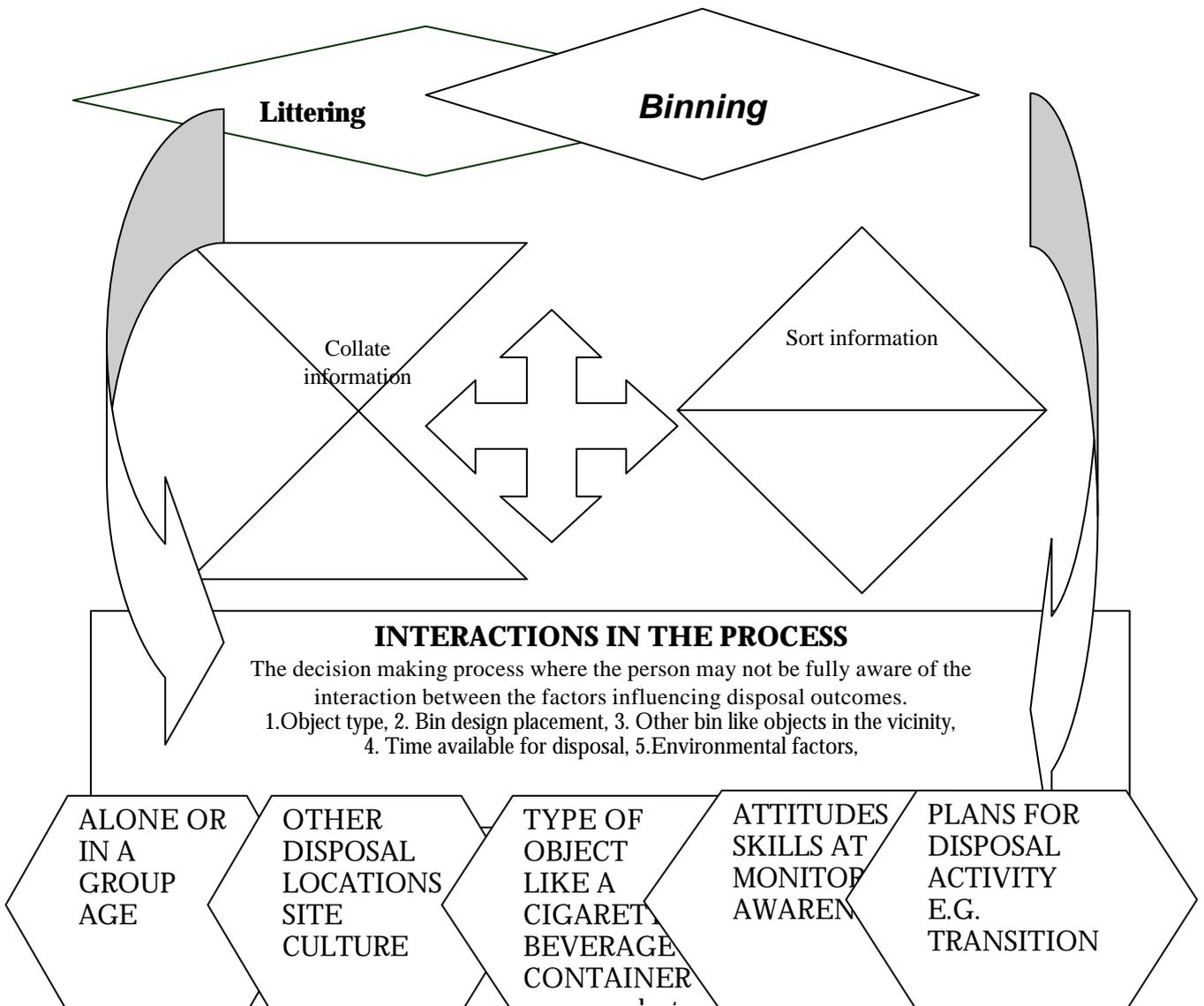
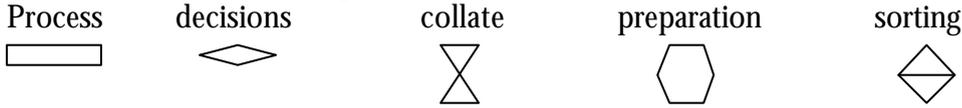
Clearly a choice to litter or bin which involves all of these factors would be complex (and this list is not exhaustive). The mapping process has been described in some detail to provide a basis for discussion and refinement. Examples of the factors listed above are provided together with some observational anecdotes to stimulate further thinking about the activities involved in disposal and to point toward areas for further exploration.

Disposal Behaviour Model

A model of the factors involved in disposal behaviour using flow chart symbols to represent the interaction involved in littering and binning as two types of behaviour from opposite ends of the continuum. Arrows indicate the feedback loops and interactions that occur which can lead to either behaviour for the same person under different conditions and different times.

Key to symbols

Interactive elements in disposals



Attitudes And Personal History

Some of the people observed were willing to go to a great deal of inconvenience to avoid littering; some walked for hundreds of metres to find an appropriate site in which to dispose of their rubbish.

Others admitted that their personal convenience was very important to them, and they would not go out of their way to avoid littering, or they littered in preference to leaving objects to dirty their car.

Some people considered the area immediately surrounding the bin to be an appropriate place to leave rubbish if the bin was full to overflowing, and some said objects could be placed outside the bin as long as they were placed 'tidily'.

The range of attitudes documented by the study is further discussed in the following section.

Skill At Monitoring Disposable Objects And Own Behaviour

People who successfully binned all of their disposable objects used a variety of techniques to constantly monitor the object and their own behaviour. This monitoring was particularly evident for people who were observed binning on windy days, with small, light objects.

Other people appeared to dispose of objects without much awareness of their actions. While it is not possible in an observational study to make conclusions about people's inner thoughts, there was evidence of a lack of thought or habitual responses in some cases. For example, one woman who was littering cigarettes actually littered one of them on her own ankle, burning her stocking and startling her considerably.

People were observed leaving an object but returning for it if it fell and made a noise. In such cases, particularly if they were taking other objects to the bin, the omission of one item appeared to be accidental rather than deliberate.

Type Of Object(s) For Disposal

As noted above, many people consistently littered some objects but binned others. Cigarettes, organic items, and very small objects were more likely to be littered than other objects.

The type of object and the way in which the person perceives that object once its initial use has been completed has an impact on how they dispose of it. For example PET bottles tended to be reused and carried by many people while food wrappers -particularly once they were wet - often became messy and were disposed of quickly.

Type, Placement And Condition Of Bins At The Site

In a number of sites, a nearly empty bin stood only a few metres away from one that was overflowing. The reasons for this are still being considered. However, there appeared to be almost a 'follow the leader' or 'herd' like element to people's behaviour. Perhaps the decision-making responsibility for selecting a bin in an area is easily passed on to others; once the decision is made the effort involved in thinking about it individually may be too great.



The design of bins was also observed to have an impact on people's behaviour. The presence or absence of ashtrays incorporated into the bin was one important design factor but it was not the only feature that seemed to have an impact on people's behaviour.

Importantly the design and operation of the lid needs to be considered. At one site people grappled with trying to fit their rubbish into large temporary bins which had only a small aperture in their lid. Many people were frustrated by these, and struggled to crush their rubbish into a shape that would fit the opening; occasionally a person who knew how to operate the bin lid would pass by and show them how to open it.

On one occasion a mobile garbage bin lid was closed by one person to rest a drink on top and within the next twenty minutes not only was the bin lid covered with disposable objects but people then deposited their waste around the bin, on the ground. The most interesting aspect of this observation was that the bin remained empty while waste piled up on top of its lid, although other bins were within 6 metres of the one with the closed lid.

In a number of cases, bins were concealed behind decorative fencing. In one Sydney site, the bins were so effectively concealed that they were hardly ever used.

Nature And Distance Of Other 'Bin-Like' Objects Or Areas Near The Person

As noted above, much litter was not left behind by accident, but was deliberately placed in a specific location. The locations in which this occurred typically shared one or more of the characteristics of a bin; most of the locations chosen provided a secure location for the object - often out of sight - which might prevent it from blowing away.

Many of the locations in which objects were placed even looked superficially like bins - some, like the electric lights shown in the photograph, were round containers.



Not all of the locations were likely to receive litter looked like a bin. Benches and seats with cracks or slats on a wooden bench were more likely to receive litter than moulded seating.

People were observed to squeeze empty drink containers or paper products into cyclone wire fences near the beach, into gaps between wheels and mudguards on trucks at a sporting venue, into lights and into drain crates or pipes

Clearly this behaviour requires some effort and forethought - often greater effort than would be required to find a bin.

Situation In Which Disposal Occurs

Factors included whether the person is in a group, and whether other people in the group are littering.

The site itself also affects the choice of disposal method in a number of ways, eg. whether it is a highly littered site with a great deal of graffiti, or a clean, well-kept site monitored by authority (eg. a nearby police station).

These effects are not always simple. For example, observers saw people littering in shopping malls in full view of police information vans and permanent booths. People littered while the Litter Patrol was cleaning the area next to them and observers saw many people littering on the steps of a busy police building, while waiting for public transport.

Other factors, such as the nature of the site, have an impact on peoples' littering and binning. For example, in a recreational site or a shopping precinct the presence of cleaners who are active and picking up after people may well influence their disposal. Many people commented during interviews that it was not littering to leave their waste behind in the particular site because cleaners were always there working to keep it clean.

One person indicated he littered all the time and threw his rubbish around him while his peers (one of whom had a plastic bag full of his waste from the day) cleaned up after themselves and the litterer. A man interviewed on the Gold Coast was observed cleaning the up other people's litter and carrying it all up the beach to a bin. He explained that the only place he used bins was on a beach; every where else he littered. Even when he had been approached by a woman in a shopping mall who pointed out he had dropped two objects, he refused to pick them up. For him, beaches were 'sacred' but littering was acceptable in all other locations.

Behavioural Types Associated With Littering

The factors outlined above indicate that the point at which a disposable object can become litter are many and varied. In some cases, people may simply neglect to bin rubbish, but in many other cases people perform actions - some of them apparently well-intentioned - which result in litter.

Some people try to find a place for their disposable object which will leave the site looking tidy but does not involve a bin; strategies of this type include 'wedging' and 'undertaking'. 'Wedgers' tuck waste into cracks or places where the rubbish will not blow away or be conspicuous, as shown in the picture. 'Undertakers' bury the object, usually under sand or leaves.

Other people seek out a bin, but do not ensure that all of their disposable objects reach it. Behavioural types in this category include 'dual disposers' (people who consistently bin some types of objects while littering others) and '90% ers' (who bin large conspicuous objects but - probably accidentally - leave behind less conspicuous objects).

Finally, some people get objects to the vicinity of the bin but do not ensure that the object is placed securely in the bin. People with these patterns of behaviour include 'foul shooters' who aim for the bin, but do not manage to get their rubbish to the target.

Behaviours Associated With Binning

People observed successfully binning objects - particularly in cases where they had a number of objects to dispose of, some of which were small enough to overlook or light enough to blow away and typically used a variety of strategies to ensure they all made it to the bin.

Some made a trip to the bin as soon as they were finished with any object, making multiple trips as needed. One woman was observed using the bin twelve times in the course of a single meal.

Other people ensured that they did not lose any of their objects by keeping physical contact with them before placing them in the bin. Others ('inventors') constructed 'mini-bins' out of one object, such as a paper bag or a plastic container, and deposited other objects into it, until they were ready to take all of their objects to the bin. One man collected all his cigarette butts in the cuff of his jeans which he emptied into a bin at home every evening.

Finally, many of the successful bidders cast a final look around the site before they left, ensuring that nothing had been left behind. Quite a few objects were retrieved at this stage and then carried off to the bin.

Factors Associated With Behaviours

It is not clear how many of these strategies - whether those used by binners or by litterers - are conscious choices.

In some cases, people appeared to be making a deliberate choice to litter using time and energy to increase the impact of their litter on a site.

It is likely that the attitudes and beliefs of some types of litterers, (especially those whose strategies leave a site looking superficially tidy), may resemble the attitudes and beliefs of people who use bins, rather than the beliefs and attitudes of other litterers.

For example, 'flagrant flingers' who litter objects out in the open without any attempt to conceal their actions are quite likely to express different views than 'inchers'. Inchers are people who have a quick look around to ensure that they are not being watched, then carefully place their litter beside them and slowly inch away from it until they can no longer be identified as the litterer. Often, after the initial placement, no eye contact is made with this object that has been left on the bench by some mysterious third party.

These behavioural types may also link up with other people's beliefs about who is most likely to litter. It is likely that people notice the behaviour of 'flagrant flingers' more than they do that of 'wedgers' or 'inchers', and that groups which tend to exhibit certain types of littering behaviour are more likely to be stereotyped as litterers.

Attitudes and behaviour do not always pattern neatly. At times people classified as 'litterers' may display more careful behaviours than those classified as 'binners'.

For example, two people were observed tossing rubbish (in each case a paper bag filled with food wrap and a discarded beverage container) at a bin. The first person tossed the rubbish and walked on, without bothering to see where it landed. Fortunately it hit the edge of the bin, teetered for a moment and then went in.

The other person threw his rubbish, which hit the edge of the bin, teetered and then fell to the ground, spilling its contents. He went to the bin, knelt and picked up all of the contents he could see, then placed them carefully into the bin. However, one piece of paper had blown underneath a bench, and he did not see this, and was recorded as a '90%er' (a person who almost gets their binning behaviour right).

In this case the 'litterer' displayed a more conscientious attitude, by monitoring and retrieving his objects, than the 'binner'.

The next section of the report looks in depth at the attitudes and views expressed by the people who completed the survey.

Findings Four: Comparing Attitudes And Behaviours

- ***There were major differences between the attitudes and behaviour of many people in the study.***
- ***Three quarters (76%) of all respondents said that it was 'never' acceptable to litter. However four out of every five people (80%) indicated that they had littered at some time in their lives.***
- ***78% of people observed littering said that littering was a 'very important' or 'extremely important' environmental issue.***
- ***There were large differences between the way people reported their behaviour and their actual behaviour, as seen by the observers.***
- ***Less than half (45%) of people who were observed littering within the previous five minutes admitted to interviewers that they had littered in the last 24 hours.***
- ***Young people were the group most likely to be frank about their littering behaviour, and women of all ages were a little more likely to be frank than men.***
- ***Respondents were asked the reasons why they littered; the most common response was 'laziness'.***
- ***Respondents were also asked to think of strategies they felt would be most effective in preventing littering; people came up with a wide variety of suggestions.***

One of the most interesting parts of the study was the chance to compare behaviour and attitudes.

Generally, people felt that littering was an important issue. Almost four out of every five people believed litter to be a 'very' or 'extremely' important environmental issue. This was equally true for men and women and all age groups.

However, people's behaviour did not always match their intentions. Comparing what people said about their littering behaviour with what they did when they were observed provided a number of surprises.

Contrasting Attitudes With Behaviour

Three quarters (76%) of all respondents said that it was 'never' acceptable to litter. However, four out of every five people indicated they had littered at some time in their lives.

Almost half of those who said that they had littered at some point in their lives said they had littered within the last week.

People who were observed littering often expressed strong concern for the environment. Most people (78%) observed littering said that they thought that littering was a 'very important' or 'extremely important' environmental issue.

It was a little surprising to discover how many litterers expressed concern for the environment. It was even more surprising to learn how many misrepresented their behaviour to interviewers.

Self-Reported Behaviour

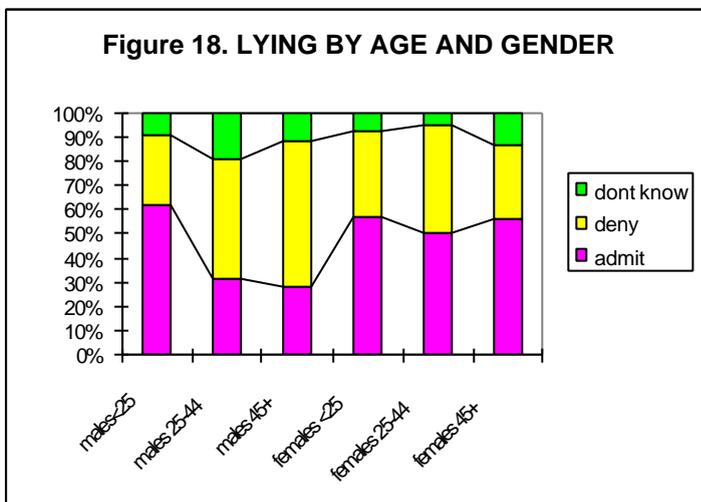
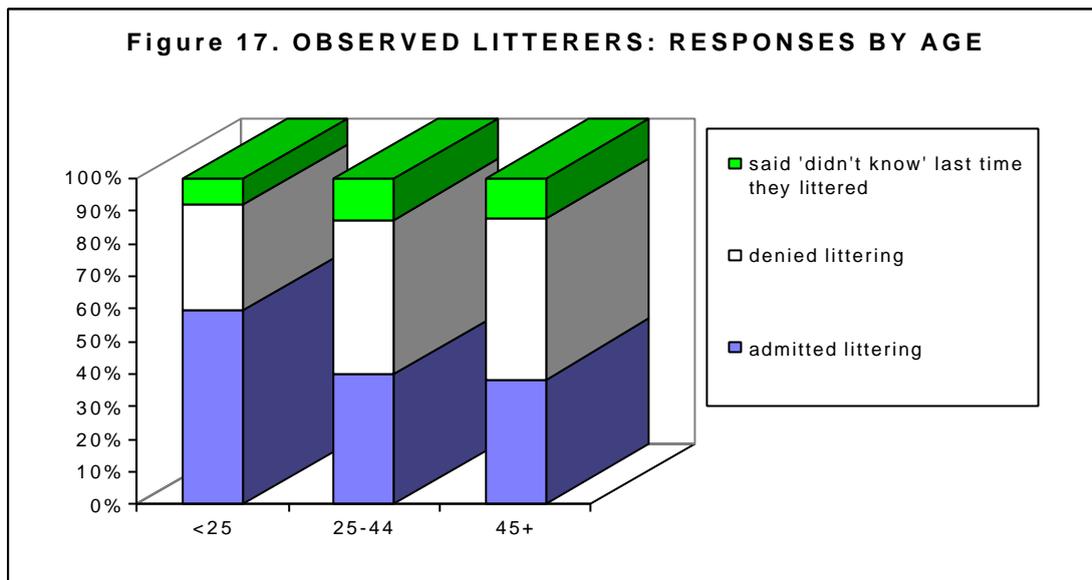
The questionnaire asked people about the last occasion they had littered.

Over one in three (37%) people who were observed littering within the previous five minutes told interviewers that they had not littered in the last 24 hours. An additional 10% said that they could not remember the last time they had littered, while 8% did not offer any answer. Fewer than half (45%) admitted littering when they had just done so.

Young people were the group most likely to be frank about their littering behaviour. A majority of young people interviewed said they had littered in the last 24 hours, whereas older people who had littered were less likely to indicate that they had done so recently.

Older men were less likely than women to admit to littering, either denying that they had littered in the last 24 hours or saying that they 'didn't know' the last time they littered.

The chart below displays people admitting and denying littering, broken down by age and gender.



Clearly peoples' reports of their littering behaviour often do not reflect their actual behaviour.

This discrepancy may help to explain some of the conclusions drawn in previous studies, which indicated that young people were most likely to litter (see Curnow et al, 1997 for a summary of these previous studies).

Studies that rely on people talking about littering may well be influenced by the same social forces that were found to operate in this study. It seems likely that younger people talk more frankly about their littering, acknowledging the behaviour, whereas the same openness or self-awareness of behaviour may not be true for older adults.

The differences between people's attitudes and behaviour cannot be assumed to simply be the result of most people deliberately lying or misrepresenting their behaviour. Some 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 some cases, this may have been because the items littered were small items which had been left behind accidentally or had blown away. In other cases it seemed that people had behaved automatically, not monitoring their own behaviour. Further research is required for a valid explanation of this phenomenon.

Why Do People Litter?

There are two possible approaches to explaining why people litter - asking people for their own explanations of their behaviour and trying to identify underlying influences which people may not be aware of, or may not feel comfortable acknowledging.

All people who said they had littered within the last six months were asked why they had littered. The most common reason, given by 35% of those who had been observed to litter, was that they were lazy or could not be bothered.

The next most common reasons for littering included:

- no bin being nearby (19%);
- habit and forgetfulness (14%);
- the inconvenience of continuing to hold on to the waste material (14%); and,
- there was no ashtray available (10%).

This last rationale for littering increased in importance with age. Only 7% of those under 25 years gave this reason, compared to 20% of people aged between 35-44 years and 50% of people aged between 45 and 54 years.

Interviewers also asked people to consider whether leaving objects on the ground next to an overflowing bin was littering.

Nationally, respondents were evenly split on this; half said it was and half said it was not littering. The only city where this was not true was in Canberra, where almost two thirds of people did not think it was littering. Surprisingly, people observed to litter were no different to people observed using bins in their responses to this question.

People were also asked to think of circumstances in which it would be okay to litter. Most of those people who thought it was okay to litter in some circumstances said that it was acceptable when:

- their waste was organic;
- there were no bins available; or,
- they were at an outdoor or sporting event where their waste was going to be collected.

The reasons people offered to explain their behaviour did not explain all aspects of the behaviour observed in the study. Laziness, for example, does not explain cases in which people go to a great deal of effort to litter objects in unique and creative ways.

The model of disposal behaviour currently under development addresses many of these issues.

Attitudes To Litter Reduction And Prevention

A series of attitudinal factors was explored to collect the information necessary for designing effective litter prevention and reduction strategies. The factors included responsibility, guilt and respondents' own suggestions for litter reduction strategies.

People who considered objects left on the ground next to a bin to be litter most often suggested that the litterer should have found another bin rather than disposing of the material in the wrong place.

Most of the people who thought that leaving litter next to an overflowing bin was not littering said that the person had tried to do the right thing and it was 'the council's responsibility' to keep the bin empty.

When respondents were asked if they agreed that litter was mainly a council responsibility, only 19% agreed.

Over 90% of all people surveyed said that litter was primarily each individual's responsibility.

Litterers held a different view in that approximately a quarter of them suggested that it was mainly a council responsibility.

One strategy for preventing litter has been the use of extra bins to help cope with the suspected laziness of litterers. It was the first mentioned suggestion for preventing litter with 35% of people.

While over four in five respondents indicated that they would always try to find a bin, people observed littering were more than twice as likely as people observed using bins to say that they often could not be bothered to look for a bin.

Respondents were asked what they would do if they had an object for disposal and no bin was available.

Four in five people said they would carry the object with them or put it in their car. People who were observed to have littered were twice as likely as binners to say that they would drop the item rather than carry it.

Litterers were also twice as likely as binners to say they would not chase after a food wrapper if it blew out of their hand.

One of the attitudinal approaches used in previous attempts to change people's littering behaviour in programs has been to build on a sense of social responsibility and guilt for people not playing their part.

Guilt did not appear to be an effective deterrent to littering. The 67% of people who 'felt guilty' about littering included 64% of people who had littered only moments before.

A further strategy for reducing litter has been the use of messages asking people to 'please dispose of the packaging thoughtfully' or in a bin.

Over four out of every five people said they were aware of the message but less than half said it influenced their disposal. Some people indicated that while it was a good reminder they already knew how they would dispose of their objects. Litterers and binners were equally likely to say that the message did not influence their behaviour.

One of the other key components of litter prevention strategies has been building the social desirability of not littering so that people are less likely to litter when watched by others.

During the pilot field tests for this study it was apparent that the methodology had to cope with people's sensitivity to being observed when littering. Respondents were asked if they agreed that they felt more aware of not littering when they were being watched.

There was an almost equal split in responses to this item. People disagreeing with the statement were likely to say either that they were going to do the right thing anyway, or that they did not care what people thought. Clearly, these responses are likely to be associated with different patterns of behaviour.

Interestingly, litterers were slightly more likely to agree with this item.

Approximately one third of people agreed that there was nothing they could do about other people's littering habits and this was equally true for litterers and binners.

However the majority of people (55%) believed they could influence others, either by setting an example or by challenging people about their behaviour.

When asked what would stop people from littering, one third of people suggested that litter prevention strategies ought to include community education, personal responsibility and raised awareness, as well as:

- increased fines and other penalties (33%);
- improved bins, signs and access to recycling bins (14%); and,
- more advertising (13%).

It is interesting to note that binners and litterers equally supported the use of fines for people caught littering.

Notwithstanding the differences in attitudes already described, there were fewer attitudinal differences between litterers and people using bins than some people may have expected. This outcome seems to be linked to one of the major findings of this study - that a rigid, two-way distinction between 'people who use bins' and 'people who litter' is not the most useful way to identify targets for prevention programs.

Two examples illustrate the difficulties involved.

- First, people who carefully put their litter in places where it would appear tidy are likely to have different attitudes from those people observed who deliberately used their waste to make sites look more littered.
- Secondly, many of those observed both used a bin and littered in the course of an hour. Observers even saw a number of cases where people picked up other people's rubbish and put it in the bin, while littering their own disposable objects.

The identification of some of the behavioural types seen to litter during this study will make it possible to develop better attitudinal questions to distinguish the different types of attitudes associated with each.

For example, 'wedgers' and others exhibiting similar types of behaviour may think of litter as a tidiness issue rather than as a question of long term water and beach pollution. 'Foul shooters' and people who leave their discarded objects next to overflowing bins may regard the area around a bin as being equivalent to the bin itself, believing that any rubbish in the vicinity of the bin will be picked up when the bin is cleared.

These and other potential attitudinal differences remain to be explored.

Also, different littering behaviour types may respond best to disparate litter prevention strategies.

For example, some behavioural types (such as 'inchers', who gradually move away from their discarded objects) appear to be very conscious of not being seen, while others (such as the 'flagrant flingers') do not. The 'inchers' littering strategy includes looking around to see if they are being watched (a strategy frequently noted by the observers, who were then particularly careful to pretend that they were not watching). These litterers may be vulnerable to litter minimisation strategies which involve the idea of other people monitoring or disapproving of their behaviour.

On the other hand, while it is likely that 'inchers' may be relatively aware of their littering behaviour, other types of litterers, such as people who bin bottles but leave bottle caps or straws behind may be quite unaware of their behaviour. They may be more responsive to strategies which enable them to become more conscious of their actions. Many of them expressed positive environmental views and might modify their behaviour once they were aware of it.

These are only two examples; many more remain to be explored.

Setting A New Agenda For Litter Prevention

It is clear that a range of strategies to prevent littering behaviour needs to be developed and implemented, to address the range of people, behaviours and contexts involved in disposal behaviour as it ranges between littering and binning.

According to the model, social, attitudinal and environmental factors need to be taken into account if behaviour is to change. The type of object littered must also be taken into account; the littering of beverage containers appears to be associated with different factors than the littering of cigarettes.

Social Factors

Social factors to take into account when designing litter prevention initiatives include the recognition that littering rates were similar between men and women, and between people of all ages. All of these groups must be targeted if littering is to be substantially reduced.

However, the study showed that, even when overall rates of littering were similar, the patterns of littering were often dissimilar.

For example, the data suggests that young people are more likely to litter when they are in a group than when they are alone. This calls for specific strategies targeted to group situations, perhaps harnessing the peer pressure which currently appears to operate to encourage littering.

Adults over the age of 25, on the other hand, are most likely to litter when they are alone and they are also more likely than young people to deny littering. Adults who had just littered may have nominated 'teenagers' as the litter problem, possibly because they were not aware of their own littering.

Much of teenagers' littering appeared to be quite obvious, and occurred when the teenagers were in highly visible groups. Much of the littering done by adults, although it happens approximately as frequently as the littering done by teenagers, may be more discreet. Not only is this type of littering not easily visible to the passer-by, the litterers may also not be aware themselves.

Strategies need to be developed which recognise that much littering behaviour occurs while the person is not fully aware of their actions.

One step toward increased awareness may be publicising the littering behaviour types so that people can recognise their actions. This could be a first step in bringing about needed change.

While people need to know about effective anti-littering strategies, they also need to know how to teach and model such strategies.

Some of the parents observed in the study modelled binning behaviour for their children, cleaning up carefully after them and placing all of the family's disposable objects in the bin.

Other parents assisted children to clear away their own disposable objects, and accompanied children to the bin, lifting them up if the lid was too high to reach. In some families the children were responsible for clearing away everyone else's rubbish.

We do not yet know which one - or combination - of these strategies is most effective. After determining the most effective approach, parents could be informed how best to inculcate good disposal habits in their children.

Attitudinal Factors

It is clear from this research that the relationships between attitudes to littering and littering behaviour are complex. The study revealed no consistent correlation between behaviour and attitudes.

Dividing people into 'litterers' and 'non-litterers' is not the most useful distinction to make to bring about change.

We need to learn the attitudes which are associated with different patterns of disposal behaviour.

Object-Related Factors

Also, strategies need to be developed which recognise the different littering patterns associated with different objects. Cigarettes, for example, are littered in very different ways from other objects.

To illustrate the point, people who litter a beverage container are likely to litter other objects. Conversely, if a person bins their cigarette they are overwhelmingly likely to bin everything else, but the littering of a cigarette is less strongly associated with other littering.

Most of the people who littered cigarettes considered that they were litter, and felt that littering was an important environmental issue. Such contradictions in thinking need to be targeted and addressed.

On the other hand, beverage containers were the type of object most likely to be disposed of in a location other than the one in which they were first used. Often by the time a person was ready to dispose of a beverage container, they had already disposed of other objects and had made a transition to another activity and location. This has implications for the disposal of beverage containers, which should be further investigated.

Recyclable objects emerged as a special concern. Many people - particularly those over 25 - did not appear to recognise the function of recycling bins in public places. Initiatives are also needed in this area.

Environmental Factors

Environmental factors identified as important in the study were the design, placement and condition of bins, the presence of other 'bin-like' objects at the site and the nature of the site.

The design and placement of bins and signage needs to be further investigated, as well as the impact of objects other than bins which appear to compete for rubbish in the area - often successfully.

Specific strategies may also need to be developed to address littering at specific sites, or in specific situations - such as the transition point between waiting for a bus or tram and getting onto the bus or tram, or at special events, recreational activities and sporting venues.

The nature of the site also appears to impact on littering behaviour in a number of ways and some sites may have a tradition of littering which requires specifically targeted interventions.

Beaches emerged as a particularly important area where a wide range of activities occur. Each of these functions puts special demands on disposal resources while the availability of sand appeared to act as a temptation to people who simply buried their rubbish.

Littering behaviour on beaches appeared to be complex, and further investigation is required.

Other sites identified as important in the study, but which were not systematically addressed by it included sporting and entertainment venues, regional areas outside capital cities and litter on highways from motor vehicles.

We did not systematically study disposal behaviour in venues where cleaning services are provided or are deliberately withheld in order for the individual to be fully responsible. The forthcoming Olympics provides

a venue for Australia to continue to lead the strategic development of litter management programs based on well researched information.

A high proportion of people said that if no bin was available nearby they would put disposable objects into their car. Observers saw many examples of this behaviour but we do not know enough about the disposal of objects once they have entered vehicles.

Also, it is important to determine whether the study's findings are equally applicable to smaller cities and towns, and to rural areas. It may be that other patterns emerge in these areas, requiring different litter prevention and reduction strategies.

Assessment

Finally, the study demonstrates that the success of any initiative should be assessed by measuring changes in actual, observed behaviour, rather than self-reported behaviour and attitudes. The disparity between the behaviour observed and the behaviour and attitudes reported by people in this study shows that it is unwise to rely on findings based solely on respondents' self-awareness and frankness.

Recommended Framework for the Development of Prevention Strategies

Clearly, a range of approaches for preventing littering behaviour needs to be developed and implemented, to address the range of people, behaviours and contexts involved in littering.

Specifically, litter prevention strategies must:

- address littering behaviour in men and women of all ages and from all social groups;
- recognise the different littering patterns associated with different objects;
- recognise the different behavioural types associated with littering, from people who simply leave rubbish behind to those who carefully place it in some way; and,
- recognise that much littering behaviour occurs while the person is not fully aware of their actions.

Litter reduction strategies should be designed and implemented with behavioural change as a goal, and the success of strategies should be assessed by measuring changes in actual, observed behaviour rather than attitudes or self-reported behaviour.

Recommended Actions to Prevent Littering

Specific recommendations arising from the report include, that:

- **Programs be developed to make people more aware of the processes involved in disposing of their objects and the behaviours associated with them (eg. ‘wedging’, ‘foul shooting’), to better enable them to recognise and monitor their own behaviour.**
- **A media and public education campaign be developed which uses Australian cultural norms, harnessing the willingness of people to challenge the behaviour of their peers, and building on the Australian tradition of listening to mates.**
- **Initiatives be developed to address the proportion of littering which occurs at ‘transition points’, eg. when people are getting onto trams or buses. Such initiatives would include strategically placed bins and ashtrays at bus and tram stops etc. in conjunction with an attitude and education program.**
- **Special initiatives and campaigns be designed to target the littering of cigarettes, which were the objects most commonly littered in the study, and were associated with behavioural patterns which differed in important ways from all others observed. Such programs would require further understanding of the factors which differentiate cigarette smokers and their behaviour from other litterers.**
- **The design and placement of bins and ashtrays be re-examined to take into account the impact of collection frequency and ‘herd’ behaviour. (This study found many instances where bins were filled to overflowing only a few metres away from bins that were almost empty.)**
- **Programs be piloted and monitored to increase the effectiveness of away from home and public place recycling facilities, including improved signage, bin design, public education programs and the evaluation of contamination levels.**
- **The behavioural types identified in this report be further investigated, to determine the attitudinal and social factors associated with them, and to develop appropriately targeted litter reduction strategies to address them.**
- **Programs be established to assist parents to teach their children good binning habits. These were seen by many binners as having been critical in the formation of their good disposal behaviour.**

- **Litter prevention and reduction programs be evaluated using a combination of approaches to assessments including observationally measuring change in actual behaviour (given that there are often large differences between people's attitudes or self-reported behaviour and their real littering behaviour).**
- **Further research is required to develop and refine a number of the findings of this study, including further development of the model of disposal behaviour. Our understanding of disposal behaviour as a continuum is at a very early stage of development, and important work remains to be done in establishing the relationships between factors that influence littering and binning behaviour.**
- **Research is also required in areas which this study identified as important, but could not address adequately, such as the littering behaviour of people in rural areas or smaller centres throughout Australia, and the littering behaviour of people in vehicles and on beaches.**

As well as litter reduction strategies, the study identified areas in which more focussed research was required. Some of these followed from the groundbreaking findings of this study, such as the disposal model and the behavioural types associated with littering.

While we now know of the existence of these behavioural types, we do not yet know whether each is more likely to be displayed by males or females, or specific age groups, etc. Nor we do not know the sorts of attitudes associated with each.

Appendix A

1. Hobart Sites

Shopping precinct observations needed to be performed on Thursday and Friday, because most Hobart shops were closed on Sunday and on Saturday afternoons, while Monday, March 3, was a public holiday.

1.1. Mall

The Elizabeth Street Mall had a number of takeaways, outdoor cafes and benches.

1.2. Shopping Precinct #1

One observation site was located on Murray Street, by the walkway between two enclosed shopping malls. Takeaways were located on both sides of the street as well as clothing shops and department stores, and a bin was placed close to the stream of pedestrian traffic on both sides of the street.

1.3. Shopping Precinct #2

Liverpool Street had a busy takeaway outlet as well as a number of benches, some bins and some garden beds which displayed almost as much rubbish as the bins.

1.4. Public Building

Hobart's GPO was located next to the city's main bus exchange. It was particularly busy before and after school, as many students use buses here.

1.5. Park

St. David's Park was located next to the Salamanca Market. Although it was busiest on market day, it also proved a popular location on other days.

1.6. Waterfront

Constitution Dock had a number of takeaway food stalls, many of them located on small boats tied to the dock. As well as being a popular strolling and eating location, it was also a Clean Up Australia site.

1.7. Special Sites

One hour observations were conducted at :

- Salamanca market;
- the Mount Nelson lookout;
- Kingston Beach (which featured temporary recycling bins and a radio-sponsored beach cleaning campaign); and,
- Franklin Square.

2. Melbourne Sites

Melbourne observations were conducted during the week of the Australian Formula One Grand Prix and the Moomba festival, which provided several opportunities to view the disposal behaviour of people in large groups. A public transport strike and a public holiday (Labour Day) also occurred during this period.

2.1. Mall

The Bourke Street Mall presented good observation opportunities at all times, but offered a special bonus on the final day, when free yoghurt samples in plastic containers were given out to a large crowd of people.

2.2. Shopping Precinct #1

This site was located on Elizabeth Street and included a small area with benches, as well as the GPO. The steps of this building were a popular location for people wanting to sit in the shade to have a smoke or eat their lunch.

2.3. Shopping Precinct #2

The second shopping precinct was located on Latrobe Street, opposite Melbourne Central Station and the Daimaru building, in front of the National Museum of Victoria. This site provided a large number of benches, which proved popular with people wanting to take a break from work or shopping to sit and eat, drink or smoke.

2.4. Public Building

At Flinders Street Station, the observers were able to watch people waiting for trams in the street and people sitting on the steps waiting for trains, family or friends.

2.5. Park

Alexandra Gardens was one of the Moomba sites, and included carnival rides and many takeaway food kiosks. Some families picnicked here.

2.6. Waterfront

The banks of the Yarra River were another Moomba site, which attracted many picnicking families while the water-skiing events were in progress.

2.7. Special Sites

One hour observations were conducted at:

- Victoria Market;
- Lygon Street;
- City Square (which hosted two demonstrations during the observation period); and,
- Southgate.

3. Canberra Sites

During the observation period, both Canberra Day (a public holiday) and the Canberra Festival occurred, providing a number of special events.

3.1. Mall

Garema Place was particularly popular with teenagers. One observation period occurred during a chess tournament.

3.2. Shopping Precinct #1

City Walk contained a large number of takeaway food shops and shaded seats which proved to be popular locations for people wanting to eat, drink or smoke outside. It was close to a number of office buildings, shops and a large merry-go-round.

3.3. Shopping Precinct #2

Petrie Plaza contained takeaways and seats which were popular locations for people wanting to eat, drink or smoke outside. It was close to a number of office buildings as well as teen oriented shops and a cinema.

3.4. Public Building

Woden transit centre handled all bus traffic between the south areas of Canberra and the centre of the city. It was particularly busy before and after work and school, but being located close to a major shopping centre, it also had many people throughout the day.

3.5. Park

Glebe Park hosted a number of events for Canberra Festival week, most of them targeted to families with young children. A number of takeaway food stalls were also set up in the park.

3.6. Waterfront

The shore of Lake Burley Griffin, by the Captain Cook Jet and Nerang Pool had more people than usual during this period as a Food and Wine Festival was held in Commonwealth Park. Many people brought picnics to the waterfront; others passed by on their way to or from the festival.

3.7. Special Sites

One hour observations were conducted in:

- the Gorman House market;
- the National Botanic Gardens;
- the Food and Wine Festival; and,
- the Balloon Festival breakfast, an outdoor event held just after dawn on the lawns between the lake and Old Parliament House.

4. Sydney Sites

There were no public holidays during the observation period in Sydney, although many people may have been attracted to the city for the Royal Easter Show.

4.1. Mall

Martin Place was a mall surrounded by office buildings. Although many people took smoking breaks, ate lunch and used the train station in the site on weekdays, the site was almost deserted on weekends. It then became a favourite spot for skateboarders.

4.2. Shopping Precinct #1

Pitt Street mall was one of Sydney's busiest shopping streets. The site contained a large number of benches and takeaway food outlets.

4.3. Shopping Precinct #2

The second shopping precinct site was located on Alfred Street, between Pitt and Loftus Street. The site contained benches and takeaway food outlets, and was bordered by a busy bus shelter.

4.4. Public Building

Circular Quay contained large numbers of locals and tourists using trains and ferries. The site also featured many takeaway food outlets, public entertainment, benches and recycling bins.

4.5. Park

The Hyde Park observation site contained a train station, and was close to shops and offices. Although many people used the park as a route to and from the city, others visited the park to eat, read, play chess or take photographs of the Archibald Memorial fountain.

4.6. Waterfront

Darling Harbour offered food stalls and cafes, a children's playground, a military display and concert and - for part of the observation period - a boatload of male strippers.

4.7. Special Sites

One hour observation periods were held at:

- Paddington Market;
- Bondi Beach;
- Centennial Park; and,
- a particularly littered site on George Street.

5. Brisbane Sites

Brisbane city shoppers frequented outdoor mall areas, and three observation sites centred on the Queen Street Mall and the streets surrounding it. A number of school holiday events were held during this time. Some sites were located on the Gold Coast.

5.1. Mall

The area of the Queen Street mall closest to Edward Street was visited by a large number of shoppers and contained many seats and takeaway food shops. Many families were attracted to the children's entertainment and fashion shows.

5.2. Shopping Precinct #1

The site at the corner of Queen Street and Albert Street was known locally as the most littered site within the Queen Street Mall. It contained a transit station entrance as well as a large shopping complex, takeaway food shops, and benches next to garden beds .

5.3. Shopping Precinct #2

The corner of Elizabeth and Albert Streets contained takeaway food stores and a large number of benches to cater for the many people who caught buses there. There were also cinemas and a video-game parlour nearby, which made it popular in the evenings. Students of a business college a few doors away used the street for lunch and coffee breaks.

5.4. Public Building

Brisbane's GPO faced a small grassy area with many benches, which was used as a luncheon spot primarily by people in nearby offices, but also by tourists.

5.5. Park

The South Bank parklands are located alongside the Brisbane River. The site was located on a grassy hill opposite an artificial beach, and contained a large kiosk as well as ice cream stands. Special events - such as stilt walkers and lassoing demonstrations - occurred throughout the observation periods. A large number of children were present.

5.6. Waterfront

Surfers Paradise beach on the Gold Coast offered a variety of activities. As well as having swimmers and sunbathers, it was also the site of an outdoor volleyball tournament during part of the observation period. An evening concert attracted people to the beach during the final observation period.

5.7. Special Sites

One hour observations were conducted at:

- Riverside Market;
- Mount Coot-Tha Botanic Gardens;
- one site at the Indy races near the front entrance where a number of takeaway food stalls were located; and
- one site at the Indy races on a hill by the race track where spectators were drinking beer and other alcoholic drinks. Although there were no recycling bins at this site, virtually all of the objects deposited in the bins were aluminium cans.

6. Adelaide Sites

South Australia is the only state with Container Deposit Legislation. The observation period coincided with the first local football derby between the Adelaide Crows and Port Adelaide Power, which provided two special observation sites. Rundle Street Mall also provided two observation sites. The Mall extends for three blocks, and the two sites were at opposite ends of the Mall.

6.1. Mall

The Rundle Street Mall had many takeaways and benches; it also featured a wide variety of buskers. A fashion show was planned and put on during the final observation period.

6.2. Shopping Precinct #1

The King William Street end of Rundle Street had many benches which were favoured by elderly people and shoppers, as well as teenagers. It was surrounded by a wide variety of takeaway food stores.

6.3. Shopping Precinct #2

Glenelg is a popular weekend destination for many South Australians. The main shopping strip had a number of outdoor cafes and benches as well as takeaway food shops.

6.4. Public Building

The State Library faced a war memorial which attracted increasing numbers of visitors in the days leading up to Anzac Day. The site also had many benches for people waiting for buses, and for people snacking or eating lunch.

6.5. Park

Hindmarsh Square was close to the central shopping mall, a cinema complex and a number of office buildings. In fair weather, it was a popular spot for outdoor lunches. In all types of weather it had a good deal of traffic from shoppers and office workers moving into and out of the main shopping area.

6.6. Waterfront

Glenelg foreshore offered different types of activities; some people swam or sunbathed, while others fished from the pier or picnicked on the grassy lawns behind the beach.

6.7. Special Sites

One hour observations were conducted at:

- East End Market;
- Elder Park on the banks of the river Torrens;
- Adelaide Crows vs Port Adelaide Power football match (at barbeques in the car park);
and,
- Adelaide Crows vs Port Adelaide Power football match (near the front entrance where a local radio station was giving away free sausages and cans of soft drinks).

7. Perth Sites

Because Anzac Day occurred during the observation period, the schedule was changed. In all other cities, weekday observations were conducted on Thursday and Friday. Because Friday was a public holiday in Perth, weekday observations were conducted on Wednesday and Thursday.

7.1. Mall

The Murray Street Mall offered benches, takeaway food stores and a variety of buskers. Because of school holidays, a wide range of ages came to the Mall during the observation periods.

7.2. Shopping Precinct #1

The first shopping precinct, on the corner of Murray and Barrack Streets, was an exceptionally littered area, which often had overflowing bins. In the vicinity of the site were a cinema complex, two bus stops and a number of takeaway food stores.

7.3. Shopping Precinct #2

This area on Hay Street was continuously busy with a steady stream of shoppers. As school holidays were on, many families came to shop and watch the buskers.

7.4. Public Building

The GPO was the site of a special charity drive by hundreds of local university students in the first two observation periods. The site also saw a steady stream of commuter traffic, as it was close to Perth railway station.

7.5. Park

Esplanade Park, near the harbour in Fremantle, was used by a large number of families picnicking on Anzac Day. Many people also bought food from local kiosks and food stalls.

7.6. Waterfront

New recycling bins were being officially launched during the observation period. The observation site included grassy areas, benches, takeaways and a bike path as well as the beach.

7.7. Special Sites

One hour observations were conducted in:

- Fremantle Market;
- Cottesloe Beach;
- Scarborough Beach; and,
- Rottnest Island. A special observation period was conducted outside the main shopping facilities on the island.

8. Darwin Sites

Because of Darwin's climate, much shopping is done in air-conditioned enclosed areas or at outdoor markets, particularly after sunset. Many of the observations occurred at these markets, which were the busiest sites in Darwin. Even the waterfront site was a market here; the beaches were not yet safe for swimming when the research team visited Darwin.

8.1. Mall

Smith Street Mall was located in the centre of town and was two blocks long. It afforded a good variety of pedestrians throughout the day, and had a set of recycling bins as well as the benches and takeaways.

8.2. Shopping Precinct #1

Darwin Plaza, located within the Smith Street Mall, was shaded by a canopy and included a children's play structure, as well as tables with inset chessboards and stone benches. It often attracted a different type of traffic from the other shopping precinct observation site.

8.3. Shopping Precinct #2

This was a popular Saturday market, which featured many takeaway stalls as well as craft stalls and was surrounded by permanent shops, with outdoor eating facilities.

8.4. Public Building

The paved square outside the state library on Knuckey Street was a favourite spot for people disembarking from or waiting for buses from outlying communities. A supermarket across the street and a takeaway provided a large number of disposable objects.

8.5. Park

Tamarind Park was surrounded by offices and takeaway restaurants; it was only a block away from the main downtown shopping district. It had stone tables and benches, as well as bins and an area which was favoured by smokers having brief breaks.

8.6. Waterfront

The busiest area in Darwin was Wandil Beach, at the sunset market. Up to five thousand people gathered to shop, eat and watch the sunset on the beach. Both the beach and the market stalls were observed.

8.7. Special Sites

One hour observations were held at:

- Rapid Creek Market;
- the Esplanade park and beach area;
- Stokes Hill Wharf; and
- the seats surrounding a statue donated by Darwin's sister city in Greece - outside the Victoria Hotel, close to a money exchange and a number of souvenir shops.

APPENDIX B

Definitions of Key Terms:

Litter -- any disposable object left behind or placed in a location other than a bin before a person left the observation site.

Rather than choosing a very formal definition of litter, the researchers chose a functional definition; 'anything which most members of the general public would consider litter, and would cause them to behave as if the site was littered'.

Size was not generally a factor, but observers were guided by common sense in this regard - a person eating and leaving behind a few crumbs was not considered a litterer, but someone leaving behind half a hamburger and a dozen chips on their seat was considered a litterer.

In some cases, small amounts of food were considered litter. In Darwin a few small pieces of chicken - perhaps a centimetre in diameter - were dropped on a bench and left behind; they were soon swarming with ants. People looking for a spot to sit would come up to this bench, look at it and turn away - preferring to stand or walk further rather than sit there. Since the dropped food caused this reaction, it was litter by the definition outlined above.

Littering - - discarding a disposable object in any location other than on one's person (see below), or in a bin or ashtray. Spitting was not included.

Objects that appeared to be accidentally disposed of were included as litter (eg. a serviette that fell off a plate on its way to a bin; a piece of plastic blown away by the wind).

Placing non-recyclable objects into a recycling bin (contamination) was not considered littering, but was recorded and analysed separately.

Littering was not counted unless the observers were able to determine that the object was in possession of the person being observed. Simply sitting beside a beverage container was not enough, as it might have been discarded by somebody else. To be classified as a litterer, a person had to interact with an object (eg. drinking from the beverage container).

Using a bin - - placing a disposable object securely inside a bin.

Objects placed on top of overflowing bins so that they fell out within a matter of seconds or within a few minutes were recorded as having been littered, rather than binned. If, however, they were still sitting on top of the bin at the end of the observation period - however precarious their long term future may have appeared - they were recorded as having been placed in the bin.

In pocket -- This term was used to record someone placing a disposable object in their bag or pocket for later disposal or re-use.

To be classified in this way, the object had to be no longer useful - beverage containers had to be empty, food wrap could contain no food, etc. For this reason, objects such as ATM slips and newspapers were not classified with this term; it was possible that when people placed such items into a bag or into their pockets, it was because they did not consider these items to be disposable.

Transition - This term was used if a person changed their major activity within 30 seconds of disposal, eg. from sitting on a bench to walking, or from waiting for a bus to climbing onto the bus.

References

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