Environment Protection and Heritage Council

Estimating consumers' willingness to pay for improvements to packaging and beverage container waste management

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Environment Protection and Heritage Council
PricewaterhouseCoopers

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Abbreviations

ABARE	Australian Bureau of Agricultural and Resource Economics
ABS	Australian Bureau of Statistics
ADF	Advance Disposal Fee
CDS	Container Deposit Scheme
EPHC	Environment Protection and Heritage Council
HH	Household
NEPM	National Environmental Protection Measure
PwC	PricewaterhouseCoopers
RIS	Regulatory Impact Statement
WTP	Willingness to pay

Executive Summary

Australia generates approximately 4.4 million tonnes of packaging waste each year, which constitutes waste paper and cardboard boxes, beverage containers (for example milk and juice cartons, bottles and cans of soft drink, beer and wine) and plastic wrapping, foam, polystyrene and other materials. Beverage container waste comprises about 25% of total packaging waste.

Of the total packaging waste, approximately 55% is recovered and recycled. The remaining waste is disposed in landfill or is treated at advanced waste facilities. The target recycling rate under the National Packaging Covenant is 65% by 2010.

In April 2008 the Environment Protection and Heritage Council (EPHC) commenced an assessment of potential options, including container deposit legislation, which would be suitable as a national measure to manage the impacts of used packaging. A range of options are under consideration:

- extending kerbside recycling services and drop-off facilities
- a national container deposit scheme
- improved recycling in core public consumption areas
- improved recycling in work places
- establishment of residual waste processing centres
- a number of alternative funding mechanisms – such as an advance disposal fee or voluntary industry levy.

These options vary in their cost-effectiveness at promoting increased recycling. A study commissioned by the EPHC found that costs range from less than $100 per tonne of packaging waste recovered to a maximum of $2,040 per tonne (BDA Group and Wright Corporate Strategy, 2009).

For some of the options investigated in the BDA study, the estimated financial costs of additional recycling exceeded market benefits, where these benefits are the value of materials recovered, the value of land ‘saved’ from landfill and potential savings in managing the collection and disposal of packaging waste.

This means that for options where costs exceed benefits on a commercial basis, there would need to be community values for recycling over and above the market benefits for increased recycling to produce a net public benefit. It was outside the scope of the BDA study to estimate community ‘non-market’ values.

Objective of this study

At present, there is little quantified information about Australia-wide community willingness to pay for increased waste packaging recycling. In recognition of this critical information gap, the EPHC engaged PricewaterhouseCoopers to undertake a non-market valuation study to estimate consumers’ values for additional waste packaging recovery and recycling.

The results of this study are to inform policy decisions about the net public benefit of additional recycling through one or more of the options above. The results are to assist with the selection of candidate options if EPHC choose to conduct a consultation regulatory impact statement (RIS), which would culminate in a comprehensive cost-benefit analysis.

Non-market costs and benefits

Waste management strategies can result in a variety of public good outcomes that are not exchanged in markets, and hence are not priced by a market. Examples of values that may be held include:

- community values for reducing the amount of waste being disposed in landfill – the concept of a reduced 'ecological footprint'
- values for improved aesthetics due to less litter in public places
- values for conservation of today's resources for future generations
- the value placed on passing on an environment to future generations that is in a condition no worse than today
- value derived from the knowledge that a waste management strategy will maintain the environment in 'good condition' (for example, the knowledge that flora and fauna can exist without interference from waste packaging).

There may also be non-market costs associated with increased recycling. Some options could require consumers to change their waste disposal habits – for example, spend additional time sorting their recyclables from residual waste or dropping off their used containers to a recycling depot. This may represent an inconvenience cost for some.

Different policies result in different outcomes in terms of the amount of material that can be recovered, the type of material recovered, the impact on litter reduction, the monetary cost to households and the level of inconvenience imposed. Technically, this is referred to as policy change rendering outcomes defined by multiple attributes. This study sought to understand the preferences and values people have for changes in each attribute and the trade-offs people are willing to make between the outcomes.

Methods

A Choice Modelling method was used to estimate consumer values for a number of attribute outcomes of waste packaging recycling. This is a well established survey technique for eliciting consumer preferences and weightings for various attributes. In effect, the technique aims to simulate a real market where the provision of goods and services are non-market attributes as opposed to market commodities.

Following extensive focus group discussions, three attributes were selected for testing using a choice experiment:

- The percentage increase in packaging waste recycled
- The percentage reduction in litter
- The additional annual cost to the respondent's household (in terms of increased product prices or increased council rates).

All waste management options and outcomes were framed in a national context, so the percentage increases (or reductions) referred to above were measured against current national recycling or litter levels. The framing was not specific to any one option under investigation, which means that people were asked to value outcomes of recycling as opposed to preferences for particular options for achieving those outcomes.

Survey respondents were reminded that the options under investigation in the study only apply to the recycling of packaging waste and that there are many other types of waste. Further, respondents were reminded that they should remember how much income they have available to spend on recycling and

be conscious of other financial commitments that may limit how much they can afford. Protest responses and invalid bids were identified and removed from the willingness to pay model.

Survey sampling

A total of 3,432 households were surveyed using an on-line questionnaire. The households were drawn from 15 regions within Australia, including eight capital cities and seven regional areas outside of the metropolitan capital city areas (one from each State and Territory excluding the Australian Capital Territory). The samples were drawn from a panel of approximately 303,000 people and quotas with respect to age, gender and income were set to ensure that samples were representative of the city and regional populations.

Choice modelling results

On average, respondents were found to be strongly 'pro-recycling'. This finding is consistent with the focus group research undertaken prior to the survey. Pro-recycling attitudes were evidenced by

- 65% of the households agreeing or strongly agreeing with the statement that "I think recycling is an important issue and we should do all we can"; and
- 86% of the sample agreeing or strongly agreeing with the statement that "Waste packaging is causing environmental problems".

Furthermore, 84% of respondents expressed a willingness to pay for increased recycling by selecting a payment option in one or more of the choice sets. Key results from the choice modelling experiment are as follows:

- Willingness to pay for increased weight recycled: Based on the national sample, households are willing to pay, on average, $2.77 per year for every 1% increase in the weight of waste packaging recycled, above the current national average level of recycling of 55%. Using the upper bound estimated aggregation factor (80%) this equates to an aggregate willingness to pay of $18.4 million per annum for each 1% increase. The 95% confidence interval of this estimate indicates a range between $14.6 million and $25.1 million.
- While there are some apparent differences in values across the regional and metropolitan capital city samples, ranging in a band between $1.00 and $3.00 per 1% point increase in weight recycled, all these estimates have overlapping 95% confidence intervals, which indicates that the differences are not statistically significant.
- Willingness to pay for litter reduction: Based on the national sample, households are willing to pay, on average, $4.15 per 1% point reduction in litter, or $41.50 per annum for a 10% reduction in litter and $83.00 for a 20% reduction.
- Using the upper bound estimated aggregation factor (80%), aggregate willingness to pay equates to $276.1 million and $552.2 million per annum for a 10% and 20% reduction, respectively. The 95% confidence intervals of these estimates are presented in Table ES1.
- While the linear increase in willingness to pay over the tested levels of litter reduction is a construct of the model, it is found to be an acceptable approximation of the true relationship as alternative, non-linear functional forms did not produce a better fitting model.
- The unit values are relative to the 'no-change' base case of 0% litter reduction. However, care needs to be taken in applying the $4.15 figure to litter reductions between the range of 0% to 10% reduction. This is because respondents could have pegged their valuations on two discrete levels of litter reduction (respondents were informed that the 10% reduction corresponds to a 'noticeable improvement' and a 20% reduction corresponds to a 'significant improvement'). Under this

experimental construct, it may be the case that the value function is a stepped function, as opposed to a linear function over the entire range of levels tested (0% to 20% reduction). That is, litter reductions below the 10% threshold may not have been valued as highly – if at all – because these reductions could have been interpreted by respondents as having no noticeable effect.

- Given this uncertainty, it is recommended that a conservative approach be taken when applying the results to potential policy measures. It is recommended that estimated values should only enter the analysis framework if the 10% threshold or 20% threshold are expected to be reached. In practice, when using these estimates in a benefit cost framework, this implies including an estimate for non-market benefits of:
  - Zero for any reduction in the national level of litter that is not noticeable (<10%);
  - $276.1 million per annum for a noticeable reduction (10%), or
  - $552.2 million per annum for a significant reduction (20% the highest level tested in the choice experiment).

Table ES1 – Maximum aggregate WTP estimates

WTP Component	Lower 95% confidence limit	Mean estimate	Upper 95% confidence limit
10% increase in national weight recycled	$146.0m	$184.0m	$251.0m
'noticeable improvement' (10% reduction) in litter	$225.5m	$276.1m	$451.1m
'significant improvement' (20% reduction) in litter	$347.3m	$552.2m	$694.6m

The results indicate that litter reduction is perceived to be important, if not more important than recycling packaging materials. It is possible that people identify with the tangible, visual outcomes of reduced litter more than recycling of waste, which produces outcomes that are less visual.

Container Deposit Scheme participation model

Inconvenience costs, to the extent that they occur, were expected to be mainly associated with the container deposit scheme (CDS), which requires consumers to return containers to a collection centre for redemption of the deposit. It was posited that an inconvenience cost could arise in cases where people are time-constrained. The effort involved in storing and dropping off containers could represent a cost to some individuals if these activities compete with demands on people's time from activities that are more highly valued or that are assigned greater priority by the individual.

In a question that followed the choice experiment, respondents were asked whether they would be willing to participate in a national container deposit scheme, where the amount of deposit was specified to respondents and varied across three sub-samples.

It should be noted that the stated participation rates do not necessarily correspond with the recovery rate of a CDS as the recovery rate will depend on the amount returned, rather than numbers of participants. Furthermore, allowance must be made for the fact that third parties, such as school groups and scouts, will return containers on behalf of households.

Analysis of results for the full 3,432 sample finds that 84% of respondents would personally return containers consumed at home to a recycling centre if a deposit of 10c was available for redemption.

Participation is not very sensitive to higher deposit rates (increasing to 86% at 20 cents and 88% at 50 cents).

It was expected that households living further away from a shopping centre (the site of the collection centre) would be less likely to participate, all else being equal, due to the inconvenience of travelling long distances to return containers. The relationship between distance and participation was the planned mechanism through which a dollar value was to be estimated for inconvenience.

However, this method was unable to be applied because distance did not influence participation rate. This result is counter intuitive but can be explained by noting that the majority of the sample resided less than 10km from a shopping centre. Variations in distance over this relatively short range appear not to be a factor of concern to households in their participation decision. Alternatively (or in addition to) 'distance' may be a poor proxy for measuring inconvenience, possibly because households would incorporate their container drop-off as part of their normal weekly or fortnightly shopping routine.

Conclusion

The willingness to pay estimates for two key outcomes of improved waste management (increased recycling and reduced litter) provide indicative value measures for use in a cost-benefit analysis of various national options for managing packaging waste. Because the values are expressed in unit terms ($ per unit outcome) the results can be aggregated to reflect the scale of changes in litter or recycling expected under a particular policy approach.

One of the observations arising out of this research is that linkage between litter reduction, in terms of tonnes of waste packaging litter collected, and consequent visual aesthetics are not well understood. The values estimated in this survey are based on people's willingness to pay for a noticeable improvement and a significant improvement in aesthetics due to litter reduction. For the purposes of the survey it is assumed the reductions of 10% and 20% would result in a noticeable and significant improvement, respectively. This assumption needs to be tested if the unit values are to be used to assess the aggregate value impact of alternative litter management scenarios. In concept, it should be possible to simulate the effect of different levels of packaging litter reduction on streetscapes and visual aesthetics, with perhaps an aesthetics scale developed for different litter densities.

The absence of a reliable and tested calibration scale for linking the choice modelling values for 'noticeable' and 'significant' improvements in visual aesthetics to reductions in litter prevents the survey results for litter being applied with confidence to the policy options considered in the BDA study.

Further research is required to quantify the size of inconvenience cost that a CDS may impose on households. In this study, distance to a collection centre was found to be an inadequate proxy for measuring inconvenience cost. While the survey finds that stated participation in a national CDS is high (84 to 88 per cent, depending on deposit amount), this does not necessarily imply that inconvenience costs are low. It tells us that other, positive factors from participating in a CDS are outweighing perceived inconvenience.

The development of a specific stated preference survey for a CDS would be one avenue for providing greater focus on measuring inconvenience values — in addition to any other impacts that are specific for CDS. One of the limitations of the generic approach adopted in this study is that impacts that are largely specific to one type of policy mechanism cannot be explored in any depth. The generic approach was the right approach to take, given the terms of reference for this study called for the estimation of values that could be used to evaluate multiple policy options. However, it does preclude a highly detailed analysis of the potential impacts associated with any one option — for example, inconvenience of participating in a CDS.

Contents

1 Introduction

This study follows the Environment Protection and Heritage Council's (EPHC's) decision in April 2008 to conduct an assessment of potential options, including container deposit legislation, which would be suitable as a national measure to manage the impacts of used packaging in Australia. In 2008 the EPHC commissioned BDA Group and Wright Corporate Strategy Pty Ltd to undertake an initial investigation into potential national options for increasing the recovery and recycling of beverage containers (henceforth referred to as the BDA study). The focus of this study was to compare the cost effectiveness of different options (in terms of dollar cost per unit of additional waste recycled) and the capacity of each option to reduce litter.

The BDA study was not intended to be a cost-benefit analysis and consequently was limited to an examination of market costs (and some market benefits) associated with each option. It did not include estimates of the 'non-market' values that society may hold for the increased recycling and reduced litter in public places. For example, people may perceive and value:

- environmental benefits from recycling materials as opposed to processing virgin materials – thus conserving resources for future generations
- benefits to future generations from leaving land in 'good condition' by reducing the amount of waste disposed in landfill and thus reducing society's ecological footprint
- the aesthetics of cleaner public places due to less packaging litter.

These values could be significant, as over 80% of national households currently engage in recycling and waste minimisation (Productivity Commission 2006). Furthermore, it is important to understand the magnitude of these values because some of the options investigated by BDA study were found to result in large net costs, meaning that without the addition of non-market benefits the options would be difficult to justify on commercial grounds. The size of non-market benefits attributable to each option is therefore a critical piece of missing information for comparing the relative net benefits of alternative options.

The purpose of this project is to address this information gap and estimate community values for non-market outcomes. As agreed by the EPHC at its May 2009 meeting, this study would be stage one of a two part process. In the second stage, Council will use the results of the community survey and the beverage container investigation by BDA (2009) to consider whether to progress to a full regulatory impact statement for a national scheme.

There may also be non-market costs associated with some types of waste management options. The BDA study included an estimate of 'inconvenience cost' pertaining to a container deposit scheme (CDS). Collectively, consumers participating in such a scheme were assumed to experience inconvenience or a time cost equivalent to two cents per container due to the need to return containers to a recycling depot. This current study of community values for recycling seeks to verify this estimate by measuring the value of inconvenience.

A stated preference approach is used in this study to estimate non-market values. By definition, these values are not able to be observed from exchanges of market goods and services, so it is necessary to create a hypothetical market where survey respondents are asked to state their preferences between different waste management outcomes. This approach is, in effect, simulating real market conditions and requiring respondents to make trade-off decisions. A Choice Modelling technique is used to present these options to households and to estimate values and preferences for alternative recycling outcomes.

1.1 Packaging waste management

According to the National Packaging Covenant, Australia generated approximately 4.4 million tonnes of packaging waste in 2006/07 (NPCC 2008). This equates to about 190kg per person, or 570kg per household each year, of which:

- About half (50%) of this waste is paper and cardboard boxes
- One quarter (25%) is beverage containers – for example milk and juice cartons, bottles and cans of soft drink, beer and wine
- The remaining quarter (25%) includes plastic wrapping, foam, polystyrene and other materials.

Of the total packaging waste, approximately 55% is recovered and recycled, made up of the material recycling rates shown in Table 1.[1] The remaining waste is disposed in landfill or is treated at advanced waste facilities.

Table 1: 2007 National recycling rates of packaging materials

Material	Recycling Rate
Paper and cardboard	65%
Glass	39%
Steel	29%
Aluminium	70%
Plastics	30%
Weighted average	54%

Source: BDA Group, *'Beverage container investigation'*, March 2009

A range of collection and recycling measures are currently in place to achieve this rate of recycling. These measures include kerbside collection by local councils, commercial collection, placement of recycling bins in public places and work places, general litter collection and drop-off facilities. Recycling rates vary between States and Territories, in a large part due to differences in the policy measures and recycling initiatives adopted by each jurisdiction. South Australia, for example, operates a CDS to recover beverage containers excluding plain milk, wine, fruit juice in containers of more than one litre, flavoured milk in containers of more than one litre, and any containers greater than three litres; and achieves recycling rates of approximately 77% for beverage containers covered by this measure (EPA SA 2009).

[1] Estimates of the proportion of packaging waste recycled in 2007 vary from 54% (National Packaging Covenant Mid-term review, 2008) to 56% (National Packaging Covenant, mid-term performance review data report). On advice from the Project Steering Committee, PwC adopted 55% as a reasonable estimate of the current level of recycling.

1.1.1 The National Packaging Covenant

The National Packaging Covenant aims to increase these recycling rates through a voluntary framework, which is designed to encourage collaboration and efficiency. The National Packaging Covenant is a voluntary component of a co-regulatory arrangement for managing the environmental impacts of consumer packaging in Australia. It is an agreement between key stakeholders in the packaging supply chain and all levels of government based on the principles of shared responsibility through product stewardship.

The Covenant is designed to minimise the environmental impacts arising from the disposal of packaging, conserve resources through better design and production processes, and facilitate the re-use and recycling of used packaging materials. The Covenant establishes a framework for the effective life cycle management of consumer packaging that will be delivered through a collaborative approach between all participants of the packaging supply chain, consumers, collectors, recyclers and all levels of government.

The regulatory underpinning of the Covenant is provided by the National Environmental Protection Measure (NEPM), designed to deal with free riders and non-signatories. The NEPM is overseen by the National Environment Protection Council (NEPC), which addresses broad national policy issues relating to environmental protection, particularly in regards to waste, air and water issues.

The Covenant has an overall packaging recycling target of 65% by 2010. In 2008 a mid term review of the Covenant framework was conducted which indicated that the recycling target may be met, the review also pointed out that a significant proportion of the improvement in the recycling rate for waste packaging was from the growth in export markets for paper, cardboard and mixed plastics[2].

1.1.2 Policy options under consideration

A range of policy alternatives for promoting increased recycling of waste packaging are currently being considered by State and Territory governments and the federal government. Table 2 contains a summary of the options investigated in the BDA study. The effectiveness of these options at recovering waste packaging material and lifting recycling rates varies – as does the expected outcomes for litter reduction and level of inconvenience imposed on consumers.

[2] National Packaging Covenant Council, *'National Packaging Covenant Mid Term Review',* October 2008.

Table 2: Policy options considered in the BDA study

Policy Option	Description
Container deposit scheme	A container deposit scheme (CDS) would mandate a ten cent refundable deposit on all beverage container purchases, which is refunded when the used container is returned for recycling. The scheme modelled by BDA would cover aluminium, glass, plastic, liquid paperboard and steel containers. This would be administered by a government body and would include all containers used for soft drink, fruit juices, milk (plain and flavoured), beer, wine and spirits. This option differs from many of the other options under consideration in that it targets only beverage containers rather than other types of packaging waste. Based on the modelling in the BDA Report it is also expected to have the greatest impact on reducing litter and is assumed to impose an inconvenience cost on households participating in the scheme.
Extended coverage of kerbside recycling/drop off	This option would involve improvements to the existing kerbside recycling scheme and would primarily include extending coverage of the existing service, by increasing the rate of recycling through public awareness and education programs, and extension of the service to small businesses.
Improved recycling at core consumption centres	This option incorporates measures to increase recycling at core public consumption areas, including minimum requirements for event co-ordinators and encouragement for the private sector at events and areas where large amounts of packaging and beverage containers are used like hospitality and retail.
Improved recycling at work places	Improved recycling in the work place would entail making improvements to recycling from small commercial and industrial enterprises through existing nationally funded instruments. Alternatively, this could be implemented at a jurisdictional level, much like the 'Recycling at Work' initiative in SA. Its aim would be to kick start a collection that would have the potential to self support in a relatively short time.
Residual waste processing centres	This option would make use of the potential recyclables in the mixed residual waste streams and use Alternative Waste Technologies (AWTs) to increase recovery rates of packaging and beverage containers.
Advance disposal fee	This option considers the implementation of a legislative (uniform weight based) fee per tonne on all packaging materials, which would be managed by a government body. The revenue derived would then be used to fund increased recovery of packaging materials, using the most efficient option(s) deemed by the scheme manager.
Voluntary industry levy	A voluntary industry levy would entail large companies opting to contribute to a set price levy per tonne, designed to be voluntarily administered by the beverage industry to raise monies to fund increased glass recovery.

1.2 Economic principles

1.2.1 Market failures associated with waste

There are a number of reasons why government intervention in waste management may be justified on economic grounds. In the absence of government policy measures, market failures may lead to sub-optimal levels of recycling in terms of outcomes that deliver less than maximum social benefit. Market failure can arise due to some of the benefits of waste management being public goods. These are goods characterised as being:

- Non-rival in consumption (for example, one person's enjoyment of a cleaner streetscape does not detract from another persons enjoyment), and
- Non-excludable – that is, there is no mechanism for providing exclusive access to the benefits.

These characteristics give rise to free-rider behaviour, whereby there is no incentive for any one individual, household or firm to undertake additional recycling because the benefits of doing so are socialised and it is difficult or impossible to recover the costs of additional recycling from beneficiaries. This is not to say that some individuals may act altruistically as opposed to out of pure self interest. However, on average, over the entire population, free riding would have the effect of reducing the level of recycling.

The aim of stated preference techniques such as Choice Modelling is to control for this free riding behaviour through controlled choice experiments so that an estimate can be made of how much people value public goods and would be prepared to pay, on average, for increased levels of recycling or reduced litter.

Another potential source of market failure in waste management is the possible environmental 'externalities' associated with landfill and with the extraction/harvesting and processing of virgin materials. Disposal of some types of waste packaging in landfill may result in reduced environmental quality. To the extent that these costs are not incorporated into landfill levies and municipal rates, an externality is said to occur. Similarly, a negative externality arises if the environmental costs of mining raw materials or harvesting wood products, for example, are not fully accounted for in the price of these materials. The failure to include externalities in landfill charges and prices of virgin materials (where and when these occur) would lead to a sub-optimal level of recycling. Once again, environmental externalities represent non-market impacts and costs for which observed values are not revealed in markets. A stated preference technique such as Choice Modelling is required to estimate how much people are prepared to pay to overcome the negative environmental impacts.

Less than optimal levels of recycling could also occur due to information asymmetry, whereby governments, businesses and the public are not fully informed about the consequences of their consumption, production and waste disposal decisions in relation to waste packaging.

While the existence of market failure is an important precondition for considering government intervention, it does not alone justify government action. Other factors come into play, primarily the total cost of addressing the market failure relative to non-market benefits of lifting recycling levels to their social optimum. This study provides estimates of the non-market benefits but does not consider the cost of implementing policies.

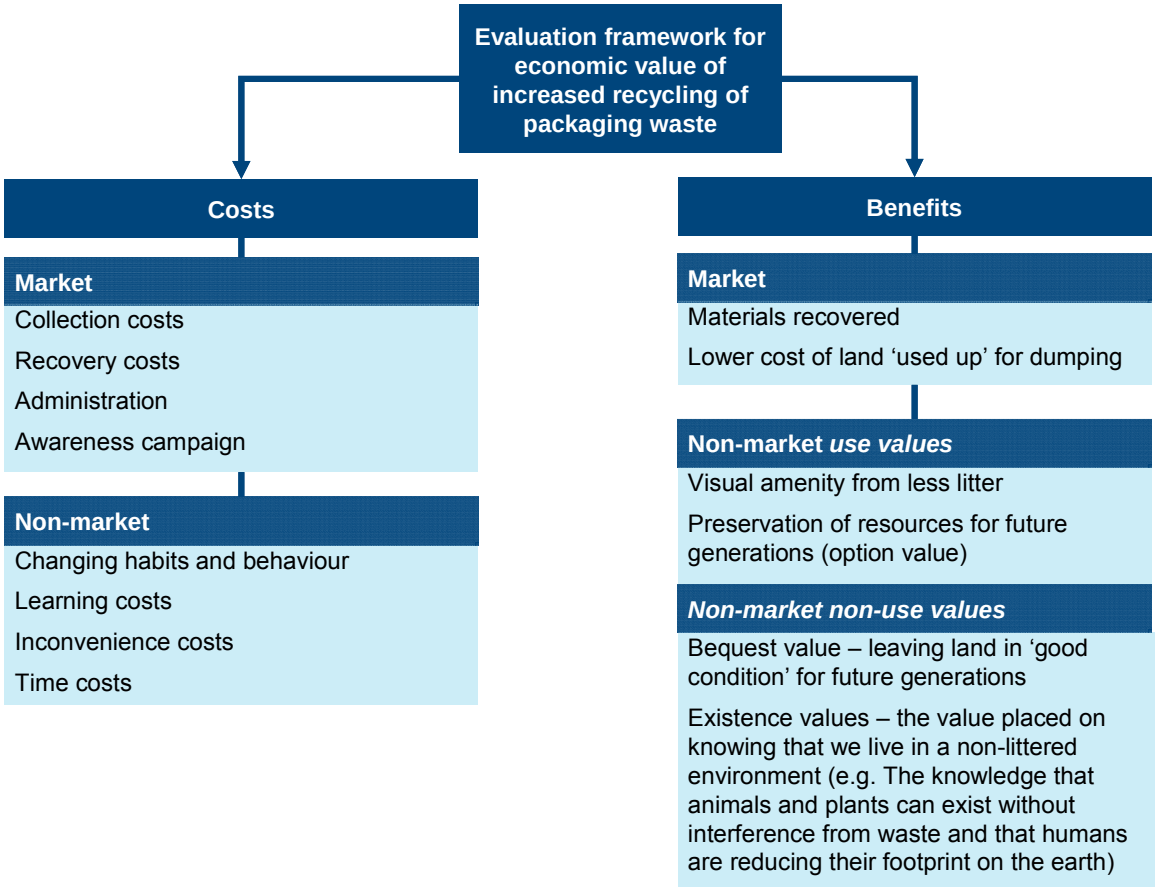
1.2.2 A framework for evaluating costs and benefits

Figure 1 sets out the main types of market and non-market values associated with increased recycling of waste packaging. Of particular interest to this study are the non-market values. These are further classified as either use values or non-use values.

- Use values refer to those benefits that arise from participating in the experiences provided by the increased level of environmental quality due to recycling or aesthetic amenity from reduced litter in public places. Further, use values may include the conservation of resources today for future generations –effectively a preservation of an option for future use.
- Non-use values include categories of benefits such as bequest value and existence value. Bequest values refer to value some people may place on passing on an environment to future generations – effectively a preservation of an option for future use. Existence value is a benefit derived from the knowledge that the environment is maintained in good condition through recycling measures (for example, the knowledge that flora and fauna can exist without interference from waste packaging).

Households may also experience a non-market, inconvenience cost with some waste management measures. This is particularly so for those measures that requires households to change their habits or expend time sorting waste packaging material and/or taking it to a recycling centre.

Figure 1: Evaluation framework for economic value of increasing recycling of packaging waste

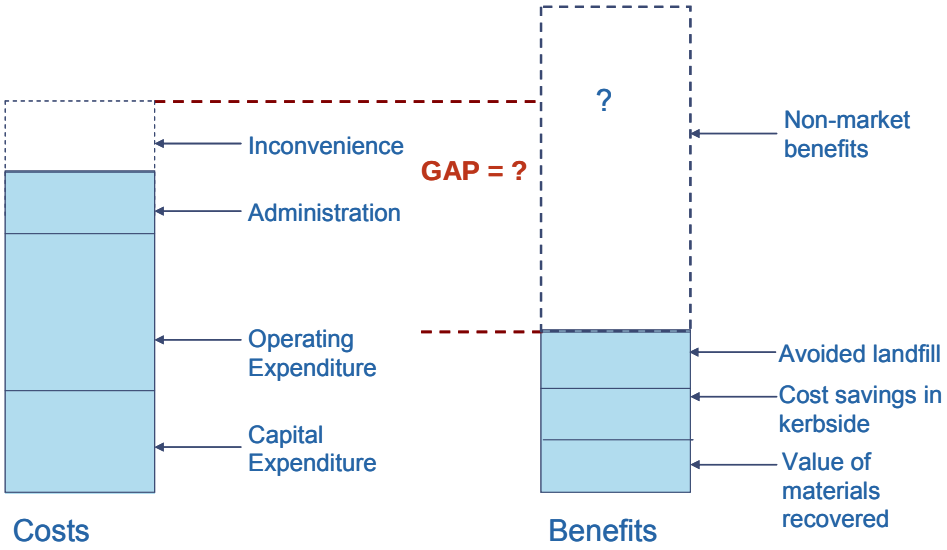


1.2.3 The benefit-cost gap

Previous economic assessments have shown that the market costs of increased waste packaging recycling can outweigh the market benefits – principally the value of materials recovered, the value of urban land 'saved' from landfill and any benefits in reduced cost of collecting material through the existing kerbside disposal service. This situation is depicted diagrammatically in Figure 2. Cost estimates also include inconvenience costs and the 'gap' is inclusive of this cost.

The benefit-cost gap needs to be filled (or closed) if recycling is to result in an overall net benefit to society. This gap, if it is to be filled, must come from the community's non-market values for recycling outcomes. The size of the gap is also critically dependent on the assumed size of inconvenience cost imposed by the policy option under investigation (also a non-market factor).

Figure 2: The benefit cost gap[3]



1.3 Key policy questions

The value estimates produced in this study serve as inputs to benefit-cost analyses of alternative waste management options. When used in conjunction with estimates of the market costs and benefits, the values assist with decision making about three key policy questions:

- How much waste recycling is optimal? This is a high level decision about the target levels of waste packaging recovery and recycling. The Choice Modelling technique is designed to elicit whether people are willing to pay for the public good outcomes arising from increases in recycling above current levels.
- What types of outcomes are valued by the community? Changes in waste management strategies can result in a variety of public good outcomes (eg changes in litter count, more recycled materials used in the production of goods, lower ecological 'footprint'). Technically, this is referred to policy change rendering outcomes defined by multiple attributes. This is because different policy interventions result in different combinations of these attributes and at different levels of provision, it is important to understand the preferences and values that people have for changes in each attribute and the trade-offs people are willing to make between the outcomes.

[3] Note that this illustration is onlystylised and no weight should be placed on the relative sizes of boxes.

- What policy mechanisms should be used? To answer this question, information is needed about the type and magnitude of outcomes expected under each policy mechanism (for example, those summarised in Table 2). Unit values for each outcome can then be assembled to calculate a total community value for particular policies. The Choice Modelling study deliberately focuses on the valuation of outcomes as opposed to directly asking people about their preferences for different processes and policies. Through the careful selection of attributes, the choice experiment is designed to capture the effects and implications that each policy may impart and to present this information to survey respondents. It is this information that respondents use to make choices between different management outcomes.

1.4 Study terms of reference

The overarching objective of this study is to provide estimates of community willingness to pay for public good outcomes associated with increased recycling of packaging waste. These estimates, together with results from the BDA study, are to form a basis for examining whether one or more additional, national measures should proceed to a consultation regulatory impact statement. The terms of reference for this study require that the method be suitably designed so as to allow an assessment of a suite of options including collection through:

- Kerbside pickup (designated times at regular intervals)
- Drop-off sites eg waste sites (local transfer station, reverse vending machines, recycling centre, landfill site), retail outlets, Council sites, etc.
- Workplace
- Away-from-home outdoor and public venues such as hotels, sporting facilities, shopping strips, transport hubs etc. where items can be purchased, consumed and disposed of
- Public place litter clean up.

The project brief also calls for:

- Identification of the nature and types of community benefits (ie private and external benefits, use and non-use values) associated with resource recovery and litter reduction in Australia.
- Development of suitably framed and plausible valuation scenario(s) for packaging and beverage container waste management. The scenario(s) should:
  A. be consistent with how consumers/community perceive waste management and recycling in general
  B. recognise practical issues in collecting and managing waste from a policy perspective.
- Recommendations on an appropriate stated preference technique/survey method that can be used to develop benefit estimates for the waste management scenario(s) developed under ‘B’ above. The technique should take heterogeneity in existing waste management practices in different States/local government areas into consideration.
- Identification of whether there are any differences in the values held by the communities in different locations around Australia, where these locations are to include each capital city and samples drawn from regional populations.
- Determination of value estimates that are clearly defined regarding the type of value they are capturing. This is important so as to ensure there is no double counting of values when estimates from the Choice Modelling study are combined with estimates of market values from the BDA study or other sources.
- If possible, estimates of values should be provided for separate categories of packaging waste.

2 Study method

This chapter contains a detailed documentation of the methods used to estimate community willingness to pay (WTP) for improvements to packaging waste management. The broad approach to the study was to assess household preferences and dollar values for each of a number of attributes (or outcomes) of alternative recycling options. The emphasis of the research was on values for outcomes as opposed to preferences for the mechanisms of achieving those outcomes.

A stated-preference survey was designed with two key elements:

- A choice modelling experiment that sought to elicit household preferences and values; and
- A question that sought to estimate household participation in a national container deposit scheme (for beverage containers consumed at home) and the factors influencing participation.

Other information collected as part of the survey included household attitudes towards recycling and current recycling practices.

The survey was administered as an on-line questionnaire to 3,432 households from a representative cross-section of the national population. The survey comprised six main components:

- Introductory background information about packaging waste in Australia, the nature of its impacts and existing measures to manage waste.
- A series of questions to identify household attitudes to waste recycling and current recycling practices.
- A choice experiment, which required the respondent to make selections of preferred waste management outcomes, including their willingness to pay a specified amount of money each year for additional recycling measures.
- A set of diagnostic questions that asked respondents about their reasons for making the choices (the purpose of these questions being to identify any responses that represent strategic behaviour, and thus invalid WTP bids).
- A question about the household's willingness to participate in a national CDS by returning used, home-consumed beverage containers to a central recycling collection centre in return for a full refund of a specified deposit amount.
- A series of questions that sought information on the respondent's socio-economic and demographic characteristics and other individual-specific variables that may be relevant in explaining recycling practices and attitudes.

A complete copy of the survey instrument is contained in Appendix A.

2.1 The Choice Modelling technique

Stated preference techniques are widely used by economists and market researchers for estimating consumer preferences and values for non-market goods and services, or for appraising consumer demand for market goods that are yet to be released to the market. Stated preference techniques, including Choice Modelling and 'Contingent Valuation', are the only techniques capable of estimating consumer values for 'non-use' goods. As discussed in Chapter 1, improved waste management may result in the provision of a variety of non-use, public goods (existence and bequest values are two examples).

For this study, Choice Modelling was selected as the preferred method over 'Contingent Valuation' because it is better equipped to estimate values for change options that involve multiple attributes – or more than one outcome.

Choice Modelling is also better able to control for framing and scope effects, because respondents are presented with a set of relevant attributes and information about how the level of each attribute varies between choice alternatives (Bennett and Blamey, 2001). A framing effect is said to occur when values estimated for a particular attribute are sensitive to the context, or 'frame of reference' in which the attribute is embedded. There is limited ability to control for framing using the Contingent Valuation method because the valuation scenario typically involves only one non-money attribute. A scope effect is said to occur when total WTP increases for progressively larger provision of the non-market good. Lack of a scope effect can be a signal that the stated preference method has been unable to produce valid estimates of WTP, as economic theory dictates that total values should increase with provision. Again, Choice Modelling can overcome this bias because respondents are presented with a range of levels for each attribute.

2.1.1 Theoretical foundations

Choice modelling surveys differ from conventional attitudinal surveys or polling. With a Choice Modelling survey, respondents are not asked directly to indicate their preferences or attitudes to specific policy options and collection methods – for example a CDS or Advance Disposal Fee (ADF). The purpose is instead to estimate people's values for underlying attributes that describe the outcomes of alternative waste management options. This is achieved by presenting survey participants with options that replicate real-world choices. Participants are asked to choose their most preferred option from a set of alternatives. A 'no-change' option is always included in the set of alternatives, which means that respondents can opt to stay with current waste management arrangements and outcomes.

Each option is defined using a common set of attributes. Options are differentiated from one another by the levels assigned to these attributes, which are determined by an experimental design. In order to estimate dollar values for different non-monetary attribute 'offerings', the set of attributes includes a money attribute (or payment). Respondents are informed that they would be required to pay the amount specified in each option, which is zero for the 'no change' option but a non-zero, positive amount for the change options.

In making choices of preferred options, respondents reveal their willingness to trade-off one attribute against another. The observed trade offs between the monetary cost attribute and the non-money attributes are used to calculate how much people are willing-to-pay for unit improvements in each non-money attribute, relative to the base case (no change) situation. Unit values are then aggregated to calculate the total willingness to pay for a set of outcomes relating to a particular option. That is, the value estimates for each attribute are additive.

The options chosen by respondents in the choice experiment are assumed to be underpinned by a theory known as Random Utility Theory. Details of this theory are provided in Box 2.1 Further technical information on the statistical methods used in this study is given in Appendix D.

Box 2.1: Random Utility Theory

The alternatives chosen by respondents in the choice experiment are assumed to be underpinned by a theory known as Random Utility Theory. The utility obtained by individual *i* from choosing alternative *j* in a choice set is given by:

$$V_{ij} = (q_j, c_j, s_i, \varepsilon_{ij})$$

where q_j is a vector of non-monetary attributes, c_j is the cost of the alternative (specified by the additional payment), s_j is a vector of the individual's socio-economic characteristics, and ε_{ij} is an error term. An error term is included to reflect the fact that the researcher does not know all the factors that contribute to an individual's utility.

The probability of individual *i* choosing alternative *j* is given by:

$$\Pr_{ij} = \Pr[\{v_{ij}(q_j, c_j, s_i) + \varepsilon_{ij}\} \geq \{v_{ik}(q_k, c_k, s_i) + \varepsilon_{ik}\}] \quad \forall j \neq k$$

This equation says that the probability of a respondent choosing alternative j is equal to the probability that the utility associated with that alternative exceeds the utility associated with any other alternative k in the choice set. The random utility model is made operational by adopting a particular cumulative density function for the unobserved component of utility, ε. If the ε's are independently and identically distributed with a extreme value type I (Weibull) distribution, then the individual's probability of choosing site *j* is given by a multinomial logit (MNL) model[4]:

$$\Pr_j = \frac{\exp(v_j)}{\sum_{k=1}^{J} \exp(v_k)}$$

Parameters of the utility function are estimated by Maximum Likelihood which finds values for the coefficients that maximise the likelihood of the pattern of choices in sample being observed. In this study, the software package SAS/STAT was used to estimate values for the coefficients.

2.1.2 Previous applications of Choice Modelling to solid waste management

To date there have been very few applications of Choice Modelling in Australia or internationally to evaluate consumer preferences for different waste recycling options. In 2008, URS used a choice modelling study to estimate household WTP for managing electronic waste, including products such as computer monitors, televisions and keyboards (URS, 2008). The different waste management alternatives for the choice experiment were defined using three attributes: percentage of electronic waste recycled, collection method (drop off or kerbside pickup) and additional cost per item purchased (an advanced disposal fee that would be used to fund the recycling of electronic waste). The study found that for an increase in recycling from the current 1% to 50%, WTP was $18 to $27 per item, and a WTP of $3.55 per item premium was found for having waste collected from the kerbside as opposed to being dropped off at a depot.

4 Originally formulated by D. McFadden 1974, 'The measurement of urban travel demand', *Journal of Public Economics*, vol. 3, pp. 303-328.

A search of the international literature uncovered only a single study outside Australia in which Choice Modelling has been used to value waste management options. Naz and Naz (2005) examined how a local government in the Philippines might organise and finance solid waste management to meet strict new national targets. A Choice modelling approach was used to determine how households and companies value the attributes of various waste management services and how much they would be willing to pay for them. The attributes included frequency of waste collection and the methods used to remove rubbish. No evaluation was made of preferences for the level of waste recovery or disaggregation of values across different types of waste.

The Contingent Valuation technique has been used to estimate values for specific waste management options. For example Tiller, Jakus and Park (1997) used this stated preference technique to estimate household willingness to pay for drop-off recycling facilities in a rural/suburban area of Tennessee, USA. Under current arrangements, urban households in this county have their general waste collected by a kerbside service but their recyclables (including plastic, paper, glass, aluminium and tin) must be dropped off at one of seven 'convenience centres'. In this study respondents' values were derived through a dichotomous choice ('yes' or 'no') format. Respondents were asked a question regarding whether they would pay a particular amount for the continuation of their current drop-off recycling program (relative to an alternative whereby all waste would be collected from kerbside and nothing would be recycled). Mean household willingness to pay was found to be $US4.00 per month.

There are no known previous applications of Choice Modelling to evaluate values and preferences for alternative packaging waste recycling options such as those set out in Table 2.

2.2 Choice modelling survey development

The entire valuation process is summarised in the eight steps below. The study commenced in July 2009 and results were obtained from the survey in September 2009.

1 Literature review – investigate policy background and context. Develop a clear understanding of the policy alternatives and decisions that the value estimates need to inform.

2 Focus groups – develop an understanding of consumer recycling practices, attitudes, motivations and level of importance placed on packaging waste relative to other waste streams and other environmental issues. One of the primary outputs of this phase of the research was the development of set of value concepts or attributes that people identify with as being important elements of recycling outcomes.

3 Survey instrument design – develop a questionnaire in consultation with the project Steering Committee and Stakeholder Reference Group. The questionnaire contained the choice experiment and supporting questions to analyse respondent preferences, attitudes and values. Another part of the survey design phase was the addressing of specific design issues arising from applying the Choice Modelling technique to waste packaging recycling. The survey instrument was peer reviewed by Australian Bureau of Agricultural and Resource Economics (ABARE) prior to going to the pilot test phase.

4 Pilot testing – pre-test all aspects of the draft on-line questionnaire using a sample of 150 participants and a detailed telephone follow-up with 26 participants. Respondent cognition of the experiment was tested, the payment vehicle, plausibility of scenarios, language and wording and clarity of background information.

5 Sampling strategy – design a sampling strategy to fulfil the valuation requirements, in particular identifying how values differ across locations and populations.

6 Survey administration – draw multiple samples using appropriate quotas to ensure sample representativeness and adequate statistical robustness. The finalised questionnaire was issued and the on-line responses coded.

7 Statistical data analysis and model estimation – each sample analysed separately, plus analysis performed on the total pooled sample (all respondents from across Australia – the national sample). Estimation of WTP for each increase in the various outcomes (attributes) of recycling.

8 Application and interpretation of results to waste policy – aggregation of the unit, household WTP values to the wider population and calculation of the total value of a 'package' of outcomes relating to particular waste management policies.

2.3 Focus groups

The use of focus groups is an important means of gaining insights into community attitudes and conceptions of waste management issues. The groups can also assist with identifying common terms and language used by 'every-day' people to describe and conceptualise recycling issues. This information helps with the task of designing a questionnaire that communicates concepts to people in their own language as opposed to technical jargon.

A focus group session is a targeted discussion with a small group of participants (6 to 12 persons) lasting about one and a half hours. In this study, Quantum Market Research was engaged to recruit and moderate the groups, while a member from the PwC research team sat in on the meetings behind a one-way viewing panel. All sessions were tape recorded and video-taped.

A total of eight focus groups were convened at different locations in Australia. Locations spanned four States and in each location, two groups were run – one comprising young adults (18 to 35 year olds) and the other comprising people from older age groups (45-65 years). The four locations were Perth, Sydney, Adelaide and Ballarat in Victoria.

Quotas were set so that a mix of both mortgage holders and renters were recruited for each group. Further, all participants were equal or joint bill payers within their respective households. Each group contained a mix of both inner city and middle /outer suburban residents. While efforts were made to ensure that a cross-section of people from different age groups and socio-economic backgrounds attended the focus groups, the groups were not intended to be completely representative of the national population. Therefore the results from these focus groups should not be taken as being entirely representative of the views held by all Australians.

A copy of the moderator's discussion guide is contained in Appendix G. Notes from each of the focus group sessions are contained in Appendix H. The principal objectives of the discussions were to find out:

- how people understand current waste management and recycling processes and their own behaviours in recycling
- how people perceive the benefits and importance of waste packaging recycling
- what factors are responsible for driving these perceived benefits
- how people relate to the notion of paying extra for additional levels of recycling and reactions to different types of payment mechanisms
- the types of outcomes people are seeking, or would expect to see, from increased waste packaging recycling.

2.3.1 Focus group findings

All focus groups displayed a high level of interest and enthusiasm for recycling. In general, increasing recycling was seen as a socially responsible thing to do. The main way the participants initially thought about recycling was in the context of kerbside recycling. Participants on the whole were conscious of the

fact that they paid for kerbside recycling through their council rates although there was little understanding of how much they paid for the existing service.

When discussing the kerbside system there was some confusion about exactly what could be recycled and how this was done. Reasons for this included different requirements between local councils, changes in requirements over time, lack of information about what could be recycled (for example, packaging foam), composite materials that did not clearly fit into a certain material category and a lack of understanding about the recycling process.

There was also a degree of distrust in some groups about whether the material placed in recycling bins on the kerb actually gets recycled. This was especially evident in the Perth groups, where there were stories of recycling bins being emptied into the same truck as the general purpose waste.

The attitudes of participants in the South Australian focus groups were very similar to those of participants in other locations. They are aware that the South Australian CDS is unique in Australia and many of them participated in the scheme. However, in this State the kerbside system was still seen as the primary mechanism for recycling.

Towards the end of the discussion, participants were informed of the existing, national level of waste packaging. Most participants indicated a desire to increase this recycling rate and most were not averse to paying something to see this happen, subject to calls for:

- greater transparency about the results of recycling (there was a widespread view that the results of recycling are seldom seen, except perhaps for some examples of products that were made from recycled products, such as photocopy paper)
- improved efficiency of local councils in undertaking the recycling task
- the need to keep things simple. There was a strong view that if increased recycling was to be achieved, the mechanism would need to be easy for people to adopt.

A range of underlying motivations for increased waste packaging recycling emerged from the focus groups. Both use and non-use characteristics of value were raised by groups (Table 3).

Table 3: Drivers or motivations for reducing waste

Type	Detail
Primary factors (most often raised in the groups)	• Dumping is becoming more expensive because land is valuable. • Creating a better future for our children. A social responsibility. • Cleaner streets. • Reduced use of raw materials – eg save trees from being cut down. • The expectation that products made out of recycled materials should be cheaper than those made out of virgin materials.
Secondary factors (not raised often, if at all in some groups)	• Environmental pollution. • Non-biodegradable nature of some materials. • Carbon footprint. • Broken glass in streets. • Hazards to wildlife.
Mitigating factors (ie perceived negatives of recycling)	• Use of scarce water to wash out containers. • Use of fuel and time to drop-off recyclables at a collection centre. • Additional effort for consumer. • Products that use recycled materials often inferior to products based on virgin materials (eg recycled photocopy paper gets jammed).

Type	Detail
	• Additional cost (most groups recognised that the current system is not working, so will require funding. Also cognisant of the low profitability of recycling).

Numerous ideas were put forward for how to increase the level of recycling. These included better community education and awareness and the concept of regulating manufacturers to reduce the amount of packaging on products and/or require them to take back and recycle packaging at their cost. CDS was also raised by all groups, without prompting, and many referred to the South Australian scheme.

There were some noticeable differences between the groups, particularly when making comparisons between the age groups. In general the older group in each location was more 'pro' recycling than the younger group. Older groups more easily articulated their strategies for achieving the existing rate of recycling, and had a more diverse range of individual approaches to deal with packaging waste.

Attitudinal differences also existed between regional and capital city groups. The Ballarat groups indicated they believed they were not as well served with recycling infrastructure as the capital cities. The suggestion was made that Ballarat residents believe they paid the same amount for recycling as their Melbourne neighbours but received fewer services.

While there were some minor attitudinal differences between some of the groups at different locations, the commonalities outweighed the differences. On the whole, participants throughout the eight locations conceive recycling in a similar manner and with a similar language.

2.3.2 Attribute and value identification

The focus group discussions about people's perceived benefits of additional waste packaging recycling elicited a number of value types and concepts, including factors cited as influential in people's support for extra recycling. At first, people were not very forthcoming with specifics. It was just thought to be the 'right thing to do'. However, with further consideration and discussion, participants identified several categorises of benefits, which are tabulated below in Table 4. This list served as a starting point for defining attributes for the choice experiment (see below).

Table 4: Recycling attributes and benefit categories raised by the focus groups

Primary point	Corresponding points
How much will it cost me? (payment)	• Increase in council rates (noting that renters do not pay rates). • Increase in product prices.
How easy will it be? (convenience)	• Complexity of rules. • Sorting waste and cleaning out bottles/cans. • Need to have sufficient capacity of kerbside bin(s). • Kerbside or drop-off - fuel and time used up getting to the depot. • Need plenty of recycling bins in public places.
How much will be recycled?	• What proportion of my yellow bin will actually be recycled? • Additional tonnes, in aggregate, being recycled and prevented from going into landfill.
I want to see evidence of recycled materials being used in products	• Increase the proportion of products with recycled material in them. • I would buy recycled products if they were cheaper and did the same job as products based on 'virgin' materials.
I want to see an increased range	• That is, materials that will be accepted by councils for recycling

Primary point	Corresponding points
of packaging waste types that can be recycled	• Mostly linked to people's perception of ease of recycling.
I want to see reduced packaging on products	• A perception that packaging has increased over time. • Should be reduced, provided this doesn't affect product (hygiene, tamper proof, damage etc.).
I want to see an increase in the use of recyclable packaging on manufactured products	• Manufacturers should be required to use materials that can be recycled.
I want to see cleaner streets	• Cleanliness of the streets and roads. • Cities are becoming dirtier, so need to do something. • The deposit-refund scheme has worked in Adelaide.
Employment generation from recycling	• Mentioned by one of the Perth groups (but in a negative sense – deemed to be secondary to the overall aim of getting more recycled products on the market). • Employment of people with disabilities (mentioned in the context of reducing costs of recycling as opposed to giving disabled people opportunities).

2.3.3 Survey instrument design

The survey design for this study was an iterative process. Numerous design issues were identified during the course of the project, which resulted in significant iterative adjustments to the survey design, particularly in the selection of appropriate attributes for the choice sets.

An initial survey design concept incorporated six attributes that were designed to capture key outcomes of the various policy options. Through an initial 'pre-test' of this approach, it was determined that the complexity of this survey, as well as the difficulty of incorporating the 'refundable deposit' characteristic of the CDS, called for a simplification and redesign.

The revised design included a choice experiment containing three attributes and a separate 'CDS-specific' question that asked respondents about their willingness to participate in a CDS (ie personally return home-consumed containers to a collection centre in return for a refund of a specified deposit). Using this approach, the choice experiment was designed to measure non-market values for the waste management outcomes and the CDS question was designed to examine household willingness to participate in a national CDS scheme at specific levels of deposit-refund. The two models were linked, as information from the choice experiment indicating an individual's willingness to pay for recycling was used as an explanatory variable in the CDS participation model.

Pre-tests of this design demonstrated that this survey instrument was more easily understood by respondents and was more plausible. This second design, with minor adjustments, became the final administered survey. A copy of the final survey is included in Appendix A.

2.3.4 Survey structure

The structure of the final survey that was sent to respondents for this project contained the following key components:

- Introduction – where respondents were provided with a definition of 'waste packaging' and 'recycling', and were informed of the purpose of the study – 'to find out your views on the recycling of packaging waste'. All references to waste management options and outcomes were framed in a national context, as the policies under investigation are to be national initiatives.
- Demographic, attitudinal and behavioural questions – where respondents indicated the characteristics of their household, their current recycling practices and their attitudes to recycling. These questions were included to ensure that answers to the choice modelling component of the survey were from 'informed' respondents. The initial set was asked prior to the respondents undertaking the choice modelling component of the survey. Care was taken to frame these attitudinal questions so as not to bias the respondents in the choice modelling experiment that followed.
- These preliminary questions were designed to lead the respondent to consider their own views of the importance of packaging waste recycling and begin to evaluate the values they hold. A series of behavioural questions were also asked of respondents prior to the choice experiment in order to allow the respondents to consider their current recycling behaviours. Respondents were asked questions relating to:
  - whether they had dropped off waste packaging to a recycling centre in the past 12 months
  - if their household currently had kerbside recycling bins
  - what materials they currently recycled
  - whether when in public they use recycling bins where available
  - whether their workplace (if applicable) had recycling bins
  - their weekly household consumption of beverage containers.
- Background information – where respondents were provided with factual information regarding packaging waste recycling current practices, reasons people give for recycling, some of the difficulties of increasing recycling and options for increasing the amount of recycling.
- Choice modelling component – following detailed instructions regarding choice set attributes and their levels, respondents were asked to complete the choice modelling section of the survey. Respondents were presented with a series of six choice sets and were asked to select one of three options. The first of these options was the base case or 'no change' option, which presented current national averages of recycling outcomes. The other two alternatives represented deviations from the base case.
- Diagnostic questions – where respondents were asked to indicate their reasons for making their selections in the choice sets.
- Container Deposit Scheme specific question – where respondents were asked specifically whether they would participate in a CDS based on a certain level of fully-refundable deposit. The level of deposit varied between 10c, 20c and 50c. The deposit amounts were assigned to three sub-samples such that any one respondent was presented with only one deposit level.

2.3.5 Attribute selection

Attributes in the choice modelling component of the survey were defined in terms of policy outcomes as opposed to the processes for achieving end-outcomes. Economic theory suggests that people should only be concerned with the end results of alternative policies, not the processes by which these results are obtained – provided that there are no side-effects of the processes that may give rise to costs or benefits in the course of achieving the end outcome. A number of selection criteria were applied for defining the attributes:

- Attributes were selected that represented the key outcomes of increased waste recycling through one or more policy mechanisms.
- Selections were made that minimised causality between the attributes (the power of the choice experiment in estimating values for individual attributes is weakened if increased provision of one attribute is perceived by respondents to cause a change in another attribute).
- Attributes must be meaningful to respondents and, as far as possible, simulate the 'real' decision making process a head-of-household would make if presented with these options.
- Care was taken to avoid selecting attributes that reflect market-related impacts of waste recycling (for example, the market value of land 'saved' from landfill).
- The attributes must represent outcomes that can be influenced by policy (this criterion ruled out factors such as increased incidence of recycled materials in manufactured products, which will be determined by market forces as opposed to government regulation).

A preliminary design concept for the choice experiment adopted a six attribute model (Table 5). In addition to increased levels of recycling and reduced packaging litter, this design was intended to capture:

- Preferences for different collection methods, in particular any inconvenience associated with reducing kerb-side services in exchange for establishing drop-off centres (which might form part of a strategy to introduce a CDS).
- Values for increasing the range of materials that can be deposited in recycling bins.
- Values for provision of an increasing array of recycling collection points (at home, workplace and public places) to make it easier for people to recycle.

However, this design was rejected because it suffered a number of problems, which are canvassed in the next section.

Table 5: Initial list of attributes

Attribute	Levels
Percentage of waste packaging recycled	55% (base case), 65%, 75%, 85%.
Collection method for 'at home' packaging waste	• Kerbside pick-up – at least fortnightly (base case). • Monthly kerbside plus local drop-off centres not more than 5km from house. • Monthly kerbside plus regional drop-off centres about 15 km from house.
Collection method for 'away from home' packaging waste	• Current collection method – it varies from location to location (base case). • Workplace recycling bins – all workplaces required to have recycling

Attribute	Levels
	bins. • Workplace plus more recycling bins in public places – all workplaces, shopping centres, sporting events and other major public places required to have recycling bins.
Type of waste packaging targeted for increased recycling	• All packaging that is currently accepted (base case). • Just beverage containers - bottles and cans, milk and juice cartons. • All currently accepted plus other – for example, polystyrene, plastic films and PVC.
Reduction in packaging litter	• No reduction on current levels (base case). • 10% reduction – noticeable improvement. • 20% reduction – significant improvement.
Additional cost to your household	$0 per year (base case). $50 per year, (or $2 per fortnight). $100 per year (or $4 per fortnight). $150 per year (or $6 per fortnight). $300 per year (or $12 per fortnight).

2.3.6 Addressing of design issues

A number of challenging research design issues were confronted in this study (see Appendix J for details). Initial design concepts for the choice experiment were modified to accommodate these issues. The main difficulties are outlined as follows.

Incorporating a refund in the choice experiment

For the purpose of calculating willingness to pay, it is important that there is no ambiguity about the monetary cost that households are being asked to pay – either from the respondent's perspective or the analyst's perspective. Complete control over this variable is necessary for the analysis. This condition is difficult, if not impossible, to satisfy with a deposit/refund. If the 'cost to household' attribute is specified as being net of any refund, this would mean that those respondents who choose not to redeem their deposit would be paying more than those that return their containers – thus preventing the calculation of individual willingness to pay. The monetary impost is unknown.

The possibility of overcoming this problem by incorporating a deposit/refund as one of the choices in the collection method attribute and specifying a particular value (cents/item) for the deposit was also considered. This information would be required, as respondents would want to know how much deposit they are being asked to pay. However, this does not overcome the problem of calculating WTP because the container consumption levels of each respondent will be different.

Even if the above problem could be overcome, through for example making some assumptions about the likely annual consumption rates of each respondent, a person's choice of a deposit-refund option may not necessarily imply that they would opt to redeem the deposit. It may be that they would support such as scheme for the community but not personally return their containers.

Difficulty in developing a plausible scenario to measure 'inconvenience'

In the absence of a refund mechanism, it is difficult to develop a scenario that would motivate respondents to drop off their containers to a collection centre – short of a mandatory requirement (which is clearly not on the policy agenda). Another alternative scenario was considered, which was to artificially reduce in the experiment the frequency of the current kerbside recycling service as a means of motivating people to utilise drop-off centres (Table 5). By observing people's take-up (or otherwise) of this option, it would be possible to estimate willingness to pay to avoid incurring an inconvenience cost. However, this design is problematic because:

- A reduction in kerbside service is not consistent with policy intentions and
- A pre-test of this approach with a small sample of respondents found that people strongly objected to reducing kerbside frequency, and
- Respondents questioned whether the option of offering drop-off centres in place of reduced kerbside frequency would be sufficient to deliver an aggregate increase in container recycling.

Inter-dependency between the attributes and other communication problems

A small pre-test of the attribute design in Table 5 found that people were having difficulty interpreting the meaning of some of the attributes and perceived a degree of interdependency between the attributes. For example, people had difficulty relating to the 'type of waste targeted' attribute because they weren't sure what types of packaging waste are currently 'accepted'. There was some confusion about how the different 'away from home' collection options (ie workplace, public place) would achieve the stated increase in recycling rate.

On the basis of the above difficulties, the decision was taken to simplify the choice model to just three attributes, thus removing the 'type of waste targeted' attribute and the 'at home' and 'away from home' collection methods. The implication of this decision is that the choice experiment no longer incorporated a measure of inconvenience, so it was not possible to determine whether this was an important factor influencing choice of waste management option. This deficiency was addressed by following the choice sets with questions that specifically relate to the CDS.

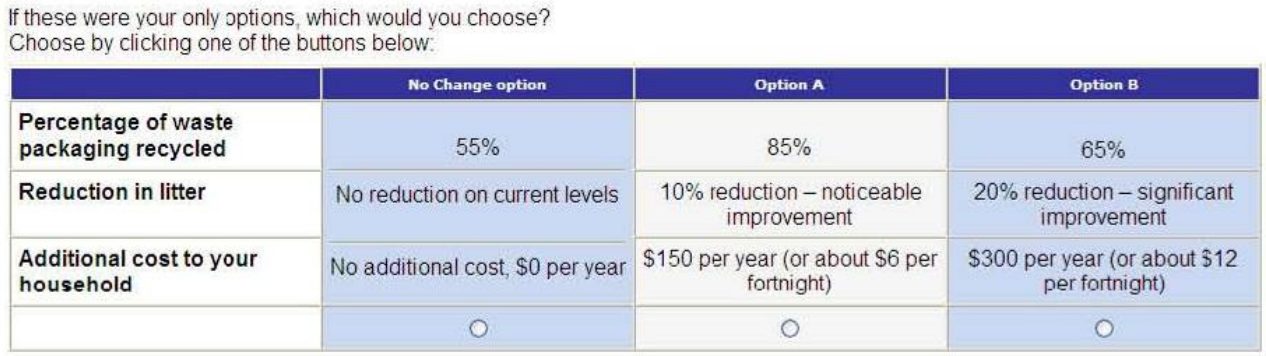
2.3.7 The choice experiment

The finalised version of the choice experiment adopted for the study utilised just three attributes (Table 6). An example choice set is illustrated in Figure 3. The choice observations generated from this experiment were statistically analysed using a Proportional Hazard model (which equates to a multinomial logit model under particular restrictions). Appendix D contains technical details of the statistical methods used to estimate the data relationships.

Table 6: Final list of attributes

Attribute	Levels
Percentage of waste packaging recycled	55% (base case), 65%, 75%, 85%.
Reduction in packaging litter	• No reduction on current levels (base case). • 10% reduction – noticeable improvement. • 20% reduction – significant improvement.
Additional cost to your household	$0 per year (base case). $50 per year, (or $2 per fortnight). $100 per year (or $4 per fortnight). $150 per year (or $6 per fortnight). $300 per year (or $12 per fortnight).

Figure 3: Sample choice set (screen shot)



2.3.8 *The CDS participation question*

The effectiveness of a CDS at increasing recycling rates and reducing litter is contingent on high public participation rates and community willingness to take up the scheme by returning beverage containers to a central collection centre. This study examined the proportion of respondent households that are willing to *personally* return home-consumed containers for a refund and the factors influencing stated participation in the scheme. Box 1 contains the participation question presented to survey respondents.

Box 1: Participation question

In addition to kerb-side recycling that currently exists, governments are exploring the costs and benefits of a national container deposit scheme for items such as milk, juice, water, soft drink, beer, wine and spirit containers. The scheme would involve adding a deposit to the price of beverages purchased in containers, which would be refunded when the container is returned to a collection centre. Most of the costs of administering a national scheme would be funded by monies raised from those who choose not to return the containers and claim their refund. A small handling fee may also be added to the cost of each beverage purchased in containers. This has been estimated at less than 1c per container.

If a national container deposit scheme was introduced, as set out above, would your household claim a refund of [respondent shown one of 10c, 20c or 50c] if collection centres were made available at your local shopping centre or nearest town?

- Yes, our household would definitely return the containers for a refund
- No, probably not.
- No, definitely not.

Potential explanatory variables

It was hypothesised that a household's decision to directly participate in a CDS would be positively influenced by:

- The household's value for increased recycling and/or reduced litter (that is, higher willingness to pay for these outcomes would increase the probability of a household participating, all else being equal) — noting that this may be a relatively weak factor influencing participation because some households may hold high values for recycling and/or litter reduction but choose not to directly participate in the scheme, instead donating their containers to a charity group for recycling on their behalf.
- The size of refundable deposit (with higher deposits inducing higher participation rates).
- Any perceived or actual benefits of having an additional method of disposing of containers that is free of capacity limits.
- The average number of beverage containers consumed at home by the household (with larger numbers increasing the potential value of the refund, and hence the attractiveness of participating).

Balanced against these positives is the potential 'inconvenience cost' that may be borne by households should they choose to participate. Inconvenience may arise through the need to make a dedicated trip to a collection centre to return the containers, time spent queuing for service at a collection centre, the need to wash out containers and sort them in preparation for return, the need to find a place to store containers prior to returning them and the transfer of potentially heavy crates of containers to a vehicle for transport to the collection centre. Some of these factors may present greater inconvenience than others. And for some households, the positive benefits of participation may outweigh the inconvenience by a large margin.

In this study no attempt was made to ask respondents to state their perceptions about whether a CDS would be a source of inconvenience, nor the magnitude of this inconvenience. Instead, the respondent was asked to provide information on the approximate distance to their local shopping centre or nearest town. This variable was used as a proxy for inconvenience in the participation model. It was hypothesised that the inconvenience of returning containers would increase with distance to the collection centre.

Table 7 contains a description of the explanatory variables used to develop a statistical participation model.

Table 7: Explanatory variables used in the CDS participation model

Variable	Description
Distance	The distance between the collection centre and the respondent's place of residence (km).
Container consumption	The average weekly household consumption of beverage containers (number).
Deposit	The amount of deposit paid (cents).
Non market value for recycling and/or litter reduction.	Proxied by the number of choice sets (in the choice experiment) in which the respondent selected the 'no payment' option. Note that higher values of this variable indicate lower willingness to pay for recycling and/or litter reduction.
Socio economic characteristics	Income, age, sex, South Australian resident (dummy variable), education level.

Statistical analysis and estimation of inconvenience cost

Respondents were presented with one of three different levels of deposit (10c, 20c, 50c). This was implemented by drawing three sub-samples from each population and assigning a different deposit amount to each sub-sample.

The participation data were analysed using a binomial logit model, which is a standard technique for fitting a 'response function' to binary (yes/no) choice data. Once coefficients are estimated for each of the variables, this function facilitates simulation of changes in predicted participation levels (of the respondent sample) if one or more of the variables are increased or decreased. For example, inconvenience cost can be estimated by calculating the amount by which the deposit-refund would need to increase to offset a unit increase in the distance variable (the proxy for inconvenience in this specification). Of course, this method requires both the deposit and distance variables to be statistically significant and correctly signed.

2.4 Survey administration

The on-line survey was administered to multiple samples drawn from a panel managed by Global Market Insite, coordinated by Quantum Market Research. This panel was preselected to be representative of the national population as a whole. The panel has a reach of just over 300,000 people. Further details on the panel can be found in 5Appendix B.

The rationale for the use of an online panel as the survey method was primarily driven by the cost and time constraints of the project. The method has significant advantages in being able to access a large number of respondents in a limited time frame. The computerised nature of the survey also allows for easy rotation of choice sets and attributes, and validation of the data. This approach was also adopted for previous EPHC studies of e-waste and built heritage.

Respondents to the survey were preselected as being the head or joint head of the household and were over 18 years of age.

2.4.1 Sampling strategy

One of the objectives of this study was to investigate whether populations residing in different parts of Australia have different preferences and values for waste packaging recycling. Therefore, 15 regions within Australia were identified for investigation. This included the capital cities of each of the eight States and Territories and regional areas of all States and Territories with the exception of the ACT, which was determined to not have a large enough truly regional population outside of Canberra to sample.

Regional areas are defined as any populated area outside the metropolitan area of each capital city. The majority of survey participants in the regional areas were recruited from major regional centres as opposed to smaller towns. This is consistent with the geographic population densities of non-metropolitan populations. The study did not attempt to over-sample in less populated areas.

The sample sizes for each population were chosen to investigate whether there are statistically significant regional differences in attitudes to packaging waste management. Furthermore, for the purpose of calculating a choice model, a minimum sample size of 150 was required for each of the 15 regions. Table 8 indicates the sample sizes targeted for each location.

Table 8: Sample sizes by location

By Count	Sample sizes targeted		
Location	Metropolitan capital city	Non-metropolitan, regional	Total
VIC	350	250	600
NSW	400	350	750
QLD	250	250	500
SA	200	150	350
WA	200	150	350
NT		150	150
TAS		150	150
ACT	150	n/a	150

Note: Tasmanian sample was drawn from both Hobart and regional Tasmania, and Northern Territory was drawn from both Darwin and regional NT, due to panels having very small samples for these areas.

In addition to the location-based quotas, additional quotas were used to ensure that each sample was representative of the population from which they were drawn, with respect to age, gender and income. For example, the age quota for the national sample is depicted in Table 9. Income was controlled by requiring 45% of the sample to be above the median household income of $66,820pa and 45% below. Sampling was controlled such that no more than 10% of the sample contained respondents that did not disclose their income. Respondents fitting within the quotas were identified through screening questions at the beginning of the survey. The specific quotas and the number of respondents in each category are listed in Appendix B.

Table 9: Age quota for the national sample

Age	Target
18-34 years	900
35-44 years	580
45-54 years	560
55+ years	960
Total	3,000

3 Results and interpretation

3.1 Response rate

For this survey 17.8% of potential respondents indicated they were willing to participate in the study. A total of 47,261 invitations were sent out with 8,431 respondents accepting the invitation. Following the screening process, and allowing for people who dropped out before completing the survey (431 persons, or 11%), a total sample size of 3,432 completed surveys was collected (Table 10).

Respondents were sent an invitation to participate by email with a hyperlink connecting them to the survey. Initial questions in the survey determined location and age characteristics which allowed the screening out of respondents where quotas had already been filled. An additional check was utilised to screen duplicates where respondents attempted to complete multiple surveys from a single computer (this is done to ensure that people don't register with a panel ten times under ten different email addresses).

The drop-out rate is calculated as follows:

- 8,431 Accepted the invitation to participate
- 3,863 started the survey. This is net of those screened out due to over-quota (4,249) and those screened out due to duplicates (319), which are responses from multiple members of the same household.
- 431 dropped out
- Drop out rate = 431/3,863 = 11%

Table 10: Survey response rate

	Number participants
Total panel	approx 303,000
Received invitation to participate	47,261
Accepted invitation	8,431
Less screened duplicates	319
Less screened through quotas	4,249
Less incomplete surveys (drop outs)	431
Completed survey	3,432

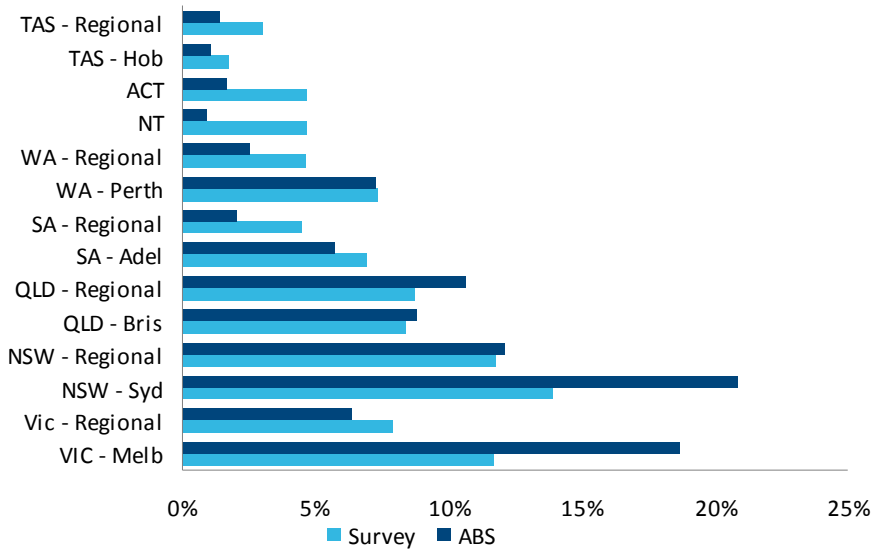
3.2 Representativeness of the samples

The sample populations were compared with Australian Bureau of Statistics (ABS) published statistics to examine how representative the sample populations were of the actual populations. Comparisons were made with regard to distributions of the populations by:

- Location (when combining smaller samples into larger groupings).
- Age and gender.
- Household income.
- Highest level of educational attainment.
- Household composition and dwelling type.

For the detailed analysis of the sample representativeness refer to Appendix B. Figure 4 provides an indication of the proportion of the sample drawn from each sample area and compares this distribution with the actual population distribution as provided by the ABS.

Figure 4: Distribution of respondents in each sub-sample area compared with ABS



Overall the sample populations were found to be generally representative of the actual populations. However, some differences exist between the sample and actual distributions. For example, the regions outside of the capital cities and the smaller States and Territories (Tasmania, NT) are over represented in the sample. This was done due to the minimum sample size requirement (150) required to estimate the choice model.

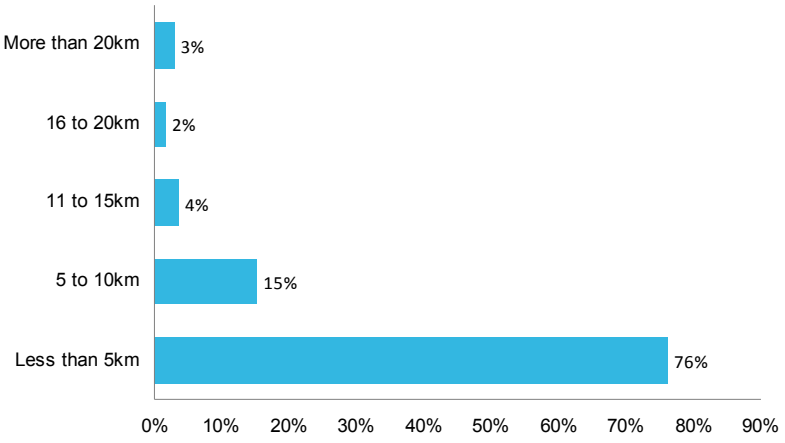
3.3 Sample characteristics

Proximity to a shopping centre

Responses to this question were intended to primarily be used to estimate the value the community places on any inconvenience. 76% of the sample indicated that they lived within 5km of a shopping centre. A summary of the national responses is presented in Figure 5. As expected, locations outside of

the capital cities indicated they were slightly further away from shopping centres although the difference was relatively small.

Figure 5: Proximity to shopping centre - National sample

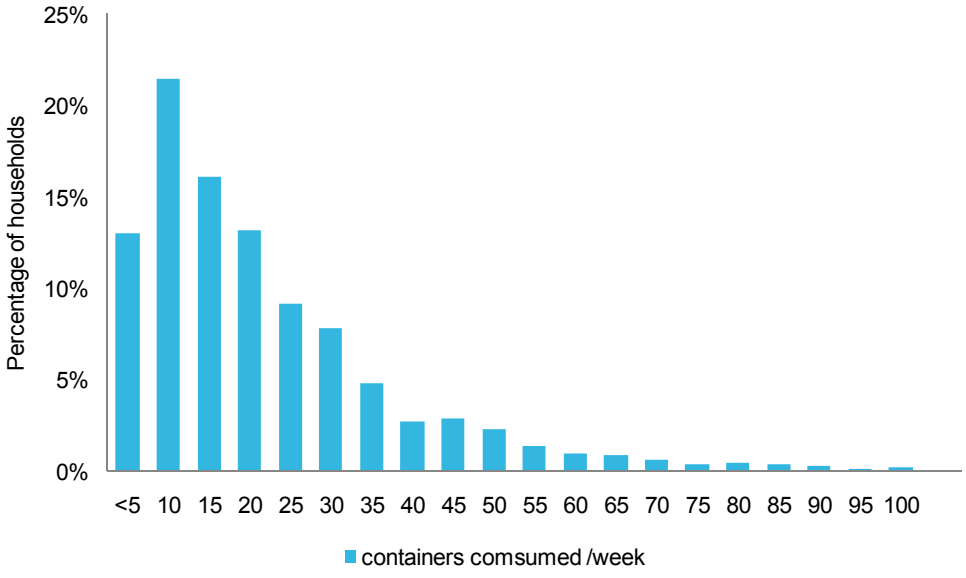


The majority (76%) of the sample population lived within 5km of a shopping centre with 9% living further than 10km away. There is no readily available data on the national populations' proximity to shopping centres. However, when compared with the ABS remoteness classification (ABS 2003) it is noted that approximately 85% of the population is considered to reside in Major Cities or Inner Regional Areas with less than 3% living in Remote or Very Remote Australia. Therefore it is considered that these proximity responses are likely to reflect the national population as a whole.

Household consumption of beverage containers

Households were also asked about their level of beverage container consumption. The national sample indicated more than one third of households (37%) consumed between 5 and 15 beverage containers each week. The distribution of the national sample is presented in Figure 6.

Figure 6: Weekly consumption of beverage containers by household – National Sample



The 15 individual location samples indicated some variation in the reported consumption behaviour; regional areas have higher average container consumption than metro areas as indicated in Table 11.

Table 11: Average weekly consumption of beverage containers by household – sample comparison

	VIC	NSW	QLD	SA	WA	TAS	NT	ACT	Total
Metro	18	18	22	18	20	18	28	17	20
Regional	23	22	26	24	24	21	30	0	24
Total	20	20	24	20	21	20	28	17	21

The community is 'pro recycling'

In general, respondents were found to be strongly 'pro recycling'. This finding is consistent with the focus group research. Pro recycling attitudes were evidenced by the following:

- When asked which statement best described their opinion about recycling, 65% of the sample selected the response: "I think recycling is an important issue and we should do all we can"; and
- 86% agreed or strongly agreed with the statement that "Waste packaging is causing environmental problems".

Further, the results from a series of attitudinal questions supported this finding. Respondents indicated a high level of agreement with a series of five statements. A summary of responses for the national sample are presented in Table 12.

These results indicate that on average Australian's believe that:

- waste packaging is causing environmental problems
- the amount of packaging on products is a issue of concern
- we should recycle because it saves resources
- litter is a big issue in Australia
- there is not enough information on how we can recycle.

Table 12: Level of agreement with attitude statements – National sample

	Waste packaging is causing environmental problems.	The amount of packaging on products is not an issue of concern to me.	No matter how big or small the savings, I think we should recycle because it saves resources.	Litter in Australia is not really a big issue.	There is not enough information on how we can recycle packaging.
Strongly disagree (1)	2%	39%	1%	45%	5%
Disagree (2)	2%	35%	1%	35%	19%
Neither agree nor disagree (3)	9%	15%	7%	9%	21%
Agree (4)	47%	8%	45%	7%	41%
Strongly agree (5)	39%	3%	46%	4%	14%
Don't know	1%	1%	0%	1%	0%
Total (n=)	3432	3432	3432	3432	3432
Mean	4.2	2.0	4.3	1.9	3.4

There is little variation in community attitudes across Australia

Comparisons between locations around Australia did not identify significant differences based on the location of survey respondents. This commonality was also noted in the focus group sessions. An illustration of this commonality can be seen in attitudes towards litter where there was little difference between capital city and other regions (labelled 'metro' and 'regional' in Figure 7). When States and Territories were compared in their attitude to litter again, only very small differences were observed (see Table 13).

Figure 7: Agreement with statement: "Litter in Australia is not really a big issue" – Comparison of metro and regional areas

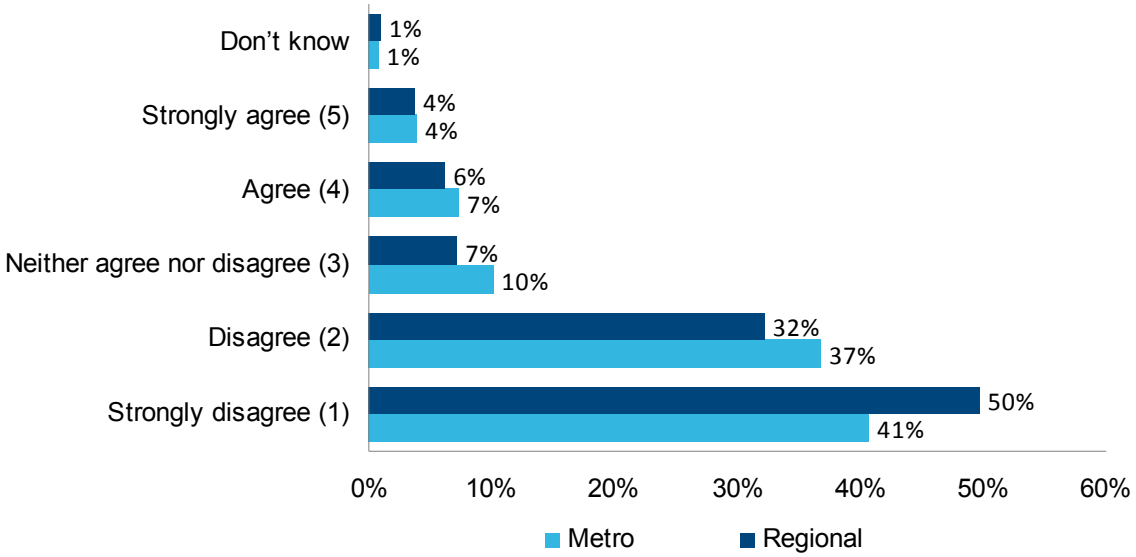


Table 13: Agreement with statement: "Litter in Australia is not really a big issue" - State/Territory and national samples

	VIC	NSW	QLD	SA	WA	TAS	NT	ACT	Total
Strongly disagree (1)	49%	42%	48%	45%	41%	49%	43%	37%	45%
Disagree (2)	31%	35%	30%	37%	38%	37%	39%	46%	35%
Neither agree nor disagree (3)	8%	11%	8%	9%	10%	7%	7%	7%	9%
Agree (4)	7%	8%	8%	6%	6%	3%	6%	7%	7%
Strongly agree (5)	4%	4%	5%	3%	4%	3%	3%	2%	4%
Don't know	1%	1%	1%	0%	1%	1%	3%	1%	1%
Total (n=)	672	881	588	394	411	164	160	162	3432
Mean	1.9	2.0	1.9	1.9	1.9	1.7	1.9	1.9	1.9

Similarly the population's opinions regarding a statement that 'waste packaging is causing environmental problems' produced very similar results across locations (see Figure 8 and Table 14).

Figure 8: Agreement with statement: "Waste packaging is causing environmental problems" – Comparison of metro and regional areas

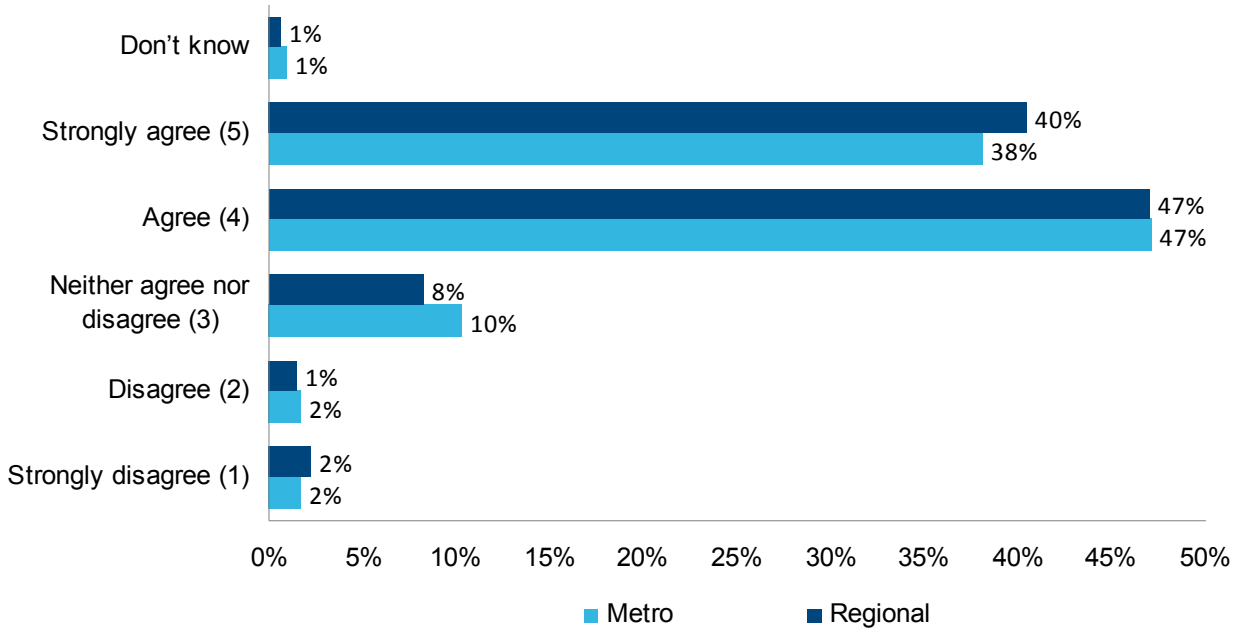


Table 14: Agreement with statement: "Waste packaging is causing environmental problems" - State/Territory and national samples

	VIC	NSW	QLD	SA	WA	TAS	NT	ACT	Total
Strongly disagree (1)	2%	2%	2%	3%	2%	2%	2%	1%	2%
Disagree (2)	2%	3%	1%	0%	2%	1%	1%	0%	2%
Neither agree nor disagree (3)	9%	10%	8%	10%	9%	6%	13%	12%	9%
Agree (4)	45%	45%	48%	46%	49%	54%	44%	55%	47%
Strongly agree (5)	41%	39%	40%	41%	37%	35%	39%	30%	39%
Don't know	0%	1%	1%	1%	1%	2%	1%	2%	1%
Total (n=)	672	881	588	394	411	164	160	162	3432
Mean	4.2	4.2	4.3	4.2	4.2	4.2	4.2	4.2	4.2

This similarity of responses across Australia provides further evidence of the appropriateness of the survey methodology using a national frame for the choice modelling experiment. The pro recycling nature of the responses also suggests that there is a desire amongst the population to see changes to the *status quo* with regards to packaging waste management.

Current recycling behaviour is primarily through kerbside collection

A significant majority (89%) of the national sample has access to kerbside recycling facilities and they use these facilities to recycle cardboard and paper (92%), glass bottles (79%), aluminium cans (88%) and plastics (87%). Capital city sample populations have more access (94%) to kerbside recycling than regions outside capital cities (81%) These findings align with the existing understanding of the kerbside

system. Focus groups also indicated that kerbside recycling was the dominant way people conceived of being involved in 'recycling'.

Of the sample population who indicated that they had a permanent workplace, 70% indicated that they had recycling facilities at their workplace. A minority (28%) of respondents had participated in recycling through dropping off waste packaging to a recycling centre in the past 12 months.

Table 15: Proportion of respondents with kerbside recycling – State/Territory and national samples

Proportion with kerbside bins	VIC	NSW	QLD	SA	WA	TAS	NT	ACT	Total
Capital Cities	95%	95%	94%	98%	89%	95%	86%	96%	94%
Other locations	94%	89%	85%	70%	67%	80%	18%	n/a	81%
Combined sample	95%	92%	89%	87%	80%	85%	65%	96%	89%

There is significant regional variation in the proportion of respondents who drop off packaging waste to recycling centres

Significant regional variation was found in the proportion of the sample populations who had dropped off waste packaging to a recycling centre in the past 12 months (see Table 16). As expected, South Australia had the highest proportion of participants. More than a third of the ACT and Tasmania samples had also participated in this form of recycling. It is also noted, and expected, that less participation was found in the capital cities for each State/Territory due to kerbside recycling not being as readily available in country areas.

Table 16: Proportion who dropped off waste packaging to a recycling centre in the past 12 months – State/Territory and national samples

Proportion dropped off to recycling centre	VIC	NSW	QLD	SA	WA	TAS	NT	ACT	Total
Capital Cities	18%	16%	23%	51%	13%	32%	14%	43%	24%
Other locations	33%	32%	28%	63%	23%	35%	29%	n/a	34%
Combined sample	24%	23%	26%	56%	17%	34%	19%	43%	28%

3.4 Choice modelling results

3.4.1 Descriptive overview

Separate models were estimated for each of the 15 regional samples and for an aggregated National model. A stepwise regression technique was used to select variables for inclusion in the model according to their explanatory power. Appendix C provides technical details of the analysis and the full set of model coefficients for each sample are contained in Appendix E.

Model diagnostics

Most of the models display satisfactory 'goodness of fit' and are capable of predicting a large proportion of the observed pattern of choices. Exceptions to this are the Northern Territory models, which are not statistically robust. In most models, the litter and recycling attributes are highly significant and correctly

signed, as is the payment attribute. Income is significant in most models and is positively signed for higher income bands, which accords with economic theory (higher WTP must be accompanied by a capacity to pay through adequate income).

In addition to formal tests of model significance, a series of diagnostic questions were included in the questionnaire that sought to diagnose the degree to which survey respondents understood the choice experiment and were providing valid responses. For example, Figure 9 shows that almost 70% of respondents considered all three attributes equally when making their choices — a finding that supports the validity of the choice experiment, as it demonstrates that respondents are not using simple heuristics to make their choices but are cognisant of the trade-offs involving all three attributes.

If respondents selected a change option at least once they were asked what the main reasons were for choosing to change from the base case (Figure 10). The top three reasons provided were highly consistent with the focus group findings:

- Reducing waste going to landfill
- Conserve resources for future generations; and
- To be more socially responsible.

Figure 9: Attributes indicated as being ignored when selecting choices – national sample

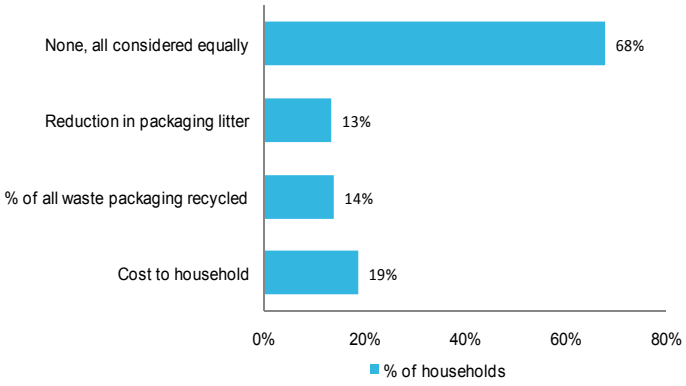
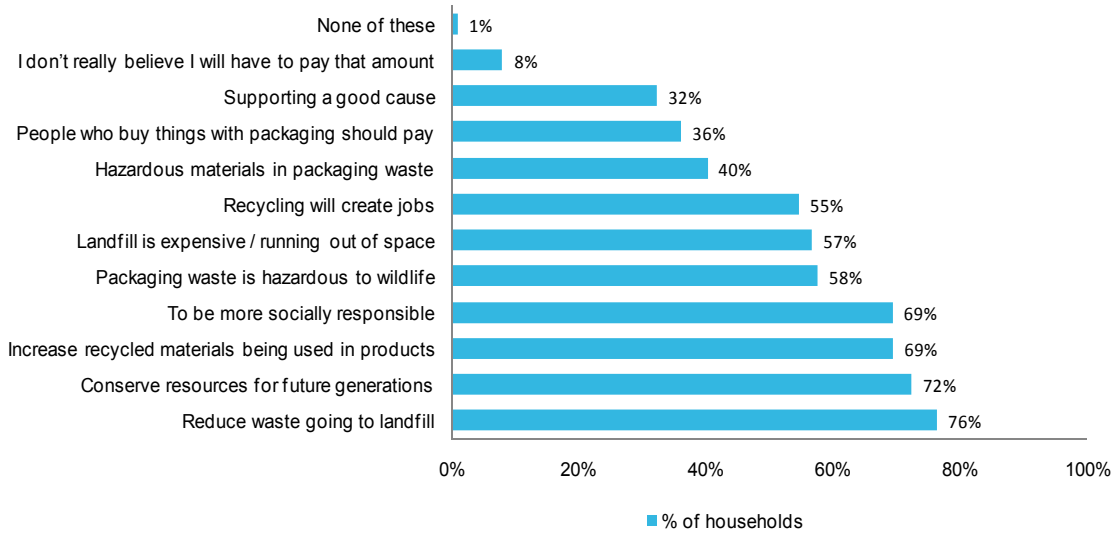


Figure 10: Main reasons for consistently selecting 'change' options – National sample



Protest responses and invalid bids

Diagnostic questions also were used to identify 'protest zeros' and 'invalid bids'. These responses represent evidence of strategic behaviour and are thus invalid measures of a respondent's true willingness to pay (or bid amount). Respondents that selected the zero payment option consistently across all choice sets were asked about their reasons for answering in this way, as a means to identify whether they were protesting against the requirement to pay (as opposed to having genuine zero value for recycling outcomes). If respondents agreed with the following statements they were considered protest zeros:

- "Manufactures should pay for recycling not consumers" (evidence of 'free rider[5]' behaviour).
- "My State recycles enough already, it is up to the other States" (evidence of 'free rider' behaviour).
- "I don't trust the government will use my money to increase recycling" (evidence of protest against the institutional arrangements for managing the funds, not necessarily the principle of paying for additional recycling).

As a result of this analysis:

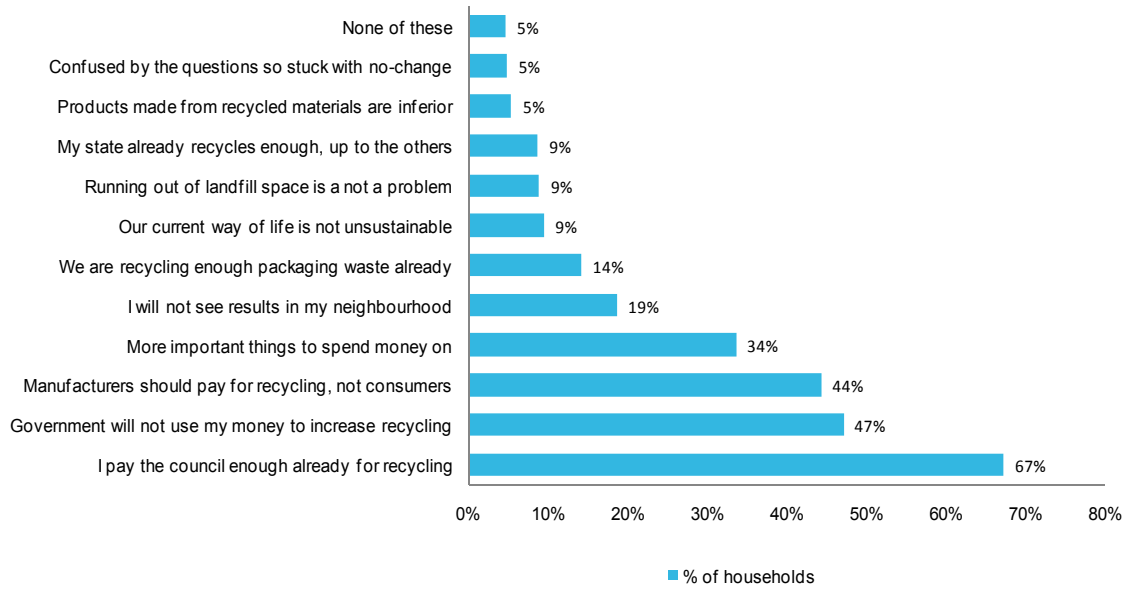
- 245 households (7% of the respondent sample) were determined to have valid zero WTP and were therefore included in the model
- 262 households (8% of the respondent sample) were classified as 'protest zeros'

As discussed above, respondents that chose a payment option at least once were presented with a different set of statements and asked to select the statements that best described the reason for choosing to pay for additional recycling or litter reduction (Figure 10). Responses to these statements were used to identify whether any of the bids represented strategic behaviour. A minority of respondents (216 households or 6% of the respondent sample) revealed that they did not really believe they would have to pay the specified amount. These responses were deemed to be invalid.

A total of 478 responses (14% of sample) were classed as 'protests' or invalid bids and were removed from the sample prior to estimating the choice models. Sensitivity analysis was also undertaken to determine whether the removal of the protests/invalid bids had a statistically significant effect on the model coefficients. This was done by estimating a second set of models with all responses retained in the sample (that is, the protest and invalid bids were added back in). This analysis found that the removal of protests/invalid bids resulted in significantly different models for at least some of the population samples, including the model estimated using the national pooled responses.

[5] Free-rider behaviour occurs where there is no incentive for any one individual, household or firm to undertake additional recycling because the benefits of doing so are socialised and it is difficult or impossible to recover the costs of additional recycling from beneficiaries. Under these conditions there is a tendency for individuals to rely on the 'good' actions of others to fulfil their desired recycling outcomes.

Figure 11: Main reasons for consistently selecting 'no change' option – National sample



Note: Totals sum to more than 100% because respondents were able to choose more than one response

3.4.2 Willingness to pay for increased recycling

Willingness to pay measures for increased recycling and litter reduction were estimated for each of the 15 samples drawn from capital city populations and regional areas in each State and Territory. In addition, a choice model was estimated for all samples combined. This was labelled the National model. The models control for individual respondent characteristics such as age, income, education etc. as these were included as explanatory variables in the choice model and are, in most cases statistically significant (see Appendix F for details on the socioeconomic variables used in the analysis and the model coefficients). The key findings regarding the community's willingness to pay for an increase in the national rate of waste packaging recycling are outlined below.

The National sample

- The National model produced the most statistically robust estimates of willingness to pay, as this was the model with the greatest number of observations (3,432 respondents).
- The results from the National model indicate that respondents are, on average, willing to pay $2.77 per 1% increase in waste packaging recycling, above current levels of recycling of 55% (national average).
- The statistical variation about this average willingness to pay is given by the 95% confidence interval, which ranges from $2.19 to $3.77. This means there is a 95% level of confidence that the true, average value lies within this range.[6]

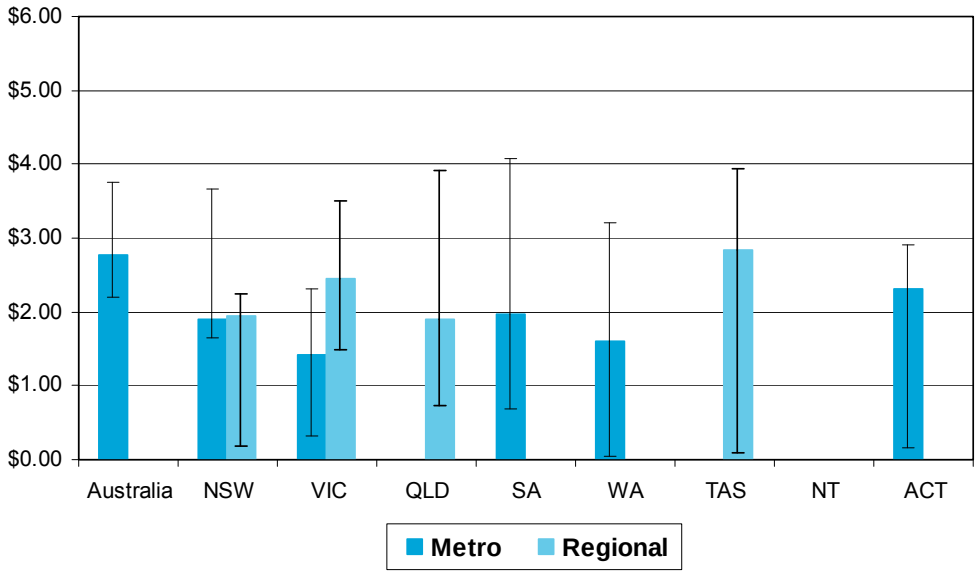
Differences between the States and regions

- Figure 12 summarises the unit values for increased waste packaging recycling obtained for each of the respondent samples.

[6] See Appendix C for details on the calculation of confidence intervals and mean willingness to pay values.

- While there are some apparent differences in values across the samples, ranging in a band between $1.00 and $3.00 per 1% point increase in weight recycled, all these estimates have overlapping 95% confidence intervals, which indicates that the differences are not statistically significant.
- Six population samples had value estimates that are not statistically different from zero. This does not necessarily imply that these populations have zero values for improvements in recycling and/or litter reduction. It means that there is too much unexplained variation in the choices to determine a statistically significant average value for these respondent samples.
- The samples with non-significant values are identified on the chart as those cities/regions that do not have a value bar. This includes Darwin, regional Northern Territory, Brisbane, regional South Australia, regional Western Australia and Hobart. Note that three out of the five samples with non-significant values are regional populations.
- For the remaining city and regional population samples, all have positive, non-zero values for increased recycling.

Figure 12: WTP estimates for increased waste recycling ($ per 1% point increase)



Note: Bars represent 95% confidence intervals on each mean value
Note: Samples without WTP estimates indicate that these samples returned estimates that are not statistically different to zero. They do not necessarily hold no value for increased recycling

3.4.3 Willingness to pay for litter reduction

The National sample

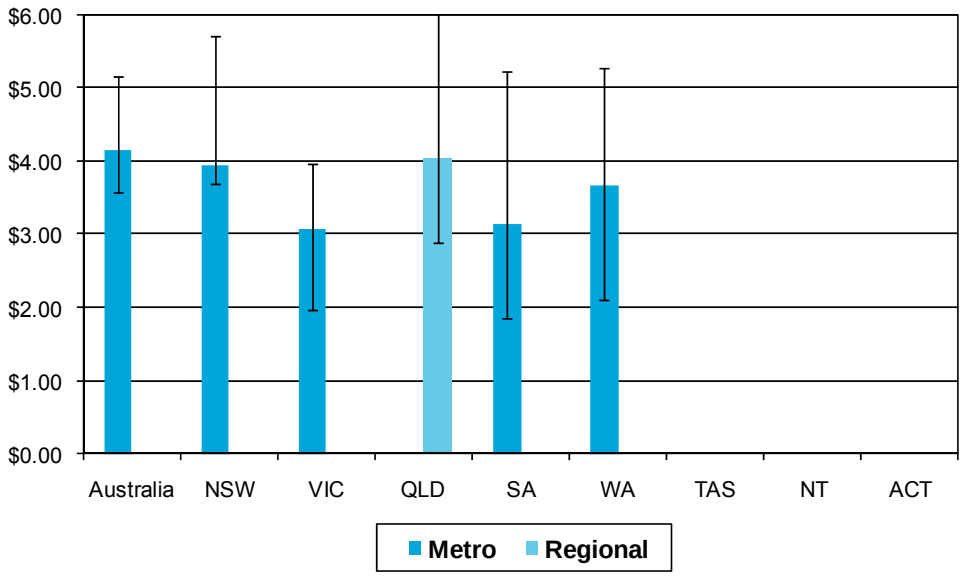
- The average respondent has a willingness to pay of $4.15 per 1% reduction in litter, relative to current levels. This implies that households are prepared to pay, on average, $41.50 per annum for a 10% reduction in litter (respondents were advised that this would produce a noticeable improvement in litter) and $83.00 per annum for a 20% reduction (corresponding to a 'significant' improvement).
- While the linear increase in willingness to pay over the tested levels of litter reduction is a construct of the model, it is found to be an acceptable approximation of the true relationship as alternative, non-linear functional forms did not produce a better fitting model.

- While the values are all relative to the 'no-change' base case of 0% litter reduction, care needs to be taken in applying the $4.15 figure to litter reductions between the range of 0% to 10% reduction. This is because respondents could have pegged their valuations on two discrete levels of litter reduction. Under this experimental construct, it may be the case that the value function is a stepped function, as opposed to a linear function over the entire range of levels tested (0% to 20% reduction). That is, litter reductions below the 10% threshold may not have been valued as highly – if at all – because these reductions could have been interpreted by respondents as having no noticeable effect.
- The statistical variation about the unit value for litter ranges from $3.39 to $5.22 per 1% point reduction, meaning that there is a 95% level of confidence that the true mean value lies within this range.

Differences between the States and regions

- Comparisons between the models show that ten out of the fifteen samples (representing different metropolitan cities and regional populations) have values for litter reduction that are not significantly different from zero. This includes Darwin, regional Northern Territory, Brisbane, regional South Australia, regional Tasmania, Hobart, regional Victoria, ACT, regional New South Wales and regional Western Australia. Note that six out of the ten samples with zero values for litter reduction are regional populations.
- For the remaining city and regional population samples, all have positive, non-zero values for reduced litter. And in all cases, there is no statistically significant difference in the size of these values (as indicated by the overlapping confidence intervals in Figure 13 below).

Figure 13: WTP estimates for reduced litter ($1 per 1% point decrease)



Note: Bars represent 95% confidence intervals on each mean value
Note: Samples without WTP estimates indicate that these samples returned estimates that were not statistically different to zero. They do not necessarily hold no value for increased recycling

3.4.4 Application of the WTP results to option valuation

These results indicate that the Australian community has a willingness to pay for increases in the national rate of waste packaging recycling and for reduction in the national level of litter. The estimated values provide the basis for policy makers to calculate the non-market values for the benefits of a range of national waste packaging initiatives.

Aggregation of results – National Population

The calculation of aggregate WTP for the national population requires an estimate of the total number of households in Australia and an estimate of the proportion of the population that can be expected to hold the same values as the sample of people that respondent to this study.

The latest ABS Australian Social Trends release (Cat. No. 4102.0) estimates that there are 8,316,000 households in Australia. It is incorrect to extrapolate the results of the choice modelling study to the entire population because less than 100% of the sample responded to the invitation to participate in the survey – implying that there could have been a degree of sample selection bias towards those with pro-recycling values.

There are two options for determining the appropriate proportion of population to which the survey results can be applied.

- The response rate to the survey. One option is to only aggregate results to 18% of the population, which is the proportion of the sample that responded to the survey. However, this is considered to be too conservative because it is likely that some non-respondents hold positive, non zero values for recycling and litter reduction but were time constrained or had other 'valid' reasons for not participating in the survey. Further, the on-line mechanism for administering the survey resulted in a rapid disbursement of invitations to participate in the survey. If the disbursement of invitations had been at a slower rate, it is expected that a much higher response rate would have been achieved.
- The rate of non-completion or drop out from the survey. An alternative option is to transfer the results of the survey to the entire population, less the proportion that clearly have zero values – as indicated by the 11% of invitees that started the survey but did not complete (for this survey there were 431 respondents who dropped out prior to completing the survey representing a drop out rate of 11%). The drop outs represent people who lost interest in the survey, most likely due to them having a zero willingness to pay for additional for recycling and/or litter reduction. The use of this indicator as a means of identifying the proportion of the population with zero values (and thus aggregating results to only those in the population that have a non-zero value) is consistent with the method used by URS (2009) for the e-waste choice modelling study.

In the present study it is also recognised that in addition to people with a zero value (indicated by the drop out rate); the online survey did not reach people in remote parts of Australia – approximately 9% to 10% per cent of the Australian population. These households may well have different attitudes and preferences to recycling than those in metropolitan city areas and the more heavily populated rural and regional areas that were included in the survey. The proportion of the household population to which the results can be validly transferred is therefore 100% less (11% drop outs plus 9% remote households) = 80%.

The proportion of the population to which values could be validly transferred was not adjusted for protest zeros because, by definition, these are respondents that say they are unwilling to pay for recycling and/or litter reduction but in fact hold positive, non-zero values. That is, they exhibit free rider behaviour. These protest bids were omitted from the estimating sample, thus removing any potential bias from the unit WTP values.

Therefore, it is considered appropriate to transfer the value estimates from the survey to 80% of the national household population. The remaining 20% either have zero values (the 11% of drop outs) or were not sampled in this study (the 9% in remote areas). The 80% level represents an upper bound estimate for the aggregation factor. An aggregation factor of 80% is not dissimilar to the 86.3% used by URS (2009) for the e-waste study (based on a drop-out rate of 13.7%).

Aggregate willingness to pay can therefore be calculated as a multiple of the individual household estimates:

National WTP = Individual household WTP x number of households x 80%

= Individual household WTP x 6,652,800

Using this method of calculation the national population is estimated have a WTP of $18.4 million per annum for each 1% increase in the level of waste packaging recycling. The 95% confidence interval of this estimate indicates a range between $14.6 million and $25.1 million.

The national population is also estimated to have a WTP of $27.6 million for every 1% reduction in litter. The 95% confidence interval in this instance provides a range between $22.6m and $34.7m.

Due to the difficulty in conceptualising reductions in litter as small as 1% it is considered inappropriate to use this estimation technique for policy measures that are expected to only have a minor impact on the level of litter (impacts of less than a 10% reduction were not investigated in the choice experiment). In the survey respondents were presented with alternatives of a 10% reduction in litter ('noticeable improvement') and a 20% reduction in litter ('significant improvement').

Therefore when applying this WTP estimate to policy measures these values should only enter the analysis framework if the 10% threshold or 20% threshold are expected to be reached. In practice, when using these estimates in a benefit cost framework, this implies including an estimate for non-market benefits of:

- Zero for any reduction in the national level of litter that is not noticeable (<10%);
- $276.1 million per annum for a noticeable reduction (10%), or
- $552.2 million per annum for a significant reduction (20% the highest level tested in the choice experiment).

The upper bound estimates for aggregate WTP for the national sample are summarised in Table 17.

Table 17: Summary of maximum aggregate WTP estimates for the National sample

WTP Component	Lower 95% confidence limit	Mean estimate	Upper 95% confidence limit
10% increase in national weight recycled	$146.0m	$184.0m	$251.0m
'noticeable improvement' (10% reduction) in litter	$225.5m	$276.1m	$451.1m
'significant improvement' (20% reduction) in litter	$347.3m	$552.2m	$694.6m

Aggregation of results – State/Territory Samples

The assumptions used in aggregating unit value estimates to the national population can also be applied to calculate an aggregate WTP for each of State and Territory (Table 18)[7].

Table 18: Aggregate WTP mean estimates by State/Territory

State/Territory	Number of Households - ABS Social Trends	WTP 1% increase in level of waste packaging recycling ($m/pa)	WTP 1% decrease in level of litter ($m/pa)	WTP noticeable (10%) decrease in level of litter ($m/pa)	WTP significant (20%) decrease in level of litter ($m/pa)
VIC	2,032,000	4.5	6.7	67.5	134.9
NSW	2,716,000	6.0	9.0	90.2	180.3
QLD	1,658,000	3.7	5.5	55.0	110.1
SA	661,000	1.5	2.2	21.9	43.9
WA	839,000	1.9	2.8	27.9	55.7
TAS	206,000	0.5	0.7	6.8	13.7
NT	70,000	0.2	0.2	2.3	4.6
ACT	134,000	0.3	0.4	4.4	8.9
Total	8,316,000	18.4	27.6	276.1	552.2

3.5 Container deposit scheme participation

This section discusses the results to the question asking respondents whether they would be willing to participate in national CDS - that is, return their household containers for a full refund of their container deposit. To test for sensitivity of participation rate to deposit amount, separate respondent subsamples were presented with either a 10c, 20c or 50c deposit.

It should be noted that the stated participation rates do not necessarily correspond with the recovery rate of a CDS as the recovery rate will depend on the amount returned, rather than numbers of participants. Furthermore, allowance must be made for the fact that third parties, such as school groups and scouts, will return containers on behalf of households.

[7] Note that the State and Territory results are calculated using the mean value estimates from the National sample as opposed to the mean estimates from each individual sample. As discussed there is no statistical difference between the samples and the National model produced the most statistically robust measure of mean willingness to pay.

3.5.1 Descriptive summary of results — correlation tables

Analysis of results for the full 3,432 sample finds that 84% of respondents would personally return containers consumed at home to a recycling centre if a deposit of 10c was available for redemption. The stated level of participation increased as the amount of the refundable deposit increased, although sensitivity to the deposit was less than expected (see Table 19).

Table 19: Participation rate by level of deposit – national sample

Deposit	Participation rate
10 cents	84%
20 cents	86%
50 cents	88%

Results across the nation showed some variation in participation rate across the States and Territories. The highest stated participation came from Northern Territory (94%) and South Australia (91%). New South Wales had the lowest stated participation rates at 82%. Results for each jurisdiction are presented in Table 20.

Table 20: Proportion of sample indicating participation in CDS (all refund levels) – State by State

Proportion agreeing to participate		
By State (including sum for metro and regional subsamples	Total	
VIC	86%	N= 672
NSW	82%	N= 881
QLD	86%	N= 588
SA	91%	N= 394
WA	87%	N= 411
TAS	87%	N= 164
NT	94%	N= 160
ACT	85%	N= 162
Total	86%	N= 3,432

Other factors influencing stated participation

Households with greater weekly consumption of beverage containers were more likely to participate in a CDS as indicated in Table 21. Distance from a shopping centre does not appear to be influential in determining participation rate, although it is difficult to be definitive about this result because the majority of respondents resided within either five or ten kilometres of a shopping centre. Very few resided at greater distance, which means that there are insufficient numbers of respondents at greater distance to provide a statistically robust estimate of participation rates for people living in remote areas (Table 22).

Income was found to have a weak negative correlation to participation rate. As expected, there is an inverse relationship between income and participation rate, indicating that people with higher incomes are less likely to return containers for a refund (Table 23).

Table 21: Consumption of container compared with participation – national sample

	Proportion agreeing to participate								
Weekly consumption	10c			20c			50c		
0 - 10	79%	n=	414	81%	n=	396	84%	n=	373
11 - 20	89%	n=	328	87%	n=	325	92%	n=	353
21 - 50	86%	n=	332	90%	n=	338	90%	n=	348
51 – 80	88%	n=	41	85%	n=	55	84%	n=	63
> 80	91%	n=	23	96%	n=	28	100%	n=	14

Table 22: Distance from shopping centre compared with participation – national sample

National Sample	Proportion agreeing to participate								
Distance	10c			20c			50c		
< 5 km	84%	n=	854	86%	n=	881	89%	n=	880
5 - 10 km	81%	n=	182	85%	n=	168	86%	n=	178
11 - 15 km	93%	n=	40	88%	n=	43	83%	n=	40
16 - 20 km	96%	n=	23	73%	n=	15	96%	n=	24
>20 km	90%	n=	39	86%	n=	36	100%	n=	29

Table 23: Income compared with participation – national sample

National Sample	Proportion agreeing to participate								
Household Income	10c			20c			50c		
< $26,000	83%	n=	166	87%	n=	150	91%	n=	163
$26,000 - $41,599	86%	n=	170	87%	n=	170	89%	n=	158
$41,600 - $62,399	87%	n=	173	90%	n=	175	89%	n=	200
$62,400 - $88,399	84%	n=	184	88%	n=	189	91%	n=	180
$88,400 - $103,999	86%	n=	145	86%	n=	117	88%	n=	158
$104,000 - $155,999	84%	n=	148	87%	n=	171	83%	n=	150
>$156,000	82%	n=	38	70%	n=	53	90%	n=	41
Total	84%	n=	1,138	86%	n=	1,143	88%	n=	1,151

3.5.2 Participation logit model results

A binomial logit model was fitted to the participation data to assess the statistical significance of individual factors that may be responsible for explaining the decision to participate. The model coefficients are contained in Appendix F.

Results indicate that the probability of an individual participating in a CDS (redeeming a refund) increases with:

- Weekly consumption of containers – a household is 4% more likely to participate with every additional container consumed per week.
- The size of deposit – a household is 3% more likely to participate with every 1 cent increase in deposit.
- Age – increasing probability of participation among older age groups.
- Whether the household is located in South Australia. – The results indicate that South Australian residents have a slightly higher probability of participation than households in other States (ie if the household is from SA, it is 0.7% more likely to participate than other households, all else being equal).

There were also a number of factors that have a statistically significant, negative effect on the likelihood of participation:

- Individuals that stated a low or zero value for recycling in the choice model are also less willing to participate.
- Households with higher incomes are less likely to participate. The results indicate that for a $10,000 increase in household income, the probability of participation decreases by 3.5%.

While the above variables are all significant in explaining participation, predicted changes in participation rate arising from marginal changes in these variables are not large. Distance from a shopping centre was not statistically significant.

3.5.3 Using participation responses to estimate inconvenience cost

Prior to undertaking this modelling, it was expected that households living further away from a shopping centre (the site of the collection centre) would be less likely to participate, all else being equal, due to the inconvenience of travelling long distances to return containers. The relationship between distance and participation was the planned mechanism through which a dollar value was to be estimated for inconvenience.

The planned method for calculating inconvenience cost was to simulate the increased participation that would result by setting the distance variable in the model to zero. Next, the deposit amount would be increased to a level that reduced participation rate back to the level predicted by the model when distance is set at the sample mean. In effect, this simulates the size of deposit-refund needed, on average, to compensate people for the inconvenience cost imposed by having to travel to a collection centre.

However, this method was unable to be applied because distance is not a significant variable in the model. This result is counter intuitive but can be explained by noting that the majority of the sample resided less than 10km from a shopping centre. Variations in distance over this relatively short range appear not to be a factor of concern to households in their participation decision. Alternatively (or in addition to) ‘distance’ may be a poor proxy for measuring inconvenience, possibly because households would incorporate their container drop-off as part of their normal weekly or fortnightly shopping routine.

It is concluded that, in the absence of a relationship between distance and participation, it is not possible to calculate an inconvenience cost from the survey results.

4 Conclusion

Through the use of Choice Modelling, a well-established non-market valuation survey technique, estimates of household values for a number of attribute outcomes of waste packaging recycling have been estimated. These results provide decision makers with quantified information about Australia-wide community attitudes to waste packaging recovery, recycling and litter reduction.

The willingness to pay estimates for two key outcomes of improved waste management (increased recycling and reduced litter) provide indicative value measures for use in a cost-benefit analysis of various national options for managing packaging waste. Because the values are expressed in unit terms ($ per unit outcome) the results can be aggregated to reflect the scale of changes in litter or recycling expected under a particular policy approach.

On average, respondents were found to be strongly 'pro-recycling'. This finding is consistent with the focus group research undertaken prior to the survey. Pro-recycling attitudes were evidenced by

- 65% of the households agreeing or strongly agreeing with the statement that "I think recycling is an important issue and we should do all we can"; and
- 86% of the sample agreeing or strongly agreeing with the statement that "Waste packaging is causing environmental problems".
- Furthermore, 84% of respondents expressed a willingness to pay for increased recycling by selecting a payment option in one or more of the choice sets.
- Respondent households are willing to pay, on average, $2.77 per year for every 1% increase in the weight of waste packaging recycled, above the current national average level of recycling of 55%. This equates to an aggregate willingness to pay of $18.4 million per annum for each 1% increase.
- Households are willing to pay, on average, $41.50 per annum for a 10% reduction in litter (respondents were advised that this would produce a 'noticeable improvement' in litter). A 20% reduction ('significant improvement') is valued at $83.00 per annum. Aggregate willingness to pay equates to $276.1 million and $552.2 million per annum for a 10% and 20% reduction, respectively.

The results indicate that litter reduction is perceived to be important, if not more important than recycling packaging materials. It is possible that people identify with the tangible, visual outcomes of reduced litter more than recycling of waste, which produces outcomes that are less visual.

One of the observations arising out of this research is that the linkage between litter reduction, in terms of waste packaging litter collected, and consequent visual aesthetics are not well understood. The values estimated in this survey are based on people's willingness to pay for a noticeable improvement and a significant improvement in aesthetics due to litter reduction. For the purposes of the survey it is assumed the reductions of 10% and 20% would result in a noticeable and significant improvement, respectively. This assumption needs to be tested if the unit values are to be used to assess the aggregate value impact of alternative litter management scenarios. In concept, it should be possible to simulate the effect of different volumes of packaging litter reduction on streetscapes and visual aesthetics, with perhaps an aesthetics scale developed for different litter densities.

The absence of a reliable and tested calibration scale for linking the choice modelling values for 'noticeable' and 'significant' improvements in visual aesthetics to reductions in litter prevents the survey results for litter being applied with confidence to the policy options considered in the BDA study.

Further research is required to quantify the size of inconvenience cost that a CDS may impose on households. In this study, distance to a collection centre was found to be an inadequate proxy for

measuring inconvenience cost. While the survey finds that stated participation in a national CDS is high (84 to 88 per cent, depending on deposit amount), this does not necessarily imply that inconvenience costs are low. It tells us that other, positive factors from participating in a CDS are outweighing perceived inconvenience.

The development of a specific stated preference survey for a CDS would be one avenue for providing greater focus on measuring inconvenience values — in addition to any other impacts that are specific for CDS. One of the limitations of the generic approach adopted in this study is that impacts that are largely specific to one type of policy mechanism cannot be explored in any depth. The generic approach was the right approach to take, given the terms of reference for this study called for the estimation of values that could be used to evaluate multiple policy options. However, it does preclude a highly detailed analysis of the potential impacts associated with any one option — for example, inconvenience of participating in a CDS.

5 References

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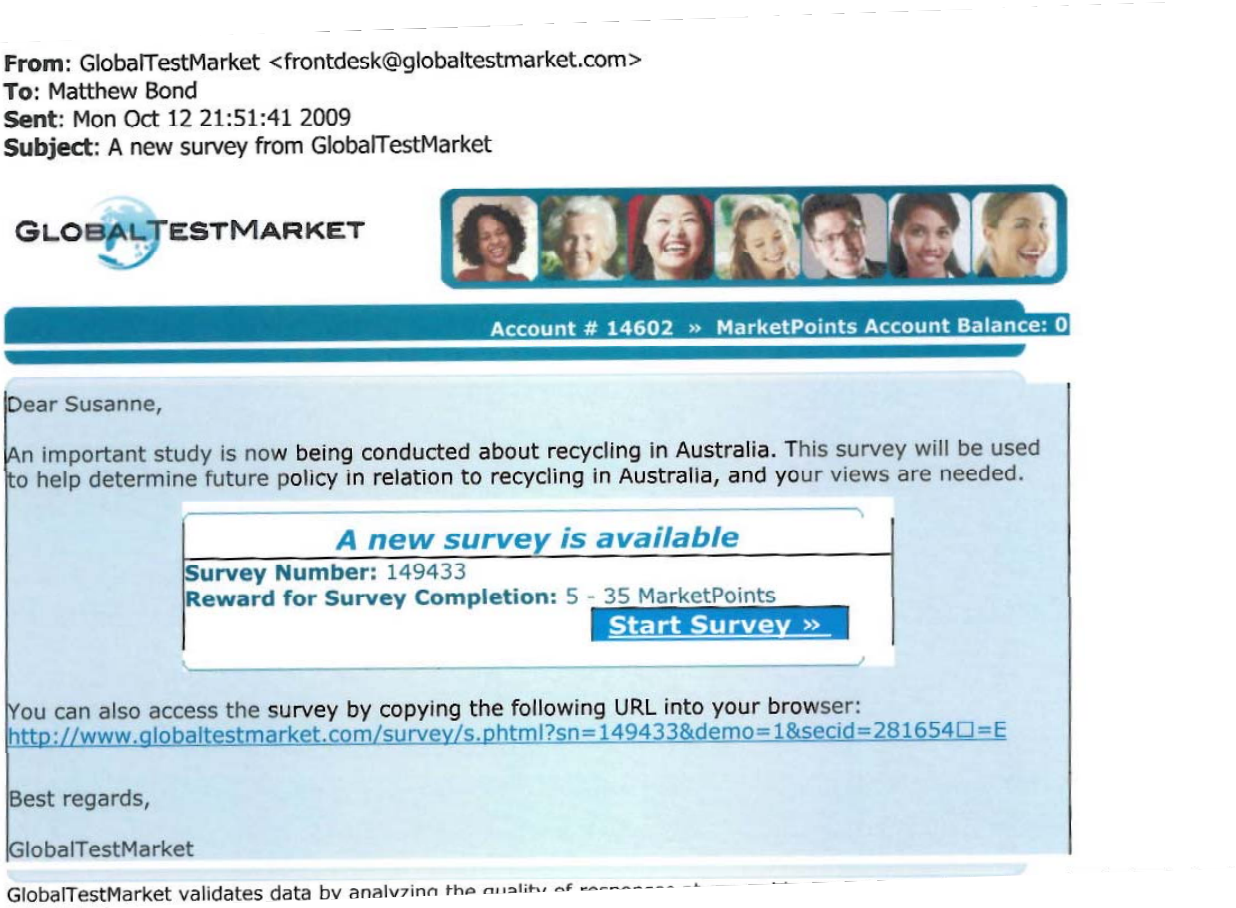
Appendices

Appendix A Survey invitation and screen shots

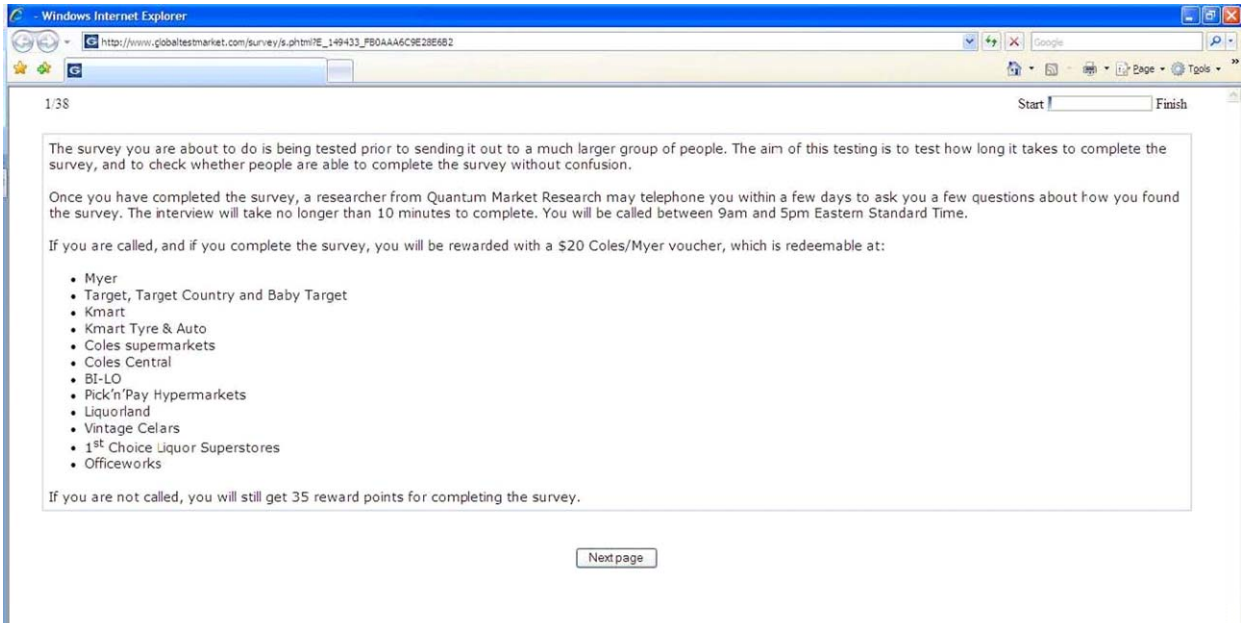
Members of the pre-screened panel were invited to participate in the survey with an email invitation. An example of the email is provided below. Respondents who accepted the invitation and passed the quota tests were presented with the survey on their screens as displayed below. The levels of the attributes in the choice sets and the level of the refundable deposit varied through the sample.

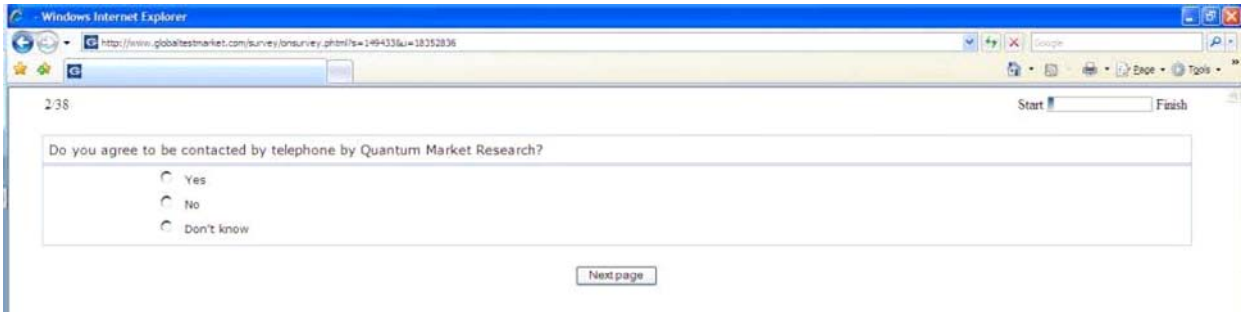
Sample invitation

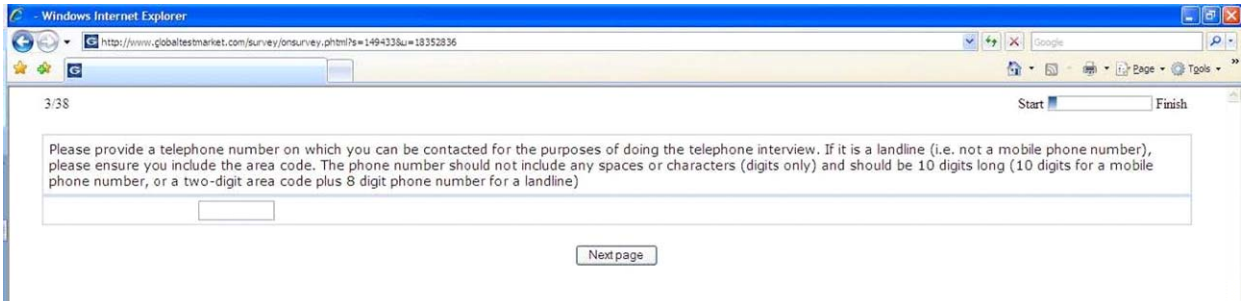


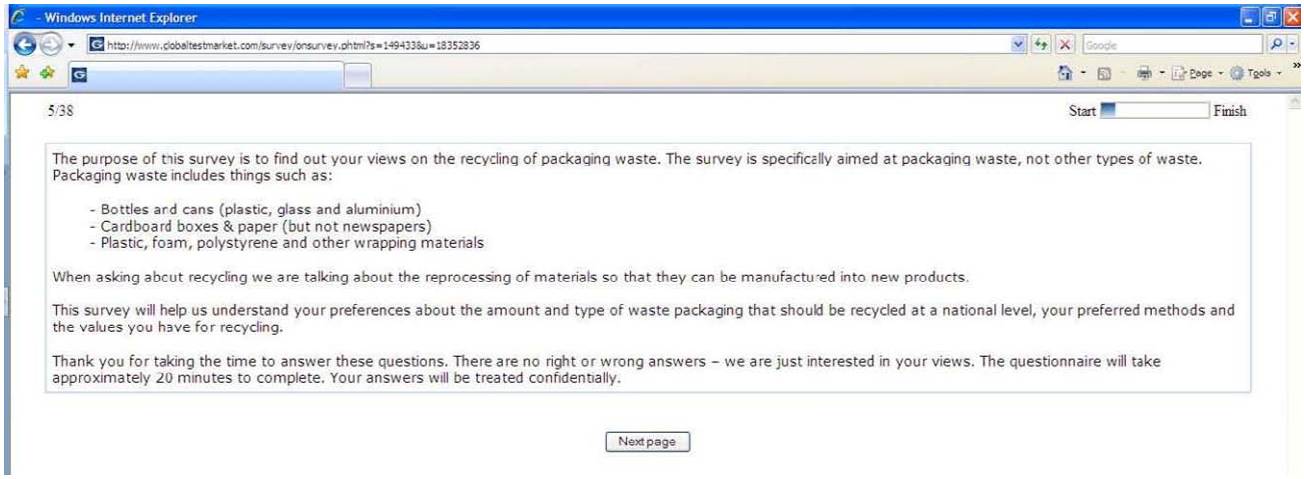
Sample survey screen shots

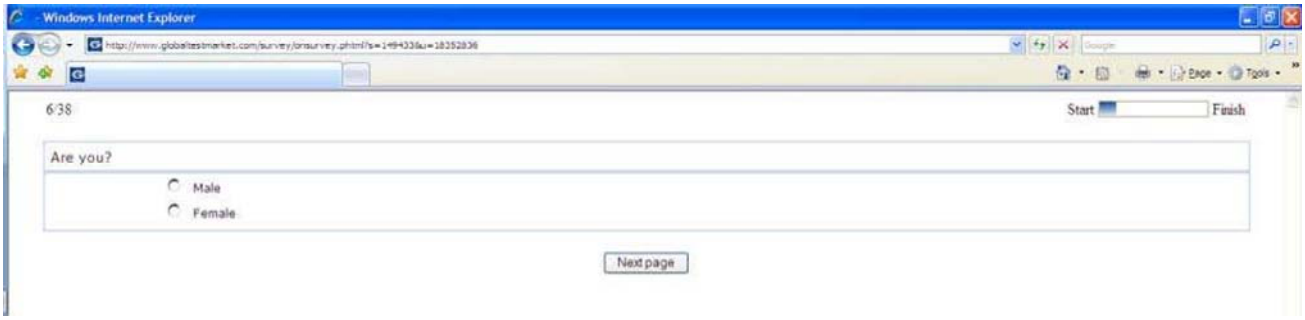
This example of the survey was the one used when sending out the pilot. For the complete sample the first three screens were not presented.

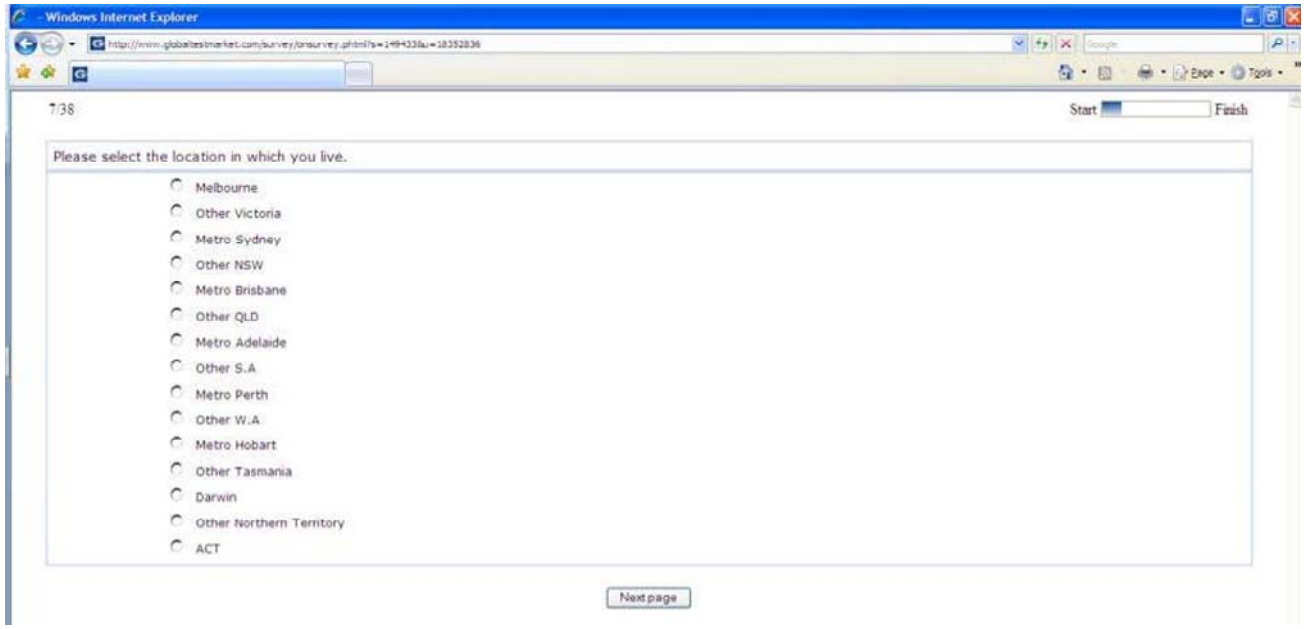


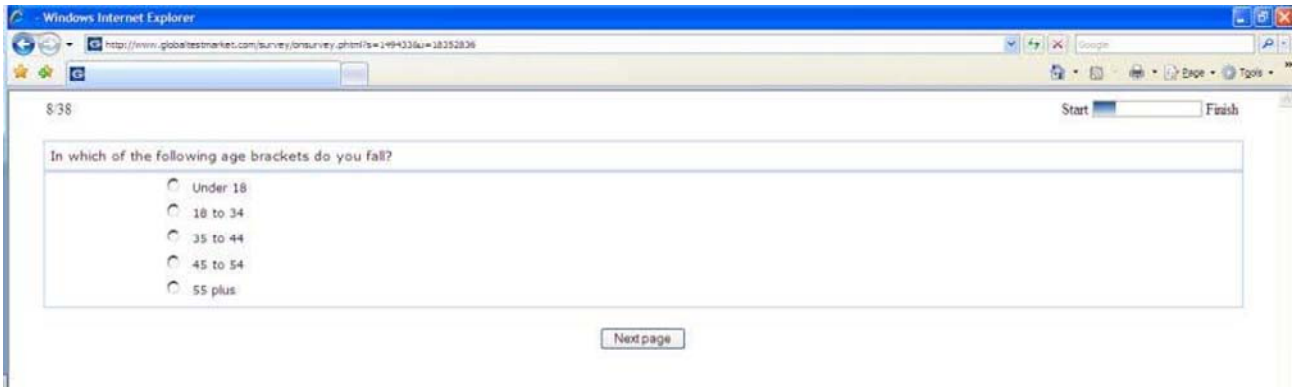


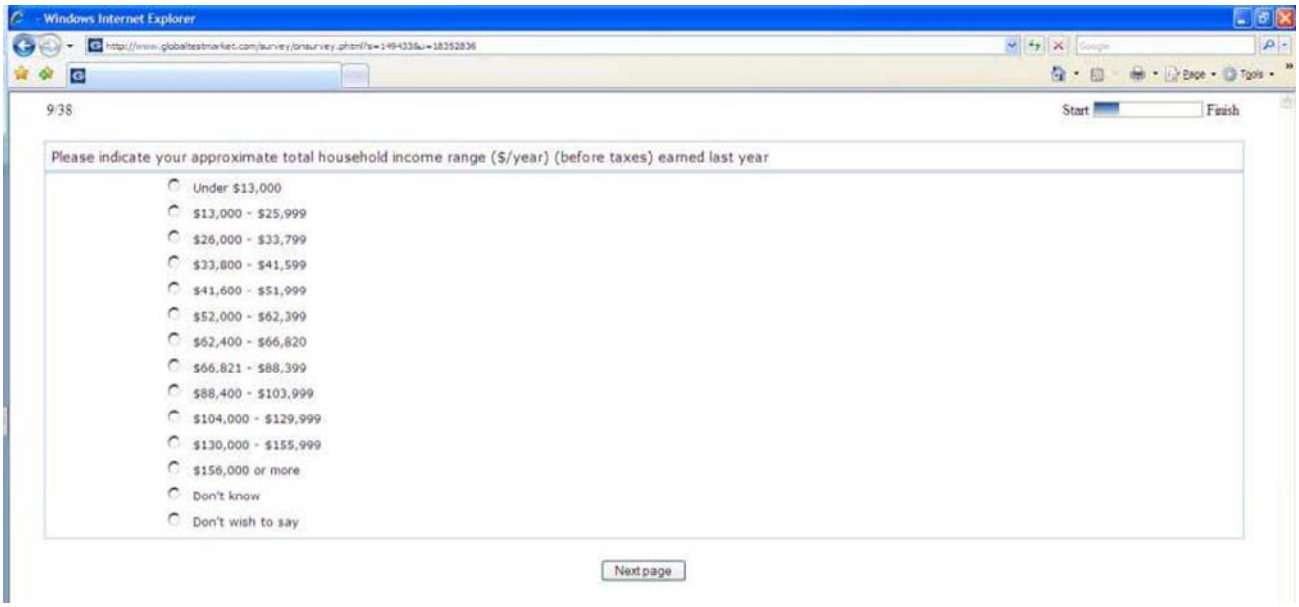



Windows Internet Explorer
5/38
Start
Finish
The purpose of this survey is to find out your views on the recycling of packaging waste. The survey is specifically aimed at packaging waste, not other types of waste. Packaging waste includes things such as:
- Bottles and cans (plastic, glass and aluminium)
- Cardboard boxes & paper (but not newspapers)
- Plastic, foam, polystyrene and other wrapping materials
When asking about recycling we are talking about the reprocessing of materials so that they can be manufactured into new products.
This survey will help us understand your preferences about the amount and type of waste packaging that should be recycled at a national level, your preferred methods and the values you have for recycling.
Thank you for taking the time to answer these questions. There are no right or wrong answers – we are just interested in your views. The questionnaire will take approximately 20 minutes to complete. Your answers will be treated confidentially.
Next page

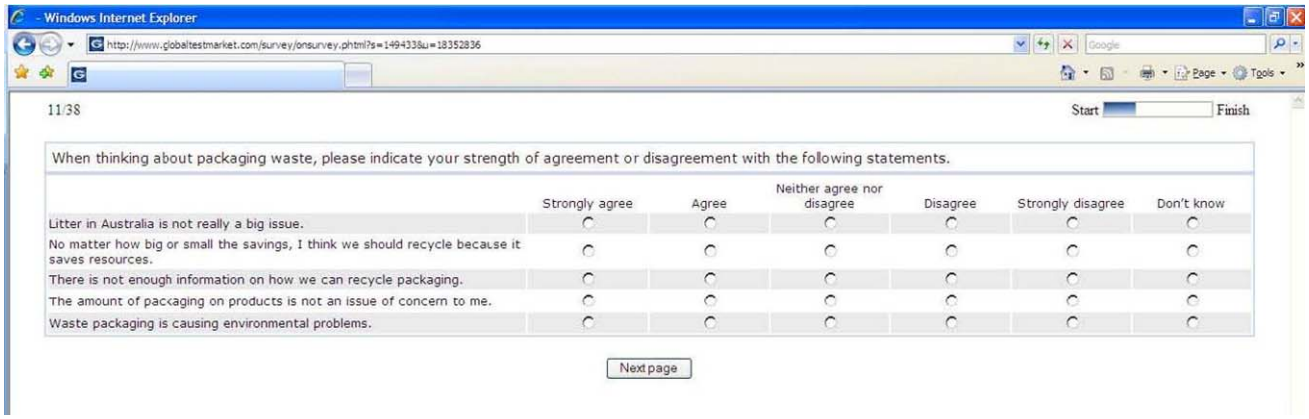

Windows Internet Explorer
6/38
Start
Finish
Are you?
Male
Female
Next page

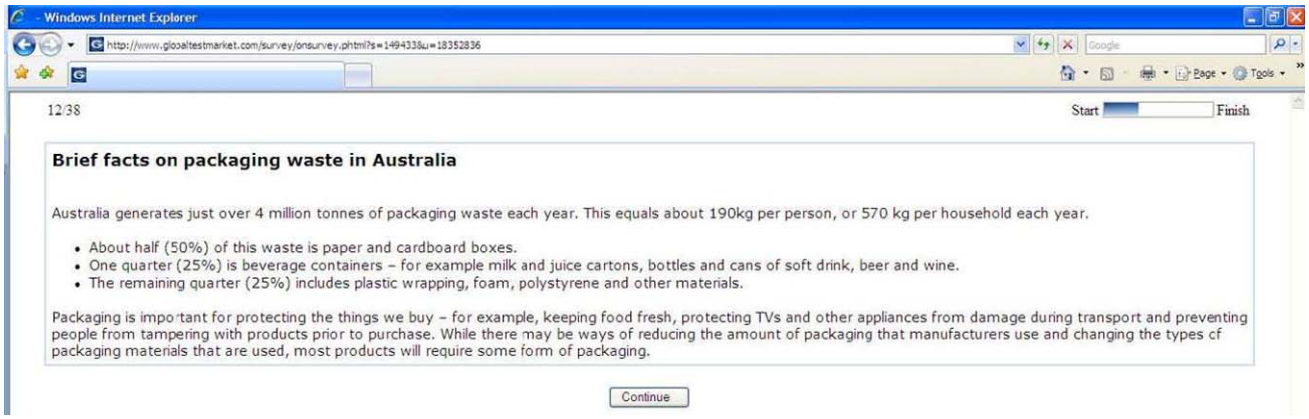

Windows Internet Explorer
7/38
Start
Finish
Please select the location in which you live.
Melbourne
Other Victoria
Metro Sydney
Other NSW
Metro Brisbane
Other QLD
Metro Adelaide
Other S.A
Metro Perth
Other W.A
Metro Hobart
Other Tasmania
Darwin
Other Northern Territory
ACT
Next page


Windows Internet Explorer
8/38
Start
Finish
In which of the following age brackets do you fall?
Under 18
18 to 34
35 to 44
45 to 54
55 plus
Next page


Windows Internet Explorer
9/38
Start
Finish
Please indicate your approximate total household income range ($/year) (before taxes) earned last year
Under $13,000
$13,000 - $25,999
$26,000 - $33,799
$33,800 - $41,599
$41,600 - $51,999
$52,000 - $62,399
$62,400 - $66,820
$66,821 - $88,399
$88,400 - $103,999
$104,000 - $129,999
$130,000 - $155,999
$156,000 or more
Don't know
Don't wish to say
Next page


Windows Internet Explorer
10/38
Start
Finish
Which of the following statements best describes your opinion about recycling? Please select one statement only.
I never think about it
I think recycling is a waste of time
I think recycling is necessary but we pay council to manage it
I think recycling is an important issue and we should do all that we can
I think increasing recycling is one of the most important issues facing Australia today
Next page


Windows Internet Explorer
11/38
Start
Finish
When thinking about packaging waste, please indicate your strength of agreement or disagreement with the following statements.
Strongly agree
Agree
Neither agree nor disagree
Disagree
Strongly disagree
Don't know
Litter in Australia is not really a big issue.
No matter how big or small the savings, I think we should recycle because it saves resources.
There is not enough information on how we can recycle packaging.
The amount of packaging on products is not an issue of concern to me.
Waste packaging is causing environmental problems.
Next page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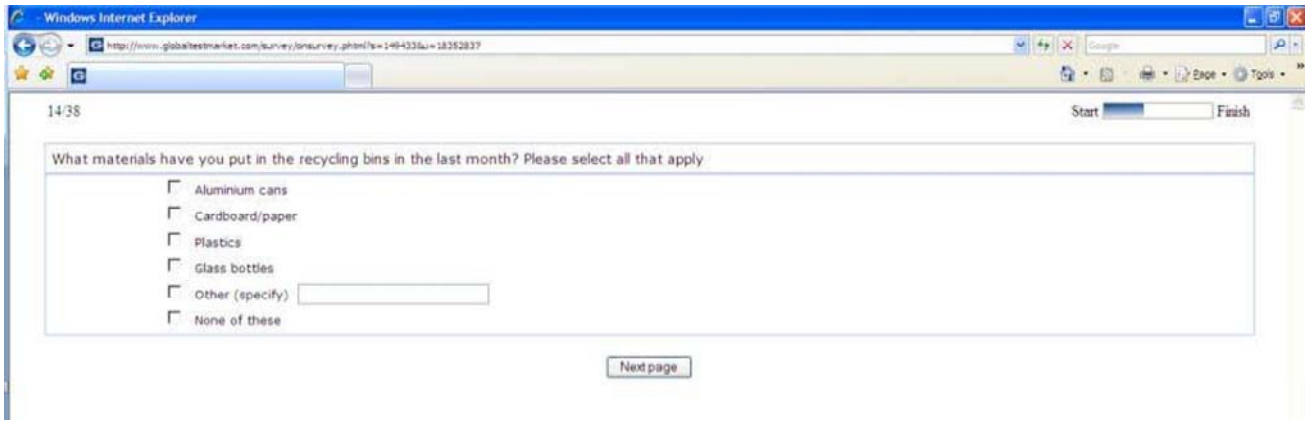
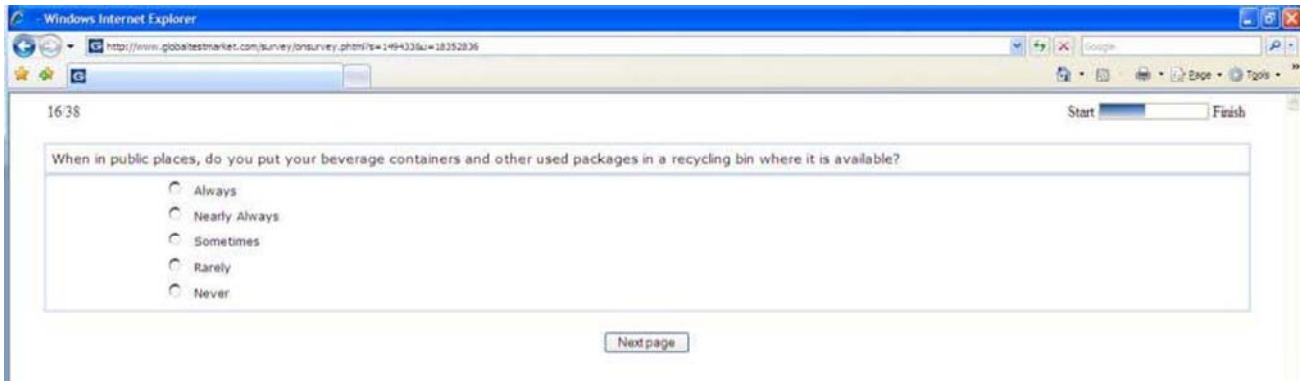
12/38
Start
Finish
Brief facts on packaging waste in Australia
Australia generates just over 4 million tonnes of packaging waste each year. This equals about 190kg per person, or 570 kg per household each year.
About half (50%) of this waste is paper and cardboard boxes.
One quarter (25%) is beverage containers – for example milk and juice cartons, bottles and cans of soft drink, beer and wine.
The remaining quarter (25%) includes plastic wrapping, foam, polystyrene and other materials.
Packaging is important for protecting the things we buy – for example, keeping food fresh, protecting TVs and other appliances from damage during transport and preventing people from tampering with products prior to purchase. While there may be ways of reducing the amount of packaging that manufacturers use and changing the types of packaging materials that are used, most products will require some form of packaging.
Continue


Windows Internet Explorer
13/38
Start
Finish
Does your household have one or more recycling bins for kerbside pickup?
Yes
No
Don't know
Next page


Windows Internet Explorer
14/38
Start
Finish
What materials have you put in the recycling bins in the last month? Please select all that apply
Aluminium cans
Cardboard/paper
Plastics
Glass bottles
Other (specify)
None of these
Next page


Windows Internet Explorer
15/38
Start
Finish
In the past 12 months have you dropped off waste packaging to a recycling centre?
Yes
No
Don't know
Next page


Windows Internet Explorer
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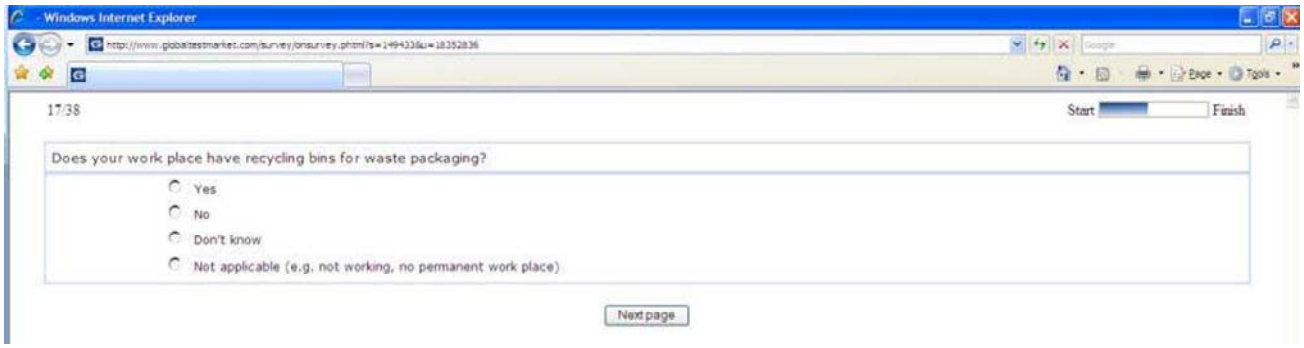
Start
Finish
When in public places, do you put your beverage containers and other used packages in a recycling bin where it is available?
Always
Nearly Always
Sometimes
Rarely
Never
Next page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17/38
Start
Finish
Does your work place have recycling bins for waste packaging?
Yes
No
Don't know
Not applicable (e.g. not working, no permanent work place)
Next page


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18/38
Start
Finish
How much packaging waste is currently being recycled?
At a national level, about 55 per cent of all packaging, by weight, is recycled.
This figure is an average across all packaging types. Some types are recycled more than others. For example, about 43 per cent of beverage containers, by weight, are recycled.
Much of the consumer packaging collected for recycling comes from kerbside pick-up services provided by local councils. Other material is collected from recycling bins in work places, shopping centres, parks and other public places.
Continue


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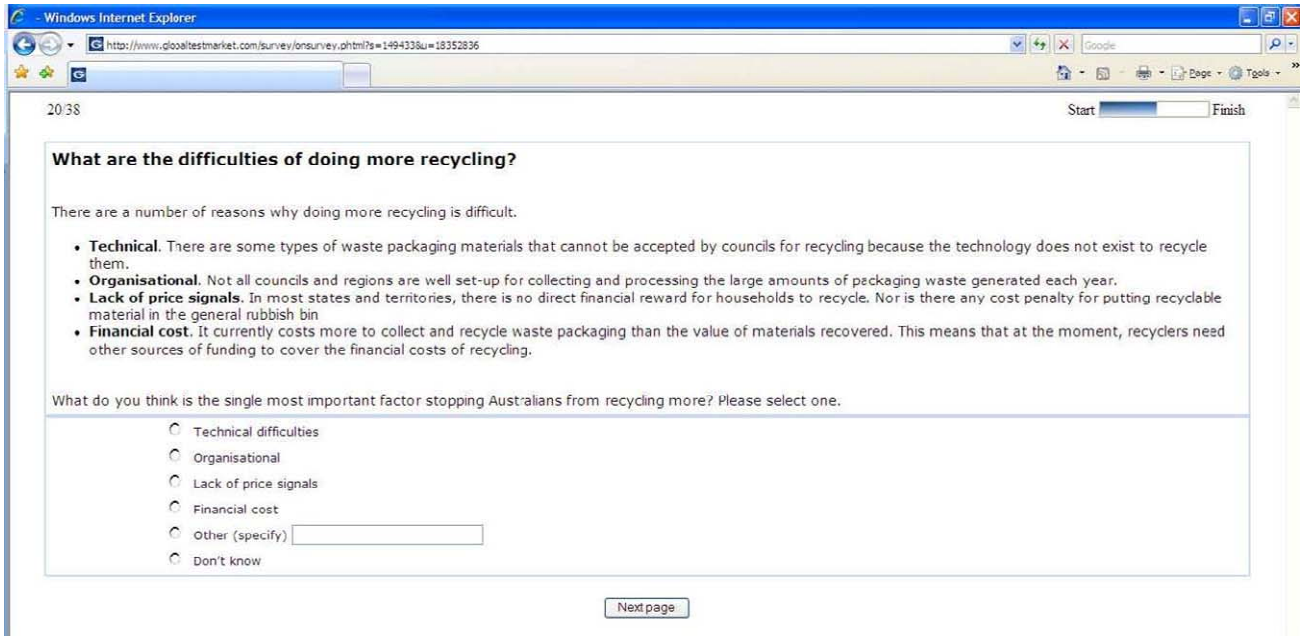
19/38
Start
Finish
Reasons for recycling packaging
There are a number of reasons why people may want to recycle. You may or may not share these views:
Less litter. Depending on how waste is collected, increased recycling could reduce the amount of litter in public places.
Environment. Less waste goes to landfill. Most waste in Australia goes to landfills that are designed and built to manage the long term legacy of such waste.
Conservation of resources. Recycling reduces the need to use raw materials. For example, recycled glass and aluminium can be used to make new bottles and cans. Waste paper can be recycled into cardboard. In some cases, recycling may only result in small improvements in conservation because collection and recycling of materials uses energy, water and other resources. Also, the volume of resources recovered may be big or small, depending on the materials and the technology available.
Continue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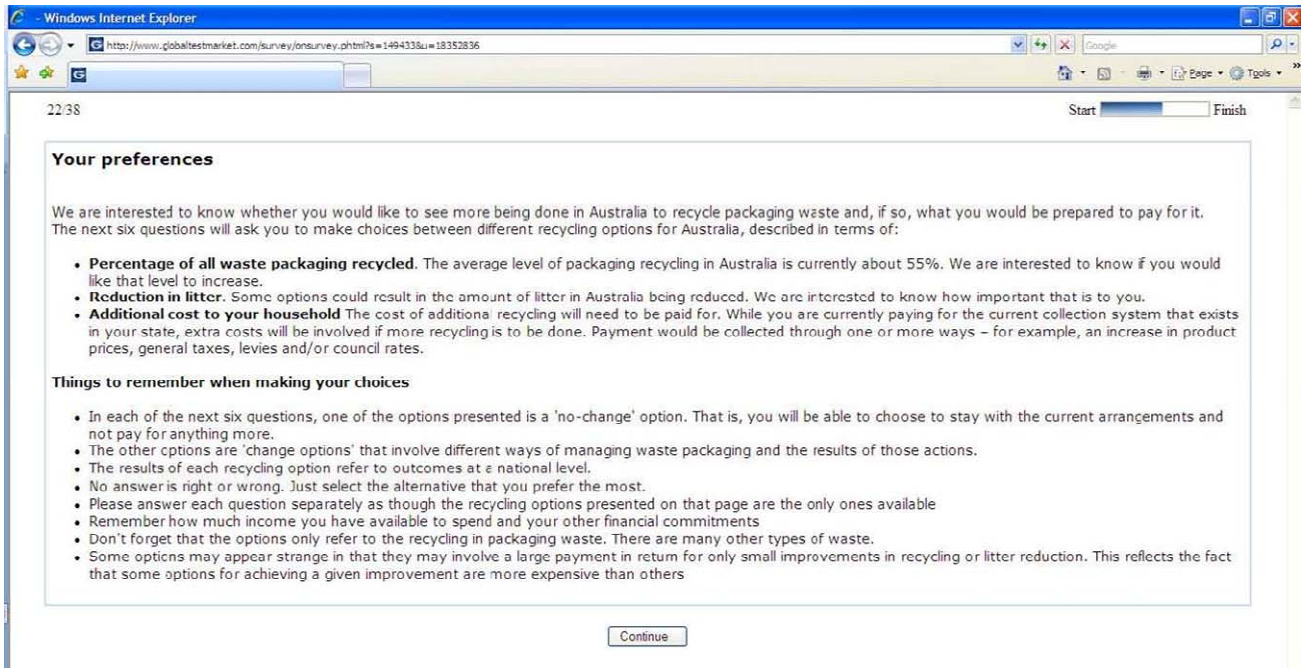
20/38
Start
Finish
What are the difficulties of doing more recycling?
There are a number of reasons why doing more recycling is difficult.
Technical. There are some types of waste packaging materials that cannot be accepted by councils for recycling because the technology does not exist to recycle them.
Organisational. Not all councils and regions are well set-up for collecting and processing the large amounts of packaging waste generated each year.
Lack of price signals. In most states and territories, there is no direct financial reward for households to recycle. Nor is there any cost penalty for putting recyclable material in the general rubbish bin
Financial cost. It currently costs more to collect and recycle waste packaging than the value of materials recovered. This means that at the moment, recyclers need other sources of funding to cover the financial costs of recycling.
What do you think is the single most important factor stopping Australians from recycling more? Please select one.
Technical difficulties
Organisational
Lack of price signals
Financial cost
Other (specify)
Don't know
Next page


- Windows Internet Explorer
http://www.globaltestmarket.com/survey/onsurvey.phtml?s=149433&u=18352836
21/38
Start
Finish
Options for increasing the amount that is recycled
There is a wide range of ways that Australians could increase the amount of packaging waste it recycles. Some possible ways include:
Education and awareness campaigns.
Increasing litter collection in public places.
Requiring manufacturers to use recyclable materials in packaging.
Making it easier for people to recycle – for example, drop-off centres, improved collection services, more bins in public places and the work place.
Providing a financial incentive for people to recycle. For example, South Australia has a container deposit scheme where, in addition to the price of the beverage, consumers pay a deposit for the container. The deposit is refunded upon return of the item to a collection centre for recycling.
Developing new processing technologies for recycling a wider range of packaging materials.
All of these options would require additional funding to help pay for the cost of the program and the cost of recycling more packaging waste.
Continue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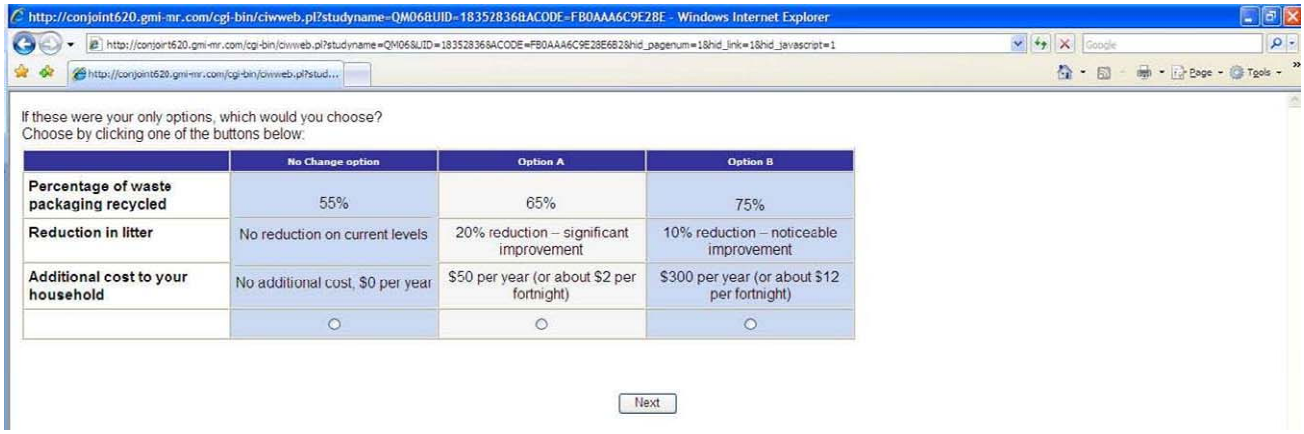
22/38
Start
Finish
Your preferences
We are interested to know whether you would like to see more being done in Australia to recycle packaging waste and, if so, what you would be prepared to pay for it.
The next six questions will ask you to make choices between different recycling options for Australia, described in terms of:
Percentage of all waste packaging recycled. The average level of packaging recycling in Australia is currently about 55%. We are interested to know if you would like that level to increase.
Reduction in litter. Some options could result in the amount of litter in Australia being reduced. We are interested to know how important that is to you.
Additional cost to your household The cost of additional recycling will need to be paid for. While you are currently paying for the current collection system that exists in your state, extra costs will be involved if more recycling is to be done. Payment would be collected through one or more ways – for example, an increase in product prices, general taxes, levies and/or council rates.
Things to remember when making your choices
In each of the next six questions, one of the options presented is a 'no-change' option. That is, you will be able to choose to stay with the current arrangements and not pay for anything more.
The other options are 'change options' that involve different ways of managing waste packaging and the results of those actions.
The results of each recycling option refer to outcomes at a national level.
No answer is right or wrong. Just select the alternative that you prefer the most.
Please answer each question separately as though the recycling options presented on that page are the only ones available
Remember how much income you have available to spend and your other financial commitments
Don't forget that the options only refer to the recycling in packaging waste. There are many other types of waste.
Some options may appear strange in that they may involve a large payment in return for only small improvements in recycling or litter reduction. This reflects the fact that some options for achieving a given improvement are more expensive than others
Continue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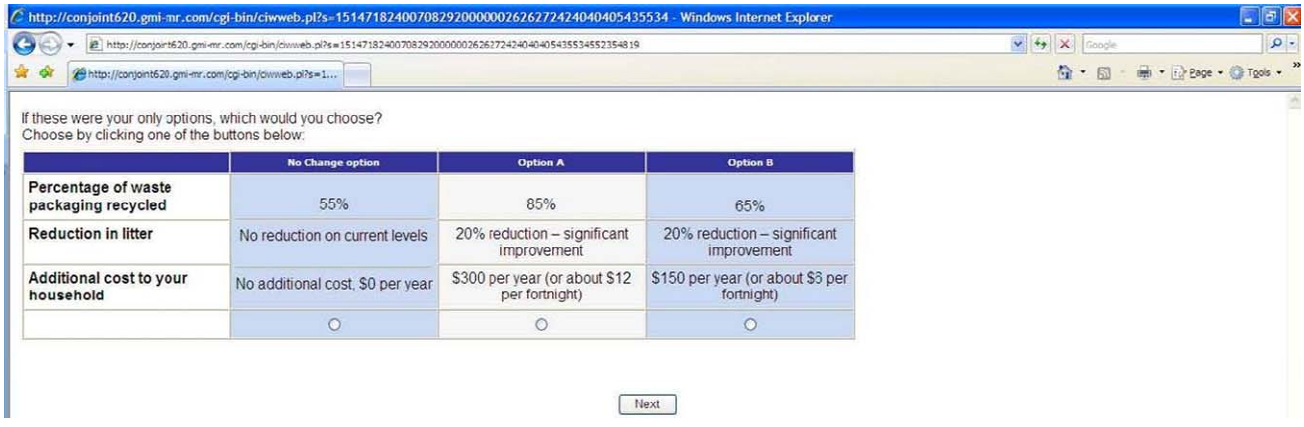
If these were your only options, which would you choose?
Choose by clicking one of the buttons below:
No Change option
Option A
Option B
Percentage of waste packaging recycled
55%
65%
75%
Reduction in litter
No reduction on current levels
20% reduction – significant improvement
10% reduction – noticeable improvement
Additional cost to your household
No additional cost, $0 per year
$50 per year (or about $2 per fortnight)
$300 per year (or about $12 per fortnight)
Next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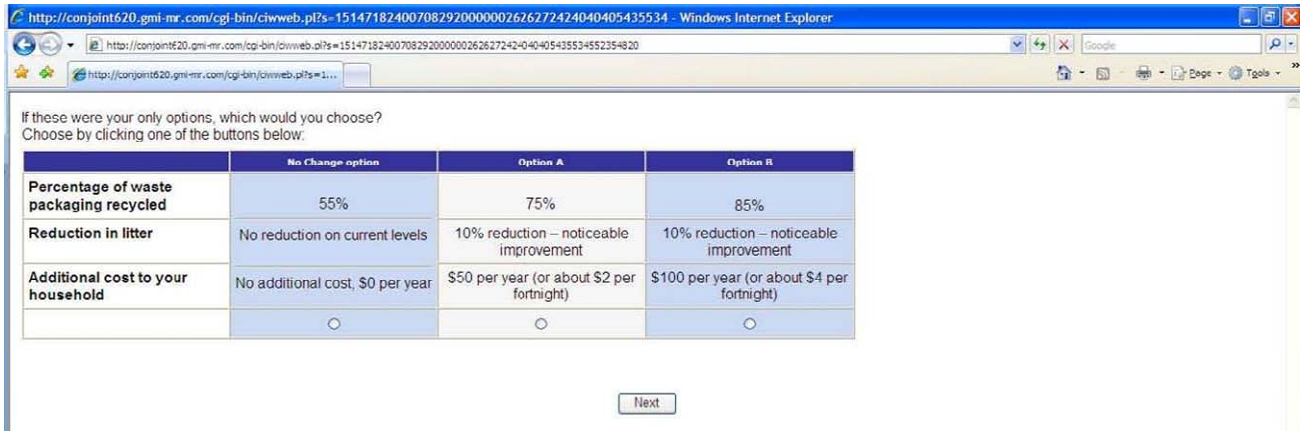
If these were your only options, which would you choose?
Choose by clicking one of the buttons below:
No Change option
Option A
Option B
Percentage of waste packaging recycled
55%
85%
65%
Reduction in litter
No reduction on current levels
20% reduction – significant improvement
20% reduction – significant improvement
Additional cost to your household
No additional cost, $0 per year
$300 per year (or about $12 per fortnight)
$150 per year (or about $3 per fortnight)
Next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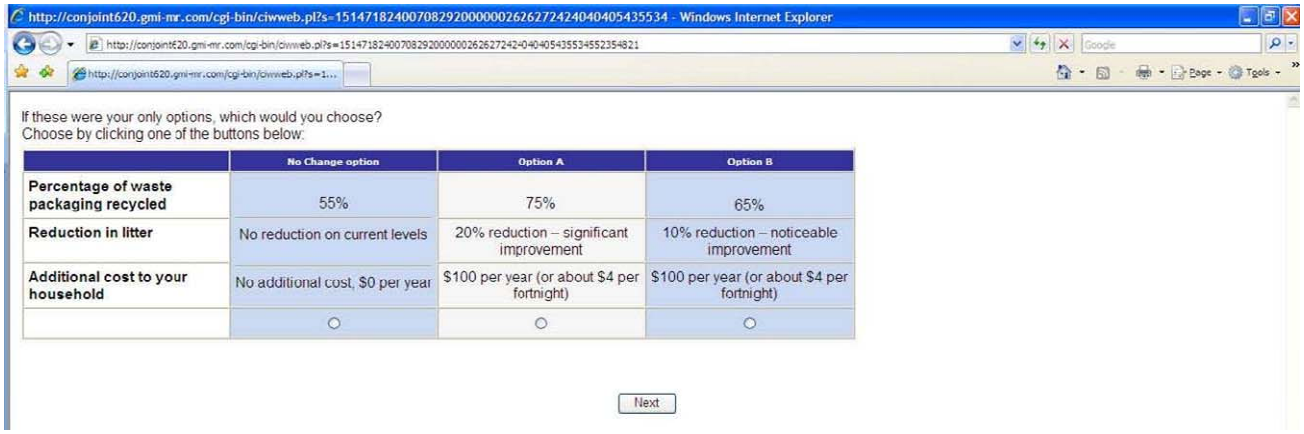
If these were your only options, which would you choose?
Choose by clicking one of the buttons below:
No Change option
Option A
Option B
Percentage of waste packaging recycled
55%
75%
85%
Reduction in litter
No reduction on current levels
10% reduction – noticeable improvement
10% reduction – noticeable improvement
Additional cost to your household
No additional cost, $0 per year
$50 per year (or about $2 per fortnight)
$100 per year (or about $4 per fortnight)
Next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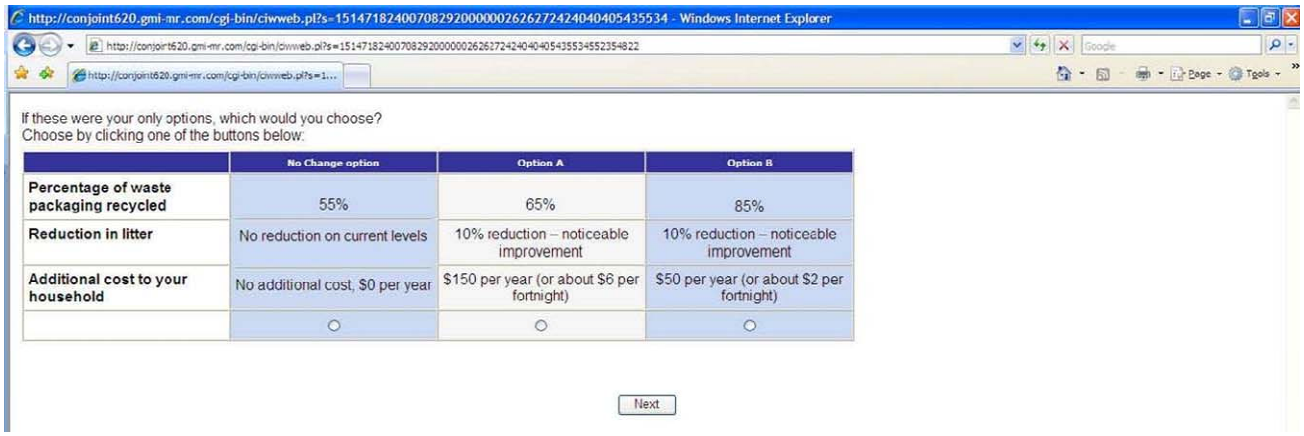
If these were your only options, which would you choose?
Choose by clicking one of the buttons below:
No Change option
Option A
Option B
Percentage of waste packaging recycled
55%
75%
65%
Reduction in litter
No reduction on current levels
20% reduction – significant improvement
10% reduction – noticeable improvement
Additional cost to your household
No additional cost, $0 per year
$100 per year (or about $4 per fortnight)
$100 per year (or about $4 per fortnight)
Next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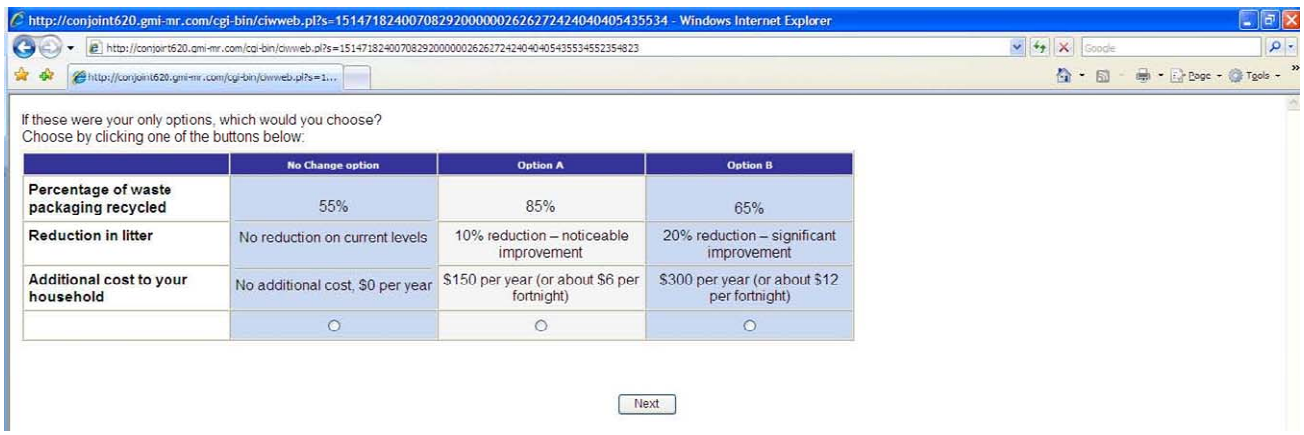
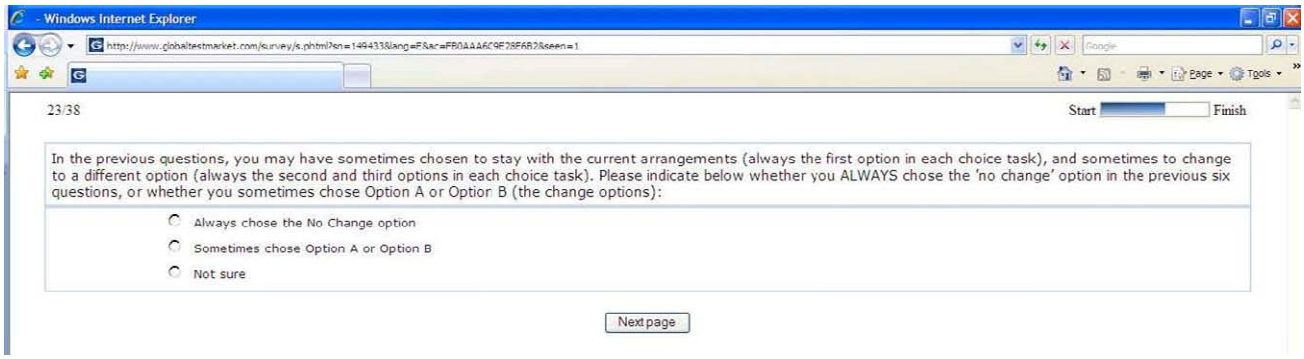
If these were your only options, which would you choose?
Choose by clicking one of the buttons below:
No Change option
Option A
Option B
Percentage of waste packaging recycled
55%
65%
85%
Reduction in litter
No reduction on current levels
10% reduction – noticeable improvement
10% reduction – noticeable improvement
Additional cost to your household
No additional cost, $0 per year
$150 per year (or about $6 per fortnight)
$50 per year (or about $2 per fortnight)
Next


http://conjoint620.gmi-mr.com/cgi-bin/ciwweb.pl?s=151471824007082920000002626272424040405435534 - Windows Internet Explorer
If these were your only options, which would you choose?
Choose by clicking one of the buttons below:
No Change option
Option A
Option B
Percentage of waste packaging recycled
55%
85%
65%
Reduction in litter
No reduction on current levels
10% reduction – noticeable improvement
20% reduction – significant improvement
Additional cost to your household
No additional cost, $0 per year
$150 per year (or about $6 per fortnight)
$300 per year (or about $12 per fortnight)
Next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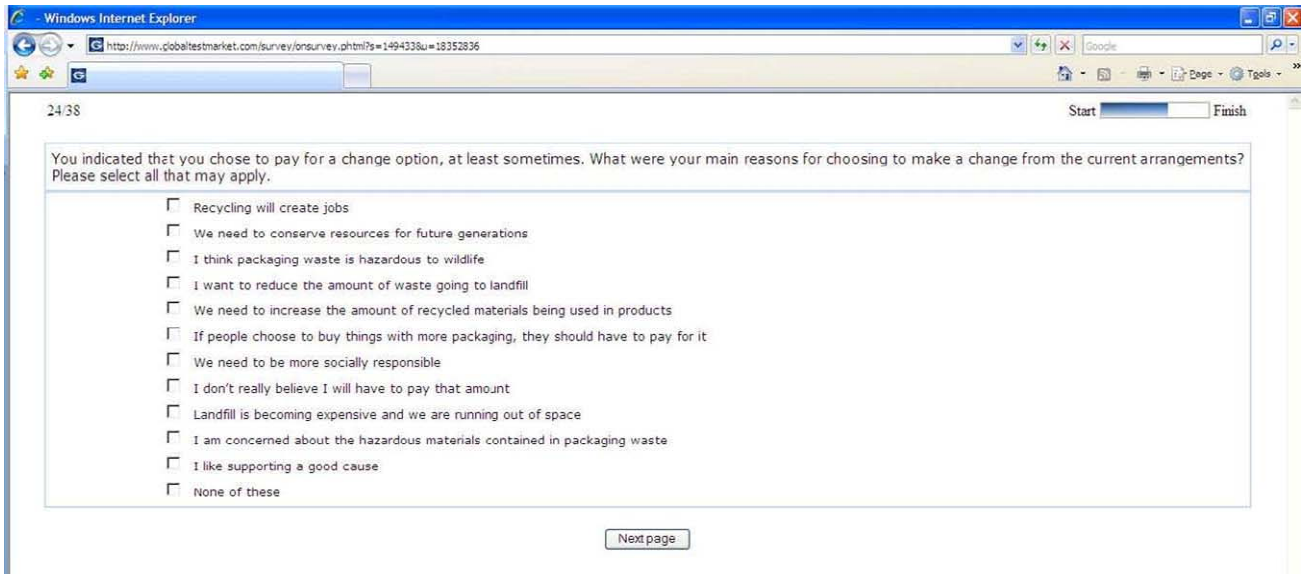
23/38
Start
Finish
In the previous questions, you may have sometimes chosen to stay with the current arrangements (always the first option in each choice task), and sometimes to change to a different option (always the second and third options in each choice task). Please indicate below whether you ALWAYS chose the 'no change' option in the previous six questions, or whether you sometimes chose Option A or Optior B (the change options):
Always chose the No Change option
Sometimes chose Option A or Option B
Not sure
Next page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24/38
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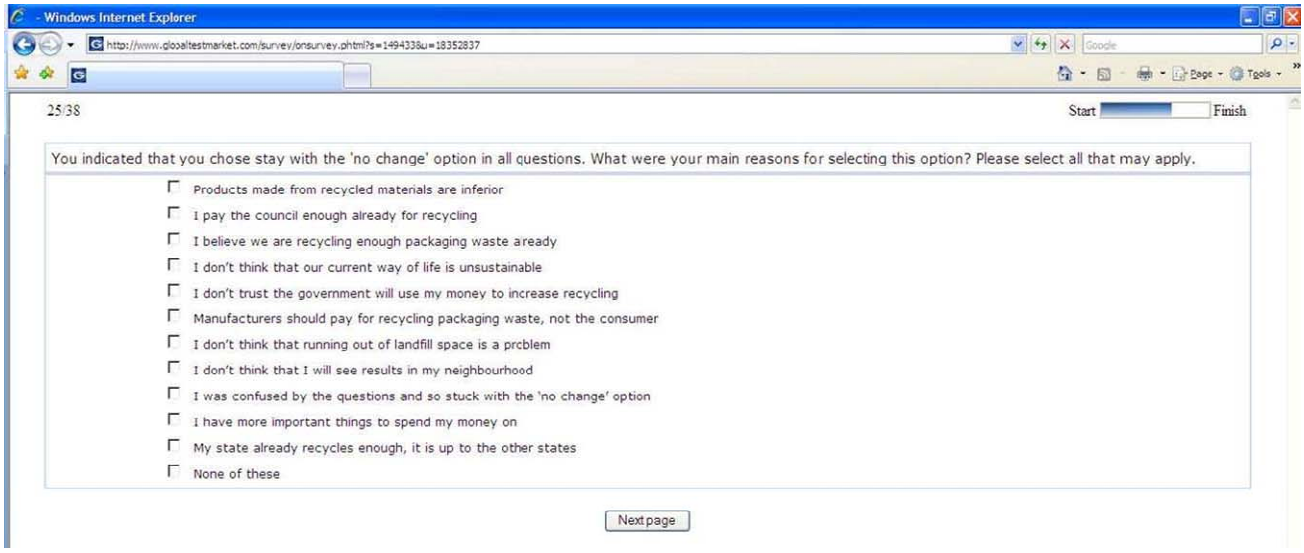
Finish
You indicated that you chose to pay for a change option, at least sometimes. What were your main reasons for choosing to make a change from the current arrangements? Please select all that may apply.
Recycling will create jobs
We need to conserve resources for future generations
I think packaging waste is hazardous to wildlife
I want to reduce the amount of waste going to landfill
We need to increase the amount of recycled materials being used in products
If people choose to buy things with more packaging, they should have to pay for it
We need to be more socially responsible
I don't really believe I will have to pay that amount
Landfill is becoming expensive and we are running out of space
I am concerned about the hazardous materials contained in packaging waste
I like supporting a good cause
None of these
Next page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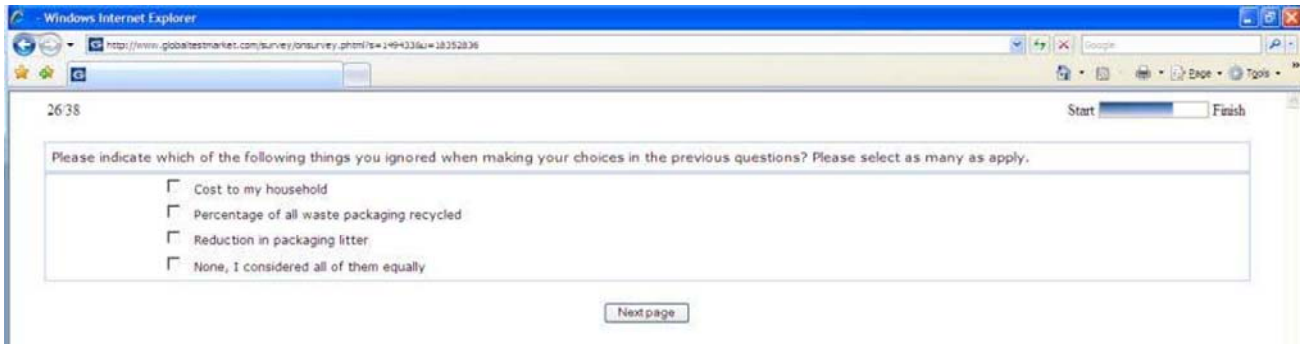
25/38
Start
Finish
You indicated that you chose stay with the 'no change' option in all questions. What were your main reasons for selecting this option? Please select all that may apply.
Products made from recycled materials are inferior
I pay the council enough already for recycling
I believe we are recycling enough packaging waste aready
I don't think that our current way of life is unsustainable
I don't trust the government will use my money to increase recycling
Manufacturers should pay for recycling packaging waste, not the consumer
I don't think that running out of landfill space is a prcblem
I don't think that I will see results in my neighbourhood
I was confused by the questions and so stuck with the 'no change' option
I have more important things to spend my money on
My state already recycles enough, it is up to the other states
None of these
Next page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26/38
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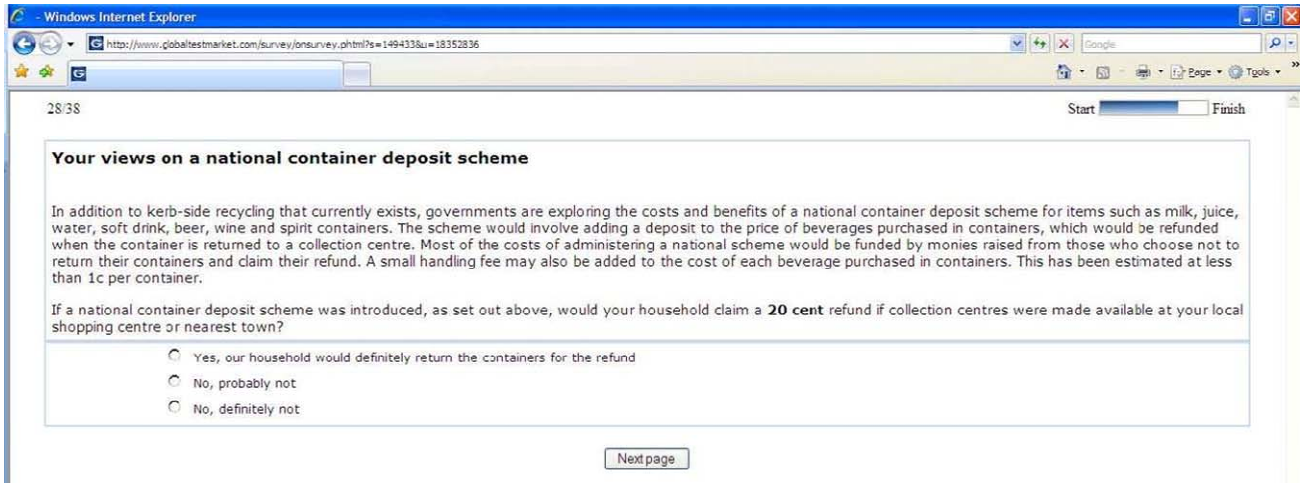
Finish
Please indicate which of the following things you ignored when making your choices in the previous questions? Please select as many as apply.
Cost to my household
Percentage of all waste packaging recycled
Reduction in packaging litter
None, I considered all of them equally
Next page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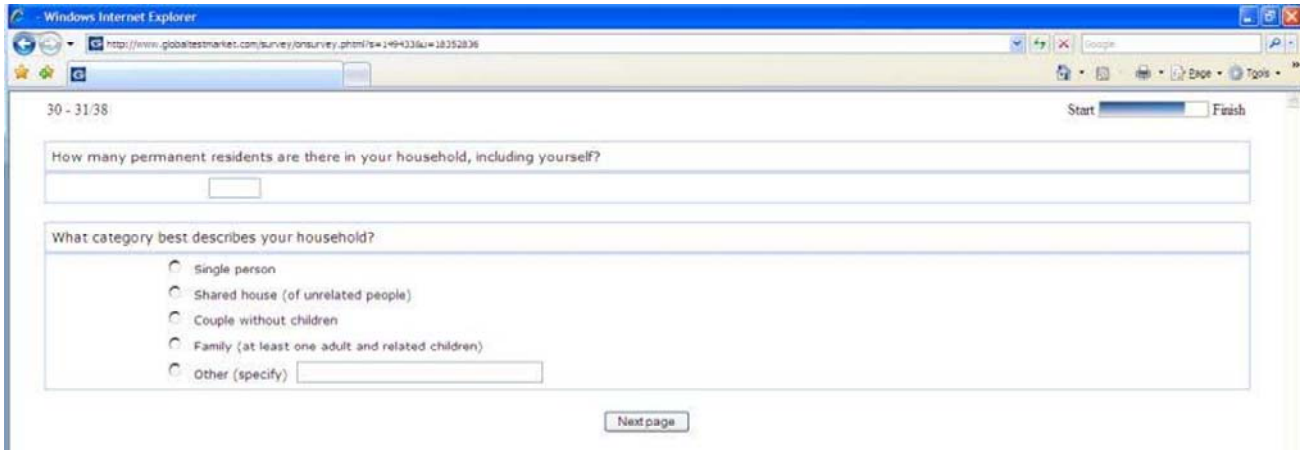
Your views on a national container deposit scheme
In addition to kerb-side recycling that currently exists, governments are exploring the costs and benefits of a national container deposit scheme for items such as milk, juice, water, soft drink, beer, wine and spirit containers. The scheme would involve adding a deposit to the price of beverages purchased in containers, which would be refunded when the container is returned to a collection centre. Most of the costs of administering a national scheme would be funded by monies raised from those who choose not to return their containers and claim their refund. A small handling fee may also be added to the cost of each beverage purchased in containers. This has been estimated at less than 1c per container.
If a national container deposit scheme was introduced, as set out above, would your household claim a 20 cent refund if collection centres were made available at your local shopping centre or nearest town?
Yes, our household would definitely return the containers for the refund
No, probably not
No, definitely not
Next page


Windows Internet Explorer
29/38
Start
Finish
We are almost finished. The final section of this survey asks some brief details about you.
In an average week, approximately how many beverage containers would your household consume in the home? Please enter a number for each category – if you do not consume any of a specific category of beverage containers please enter a zero.
Number per week
Milk and juice bottles and cartons
Beer, spirits wine bottles and cans
Soft drink bottles and cans
Sports drinks, water and other beverages
Next page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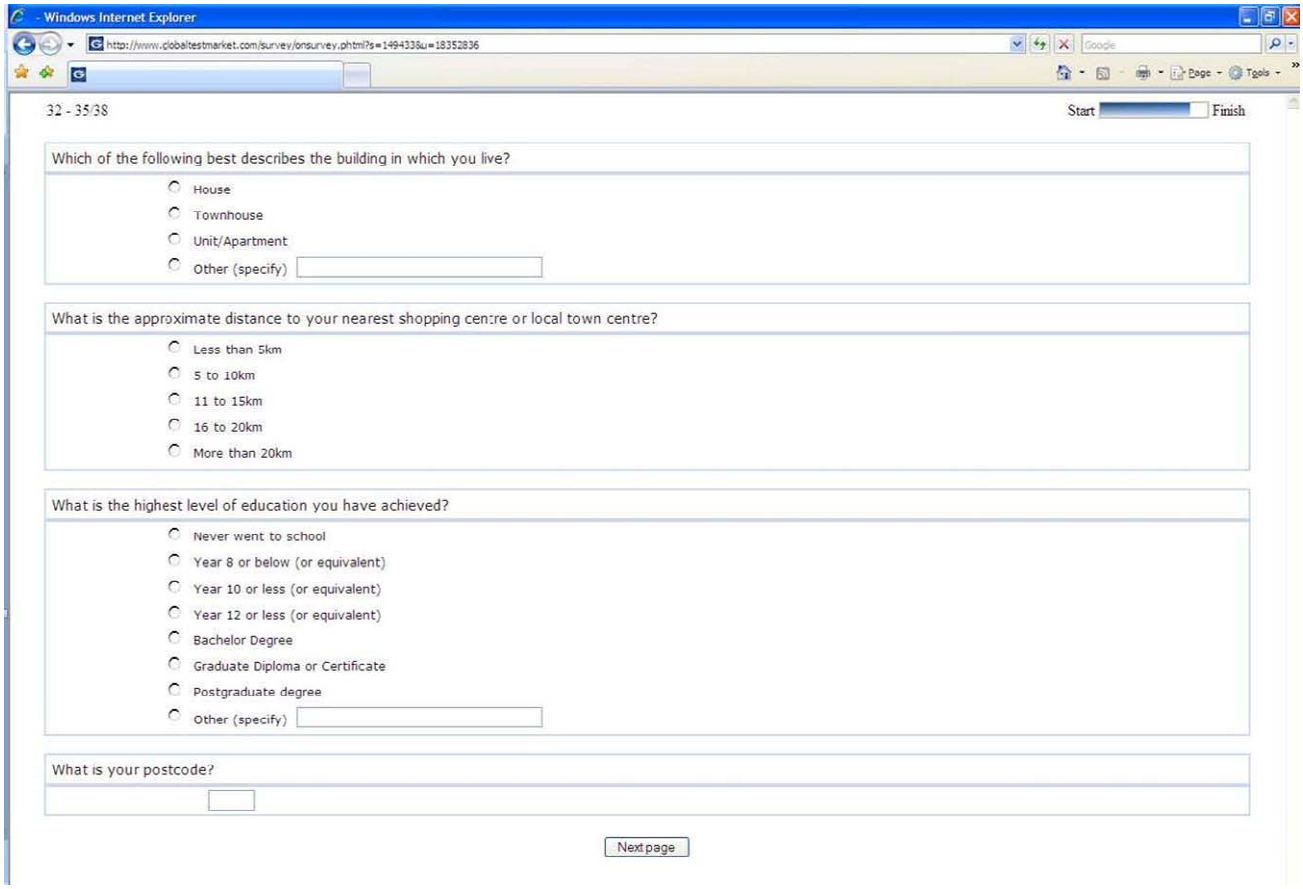
30 - 31/38
Start
Finish
How many permanent residents are there in your household, including yourself?
What category best describes your household?
Single person
Shared house (of unrelated people)
Couple without children
Family (at least one adult and related children)
Other (specify)
Next page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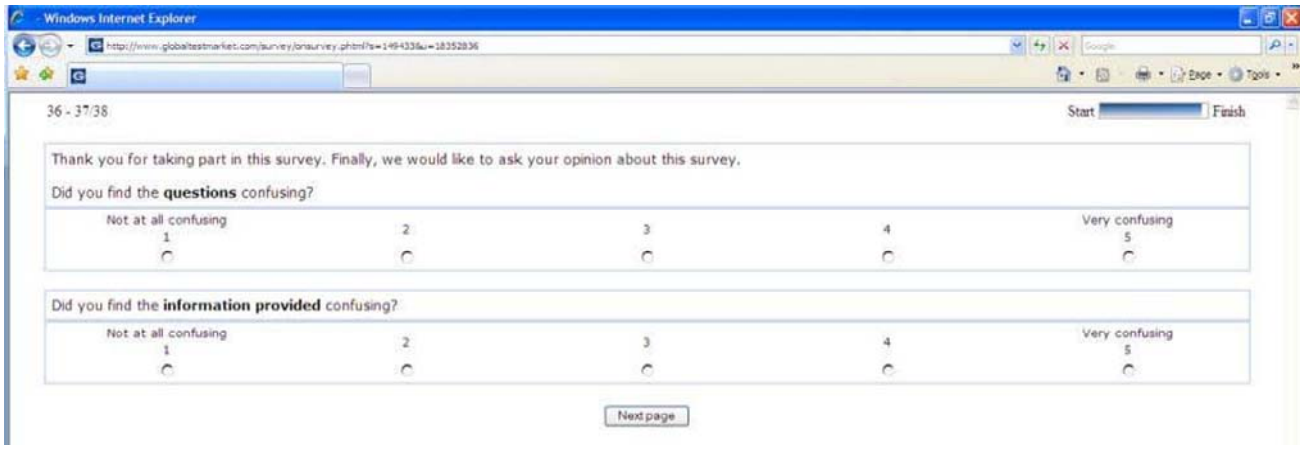
32 - 35/38
Start
Finish
Which of the following best describes the building in which you live?
House
Townhouse
Unit/Apartment
Other (specify)
What is the approximate distance to your nearest shopping centre or local town centre?
Less than 5km
5 to 10km
11 to 15km
16 to 20km
More than 20km
What is the highest level of education you have achieved?
Never went to school
Year 8 or below (or equivalent)
Year 10 or less (or equivalent)
Year 12 or less (or equivalent)
Bachelor Degree
Graduate Diploma or Certificate
Postgraduate degree
Other (specify)
What is your postcode?
Next page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36 - 37/38
Start
Finish
Thank you for taking part in this survey. Finally, we would like to ask your opinion about this survey.
Did you find the questions confusing?
Not at all confusing
1
2
3
4
Very confusing
5
Did you find the information provided confusing?
Not at all confusing
1
2
3
4
Very confusing
5
Next page


Windows Internet Explorer
That's the end of the interview – thank you very much for your participation.
Thank you for completing the survey. As this is market research, it is carried out in compliance with the Privacy Act and the information you have provided will be used only for research purposes. All data collection is anonymous and your personal details will not be linked to your responses. This research was conducted on behalf of the Commonwealth and State Governments of Australia. If you have any queries, you can contact Quantum Market Research about this survey at surveys@qmr.com.au.

Appendix B On-line Panel Details

The on-line panel utilised in this study is maintained by Global Market Insite (GMI) and was implemented using their GlobalTestMarket brand. This process was co-ordinated by Quantum Market Research (QRM).

National panel characteristics

GMI maintains market research panels worldwide. Their National panel has a reach of over 300,000. Figure 14 Figure 1displays further details of the National GMI panel characteristics.

Figure 14: GMI National Panel Characteristics

GMI GLOBAL PANEL BOOK

Australia

Panel Reach: 303,211
Census Population: 18,769,249
Online Penetration: 79.70%

Gender	Panel (%)	Census (%)
Male	32.33	49.39
Female	67.67	50.61

Age	Panel (%)	Census (%)
< 15	0.19	20.85
15-24	17.51	13.67
25-34	26.63	14.51
35-44	23.57	15.28
45-54	17.87	13.68
55-64	10.28	9.38
> 65	3.95	12.63

Level of Education	Panel (%)
Grade/Elementary/Jr. High	10.69
High School/Secondary	38.58
College (<2 years)	28.25
College (2 years)	4.53
College graduate	12.24
Post-graduate degree	5.71

Marital Status	Panel (%)	Census (%)
Married	58.15	54.65
Divorced	10.82	7.36
Widowed	2.01	6.17
Never Married (Single)	29.02	31.82

Annual Household Income	Panel (%)
AUD 0 - AUD 22,800	8.75
AUD 22,801 - AUD 45,600	18.38
AUD 45,601 - AUD 91,000	30.88
AUD 91,001 - AUD 136,900	17.55
AUD 136,901 - AUD 182,600	6.62
AUD 182,601 +	3.37
Prefer not to answer	14.44

Language	Census %
English	79.10
Chinese	2.10
Italian	1.90
Other	16.90

Source: http://www.gmi-mr.com

Recruitment and participant incentives

GMI recruits panellists from a variety of sources in their attempt to provide a representative sample, their methods include:

- Web advertising
- Permission-based databases
- Public relations
- Partner-recruited panels
- Alliances with heavily trafficked portals

Members of the panel are offered incentives to complete surveys for GMI clients. These incentives are in the form of ‘reward points’. For this survey 35 reward points were offered. Once panellists have collected 1,000 reward points they can redeemed these points for US$50.

Panel Integrity

QMI indicates that its methodology to maintain panel integrity includes:

- Screening of panellists - Email invitations are only sent to double opted-in registrants.
- Purging straight line clickers - Metrics and responses are closely monitored to ensure no one is just mindlessly clicking the same response or pattern of responses through the online survey.
- Elimination of Speedsters - Minimum time thresholds proactively weed out responses that appear to be the result of fast, careless answering.
- Scrubbing email addresses - Contact information is checked against panel integrity databases to avoid sending multiple invitations to the same respondent.
- Permanently blocking suspicious email addresses, domains and IP's - Online survey takers that are known to have provided inaccurate data are blocked increasing panel integrity.
- Panel partner approval - Approved panel partners are selected based on their panel quality. Qualification criteria includes ensuring that panellists are double-opted in, that vendors comply with all industry research conventions, and that they adhere to the same quality standards GMI upholds.

Appendix C Representativeness of samples

Comparison with data from the Australian Bureau of Statistics (ABS) indicates that the sample population is broadly representative of the population of Australia. The sample and actual populations were compared on the basis of their location, sex, age, household income, education of the head of the household; as well as household composition. This appendix presents the details of the characteristics in both tabular and graphical form and makes use of the Pearson chi-square test as a formal measure of representativeness. Results are primarily presented for the National national sample; results from each individual sub sample are displayed in tabular form.

Location

As determined by the location quota, the total sample of 3,432 was stratified into 15 sub samples each requiring a minimum sample size of 150 respondents. Separate quotas were set for the capital city of each State and Territory and the regional areas outside of the capital. For Northern Territory and Tasmania the limitations of the panel dictated that one sample was collected for each of these regions. The number of completed responses in each region is presented in Table 24.

Table 24 – Number of completed surveys in each sub sample

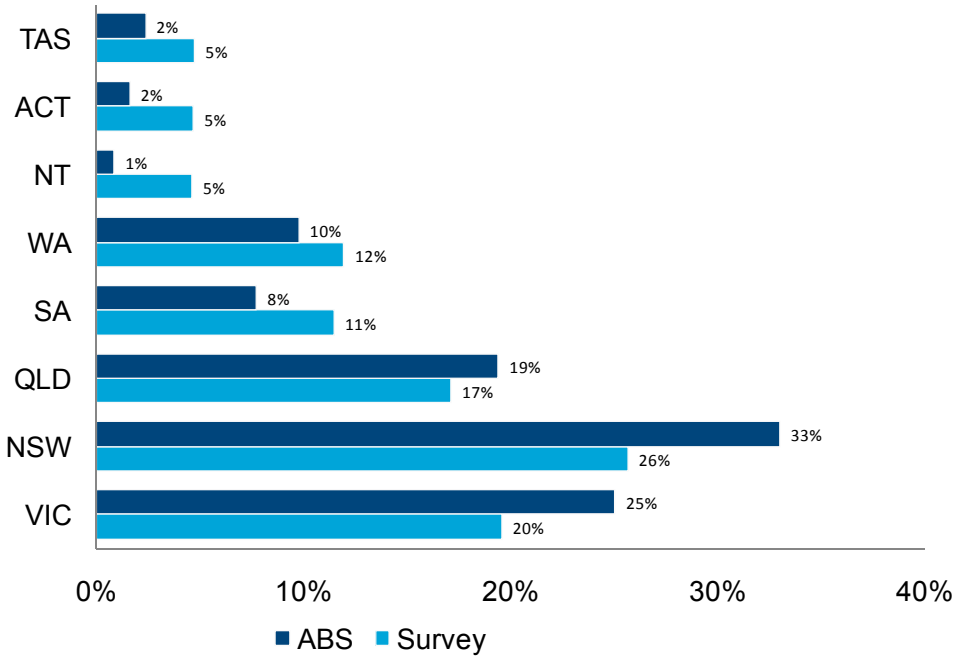
By Count	Survey		
Location	Capital	Other	Total
VIC	401	271	672
NSW	478	403	881
QLD	288	300	588
SA	239	155	394
WA	252	159	411
NT	111	49	160
ACT	162	n/a	162
TAS	60	104	164
Total	1,991	1,441	3,432

When compared to the ABS distribution of the population of Australia the survey has over sampled the regions outside of the capital cities and the States of SA, WA, NT, ACT and Tasmania. This was necessary in order to have the 150 minimum sample size required for the choice model to be computed. Individual model estimates were needed to gain an understanding of whether regional differences in attitude exist. Figure 15 indicates the differences in the proportion of the sample population from the ABS population by State location.

Further indications of the location-based representativeness of the sample were investigated from responses to a question regarding proximity to a shopping centre. The majority (76%) of the sample population also indicated that they lived within 5km of a shopping centre with 9% living further than 10km away. There is no readily available data on the National populations' proximity to shopping centres. However, when compared with the ABS remoteness classification (ABS 2003) it is noted that approximately 85% of the population is considered to reside in Major Cities or Inner Regional Areas with

less than 3% living in Remote or Very Remote Australia. Therefore it is considered that these proximity responses are likely to reflect the National population as a whole.

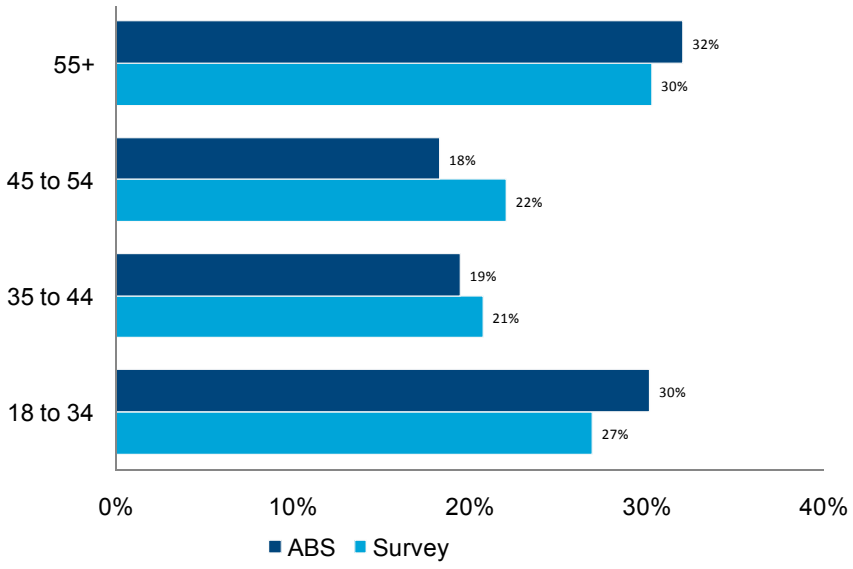
Figure 15 – Sample population compared to actual population by location (State)



Age and Gender

Of the 3,432 total respondents 49% indicated they were male and 51% indicated female. For the national sample the age distribution of respondents was found to be similar to that of the total population as described in the ABS statistics as displayed in Figure 16.

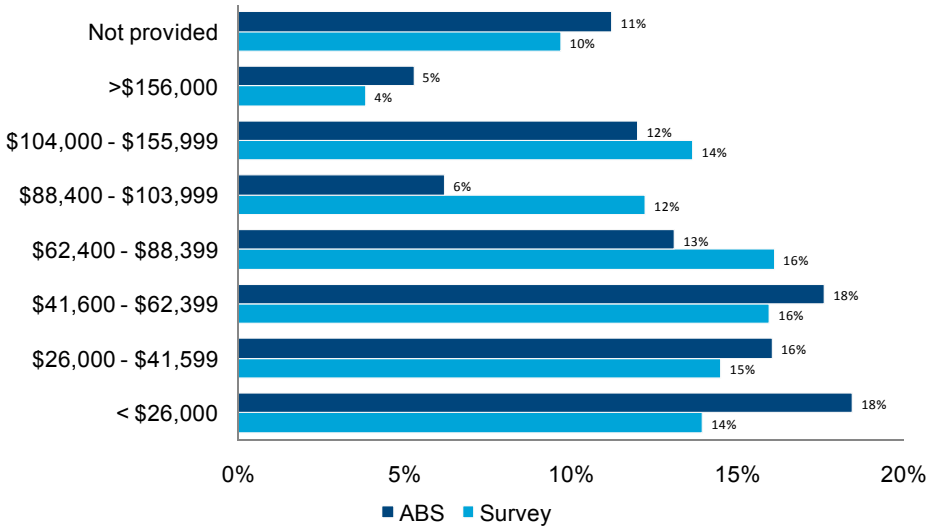
Figure 16 – Sample population compared to actual population by age – National Sample



Household Income

A quota was set around the household income of the sample requiring half of the sample to be either side of the median household income of Australia ($66,820). As indicated in the Figure 17 below, it the sample appears to have had stronger representation from the $62,400 - $103,999 household income bands than the general population. However, the chi-square test result (p-value 0.9577) indicates that the difference between the population distributions is statistically insignificant.

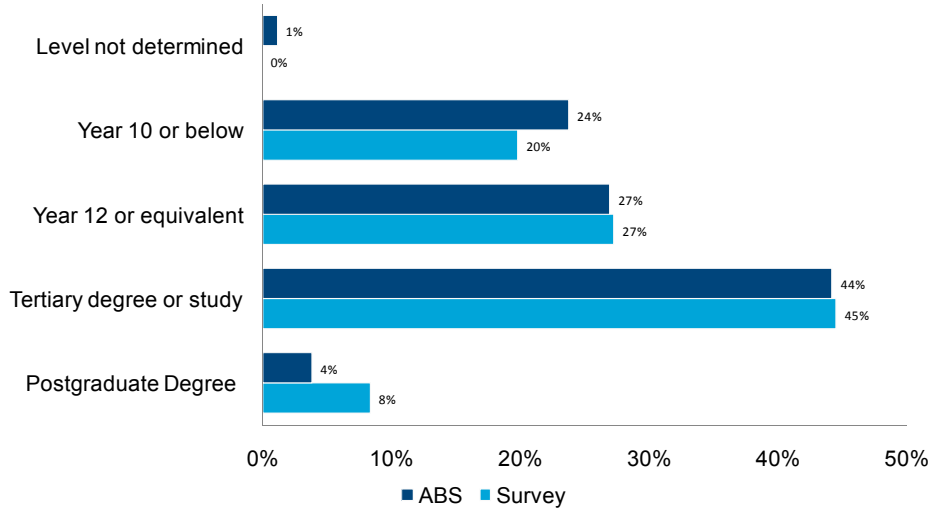
Figure 17 – Sample population compared to actual population by household income – National Sample



Education of the head of the household

A question regarding the education level of the head of the household was also included in the survey. Responses indicated that 53% of respondents had undertaken or completed tertiary study and that 27% had completed year 12 or the equivalent. The respondents indicated level of education is compared with the ABS statistics in Figure 18 below.

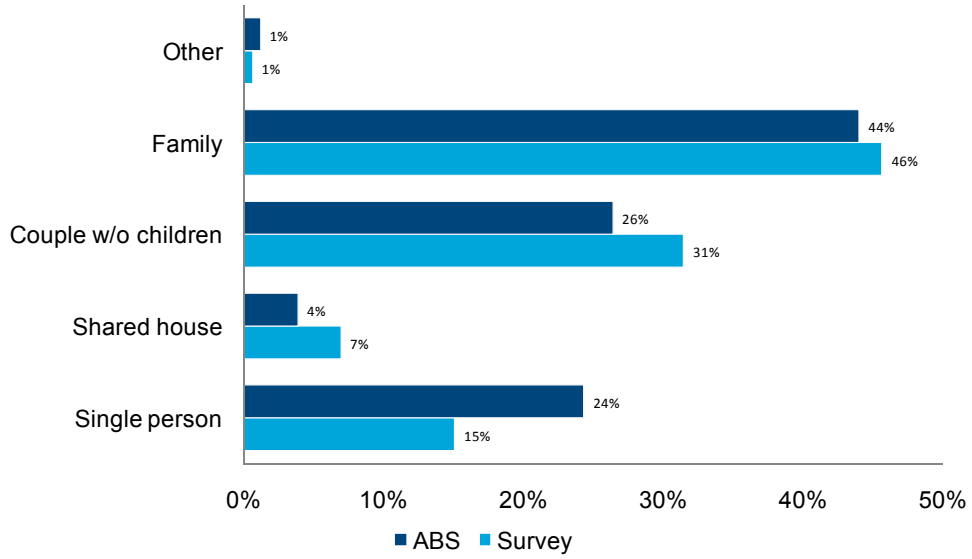
Figure 18 – Sample population compared to actual population by education – National Sample



Household type and household structure

Demographic data was collected in the survey on household type and dwelling structure. Figure 19 below indicates that the respondents' household type broadly corresponds with the national population. The results of the chi-squared test (p-value 0.7670) also indicate that this distribution is not significantly different to the distribution of the national population.

Figure 19 – Sample population compared to actual population by household type – National Sample



A question was also asked of the respondents as to the type of dwelling structure that was occupied. Seventy eight percent of respondents indicated they lived in a house. Responses to the dwelling type question are displayed in Table 25.

Table 25 – Dwelling type of respondents – national sample

Dwelling Structure Type	Survey
House	78%
Townhouse	5%
Unit/Apartment	16%
Caravan/mobile home	1%

Conclusion

Overall the sample population surveyed were generally representative of the national population. This was expected as a result of the quota system utilised in the study.

Characteristics of sample populations compared to ABS populations

Table 26 – Characteristics of the national sample compared to actual population (ABS)

National Sample- combined	Number		Percentage			
Age	Survey	ABS	Survey	ABS	Chi-Square	P-value
18 to 34	924	4,551,806	27%	30%	0.3122	0.9577
35 to 44	712	2,937,429	21%	19%		
45 to 54	757	2,762,141	22%	18%		
55+	1,039	4,836,644	30%	32%		
Income	Survey	ABS	Survey	ABS	Chi-Square	P-value
< $26,000	479	1,389,913	14%	19%	2.0216	0.9586
$26,000 - $41,599	498	1,184,249	15%	17%		
$41,600 - $62,399	548	1,256,511	16%	18%		
$62,400 - $88,399	553	921,236	16%	13%		
$88,400 - $103,999	420	430,086	12%	6%		
$104,000 - $155,999	469	810,717	14%	11%		
>$156,000	132	348,578	4%	5%		
Not provided	333	802,088	10%	11%		
Education	Survey	ABS	Survey	ABS	Chi-Square	P-value
Postgraduate Degree	288	535,300	8%	4%	1.6042	0.8080
Tertiary degree or study	1,528	6,114,400	45%	44%		
Year 12 or equivalent	936	3,726,500	27%	27%		
Year 10 or below	680	3,286,400	20%	24%		
Level not determined	0	163,200	0%	1%		
Household Type	Survey	ABS	Survey	ABS	Chi-Square	P-value
Single person	518	1,740,301	15%	24%	1.8298	0.7670
Shared house (of unrelated people)	240	280,838	7%	4%		
Couple without children	1,079	1,887,536	31%	26%		
Family (>= one adult, related children)	1,565	3,145,019	46%	44%		
Other (specify)	24	89,684	1%	1%		
Dwelling Structure Type	Survey	ABS	Survey	ABS	Chi-Square	P-value
House	2,686	5,471,964	78%	77%	0.7475	0.9453
Townhouse	181	658,846	5%	9%		
Unit/Apartment	542	932,720	16%	13%		
Other (specify)	4	25,595	0%	0%		
Caravan/mobile home	19	50,483	1%	1%		
Distance to Shopping Centre	Survey	ABS	Survey	ABS		
Less than 5km	2,615	n/a	76%	n/a		
5 to 10km	528	n/a	15%	n/a		
11 to 15km	123	n/a	4%	n/a		
16 to 20km	62	n/a	2%	n/a		
More than 20km	104	n/a	3%	n/a		

Table 27 – Characteristics of the Melbourne sample compared to actual population (ABS)

Victoria - Melbourne	Number		Percentage			
Age	Survey	ABS	Survey	ABS	Chi-Square	P-value
18 to 34	97	899,723	24%	32%	0.9505	0.8132
35 to 44	91	555,577	23%	20%		
45 to 54	89	485,644	22%	17%		
55+	124	876,535	31%	31%		
Income	Survey	ABS	Survey	ABS	Chi-Square	P-value
< $26,000	52	228,173	13%	18%	1.2436	0.9899
$26,000 - $41,599	57	197,251	14%	15%		
$41,600 - $62,399	67	226,284	17%	18%		
$62,400 - $88,399	62	170,348	15%	13%		
$88,400 - $103,999	45	82,305	11%	6%		
$104,000 - $155,999	57	163,168	14%	13%		
>$156,000	19	72,598	5%	6%		
Not provided	42	143,175	10%	11%		
Education	Survey	ABS	Survey	ABS		
Postgraduate Degree	44	n/a	11%	n/a		
Tertiary degree or study	186	n/a	46%	n/a		
Year 12 or equivalent	119	n/a	30%	n/a		
Year 10 or below	52	n/a	13%	n/a		
Level not determined	0	n/a	0%	n/a		
Household Type	Survey	ABS	Survey	ABS	Chi-Square	P-value
Single person	56	305,138	14%	24%	2.2649	0.6872
Shared house (of unrelated people)	33	57,248	8%	4%		
Couple without children	119	309,225	30%	24%		
Family (at least one adult and related children)	190	592,150	47%	46%		
Other (specify)	3	19,541	1%	2%		
Dwelling Structure Type	Survey	ABS	Survey	ABS	Chi-Square	P-value
House	287	937,621	72%	73%	1.0759	0.8981
Townhouse	29	145,397	7%	11%		
Unit/Apartment	84	193,575	21%	15%		
Other (specify)	0	3,545	0%	0%		
Caravan/mobile home	1	2,904	0%	0%		
Distance to Shopping Centre	Survey	ABS	Survey	ABS		
Less than 5km	335	n/a	84%	n/a		
5 to 10km	47	n/a	12%	n/a		
11 to 15km	12	n/a	3%	n/a		
16 to 20km	6	n/a	1%	n/a		
More than 20km	1	n/a	0%	n/a		

Table 28 – Characteristics of the Regional Victoria sample compared to actual population (ABS)

Victoria - Regional	Number		Percentage			
Age	Survey	ABS	Survey	ABS	Chi-Square	P-value
18 to 34	40	250,076	15%	26%	2.5340	0.4692
35 to 44	62	185,770	23%	19%		
45 to 54	79	193,878	29%	20%		
55+	90	332,859	33%	35%		
Income	Survey	ABS	Survey	ABS	Chi-Square	P-value
< $26,000	39	119,281	14%	24%	3.3627	0.8495
$26,000 - $41,599	46	98,532	17%	20%		
$41,600 - $62,399	48	93,525	18%	19%		
$62,400 - $88,399	46	61,370	17%	12%		
$88,400 - $103,999	33	24,656	12%	5%		
$104,000 - $155,999	25	35,348	9%	7%		
>$156,000	6	10,287	2%	2%		
Not provided	28	55,364	10%	11%		
Education	Survey	ABS	Survey	ABS		
Postgraduate Degree	19	n/a	7%	n/a		
Tertiary degree or study	115	n/a	42%	n/a		
Year 12 or equivalent	80	n/a	30%	n/a		
Year 10 or below	57	n/a	21%	n/a		
Level not determined	0	n/a	0%	n/a		
Household Type	Survey	ABS	Survey	ABS	Chi-Square	P-value
Single person	40	131,319	15%	26%	2.8087	0.5903
Shared house (of unrelated people)	9	14,462	3%	3%		
Couple without children	79	142,899	29%	29%		
Family (at least one adult and related children)	143	205,249	53%	41%		
Other (specify)	0	4,434	0%	1%		
Dwelling Structure Type	Survey	ABS	Survey	ABS	Chi-Square	P-value
House	244	443,296	90%	89%	0.6662	0.9554
Townhouse	5	17,568	2%	4%		
Unit/Apartment	21	30,967	8%	6%		
Other (specify)	0	2,260	0%	0%		
Caravan/mobile home	1	4,140	0%	1%		
Distance to Shopping Centre	Survey	ABS	Survey	ABS		
Less than 5km	185	n/a	68%	n/a		
5 to 10km	42	n/a	15%	n/a		
11 to 15km	16	n/a	6%	n/a		
16 to 20km	7	n/a	3%	n/a		
More than 20km	21	n/a	8%	n/a		

Table 29 – Characteristics of the Sydney sample compared to actual population (ABS)

NSW - Sydney	Number		Percentage			
Age	Survey	ABS	Survey	ABS	Chi-Square	P-value
18 to 34	191	1,035,863	40%	33%	1.0303	0.7939
35 to 44	93	629,674	19%	20%		
45 to 54	92	556,839	19%	18%		
55+	102	928,171	21%	29%		
Income	Survey	ABS	Survey	ABS	Chi-Square	P-value
< $26,000	60	237,974	13%	17%	1.5735	0.9797
$26,000 - $41,599	52	198,389	11%	14%		
$41,600 - $62,399	80	225,675	17%	16%		
$62,400 - $88,399	78	179,512	16%	13%		
$88,400 - $103,999	55	93,483	12%	7%		
$104,000 - $155,999	74	210,428	15%	15%		
>$156,000	30	116,958	6%	8%		
Not provided	49	161,116	10%	11%		
Education	Survey	ABS	Survey	ABS		
Postgraduate Degree	65	n/a	14%	n/a		
Tertiary degree or study	238	n/a	50%	n/a		
Year 12 or equivalent	102	n/a	21%	n/a		
Year 10 or below	73	n/a	15%	n/a		
Level not determined	0	n/a	0%	n/a		
Household Type	Survey	ABS	Survey	ABS	Chi-Square	P-value
Single person	87	328,516	18%	23%	1.6729	0.7956
Shared house (of unrelated people)	50	59,614	10%	4%		
Couple without children	118	335,500	25%	24%		
Family (at least one adult and related children)	221	679,251	46%	48%		
Other (specify)	2	4,434	0%	0%		
Dwelling Structure Type	Survey	ABS	Survey	ABS	Chi-Square	P-value
House	276	905,633	58%	64%	0.9428	0.9183
Townhouse	53	168,433	11%	12%		
Unit/Apartment	149	339,784	31%	24%		
Other (specify)	0	5,015	0%	0%		
Caravan/mobile home	0	3,631	0%	0%		
Distance to Shopping Centre	Survey	ABS	Survey	ABS		
Less than 5km	397	n/a	83%	n/a		
5 to 10km	68	n/a	14%	n/a		
11 to 15km	11	n/a	2%	n/a		
16 to 20km	1	n/a	0%	n/a		
More than 20km	1	n/a	0%	n/a		

Table 30 – Characteristics of the NSW Regional sample compared to actual population (ABS)

NSW - Regional	Number		Percentage			
Age	Survey	ABS	Survey	ABS	Chi-Square	P-value
18 to 34	89	456,629	22%	25%	0.6898	0.8756
35 to 44	83	328,167	21%	18%		
45 to 54	98	347,498	24%	19%		
55+	133	697,145	33%	38%		
Income	Survey	ABS	Survey	ABS	Chi-Square	P-value
< $26,000	59	229,408	15%	25%	4.6145	0.7069
$26,000 - $41,599	66	174,378	16%	19%		
$41,600 - $62,399	63	157,549	16%	17%		
$62,400 - $88,399	65	105,338	16%	12%		
$88,400 - $103,999	55	44,600	14%	5%		
$104,000 - $155,999	49	70,318	12%	8%		
>$156,000	7	23,032	2%	3%		
Not provided	39	100,060	10%	11%		
Education	Survey	ABS	Survey	ABS	Chi-Square	P-value
Postgraduate Degree	26	n/a	6%	n/a	n/a	n/a
Tertiary degree or study	179	n/a	44%	n/a		
Year 12 or equivalent	92	n/a	23%	n/a		
Year 10 or below	106	n/a	26%	n/a		
Level not determined	0	n/a	0%	n/a		
Household Type	Survey	ABS	Survey	ABS	Chi-Square	P-value
Single person	52	234,112	13%	26%	2.8603	0.5815
Shared house (of unrelated people)	19	27,479	5%	3%		
Couple without children	136	260,315	34%	29%		
Family (at least one adult and related children)	193	374,280	48%	41%		
Other (specify)	2	8,498	0%	1%		
Dwelling Structure Type	Survey	ABS	Survey	ABS	Chi-Square	P-value
House	350	756,988	87%	84%	0.5969	0.9634
Townhouse	13	58,121	3%	6%		
Unit/Apartment	34	72,008	8%	8%		
Other (specify)	2	4,674	0%	1%		
Caravan/mobile home	4	12,385	1%	1%		
Distance to Shopping Centre	Survey	ABS	Survey	ABS		
Less than 5km	274	n/a	68%	n/a		
5 to 10km	73	n/a	18%	n/a		
11 to 15km	27	n/a	7%	n/a		
16 to 20km	9	n/a	2%	n/a		
More than 20km	20	n/a	5%	n/a		

Table 31– Characteristics of the Brisbane sample compared to actual population (ABS)

QLD - Brisbane	Number		Percentage			
Age	Survey	ABS	Survey	ABS	Chi-Square	P-value
18 to 34	58	444,541	20%	33%	2.4259	0.4888
35 to 44	60	265,808	21%	20%		
45 to 54	61	237,785	21%	18%		
55+	109	381,613	38%	29%		
Income	Survey	ABS	Survey	ABS	Chi-Square	P-value
< $26,000	41	99,169	14%	16%	2.4821	0.9284
$26,000 - $41,599	44	97,294	15%	15%		
$41,600 - $62,399	35	115,844	12%	18%		
$62,400 - $88,399	39	92,099	14%	15%		
$88,400 - $103,999	42	43,046	15%	7%		
$104,000 - $155,999	45	81,900	16%	13%		
>$156,000	9	32,281	3%	5%		
Not provided	33	66,582	11%	11%		
Education	Survey	ABS	Survey	ABS	Chi-Square	P-value
Postgraduate Degree	23	n/a	8%	n/a	n/a	n/a
Tertiary degree or study	119	n/a	41%	n/a		
Year 12 or equivalent	80	n/a	28%	n/a		
Year 10 or below	66	n/a	23%	n/a		
Level not determined	0	n/a	0%	n/a		
Household Type	Survey	ABS	Survey	ABS	Chi-Square	P-value
Single person	45	140,120	16%	22%	1.7122	0.7885
Shared house (of unrelated people)	27	31,587	9%	5%		
Couple without children	85	164,330	30%	26%		
Family (at least one adult and related children)	128	282,751	45%	45%		
Other (specify)	1	9,428	0%	2%		
Dwelling Structure Type	Survey	ABS	Survey	ABS	Chi-Square	P-value
House	236	502,673	82%	80%	0.8214	0.9356
Townhouse	13	45,587	5%	7%		
Unit/Apartment	39	74,296	14%	12%		
Other (specify)	0	1,000	0%	0%		
Caravan/mobile home	0	4,432	0%	1%		
Distance to Shopping Centre	Survey	ABS	Survey	ABS		
Less than 5km	223	n/a	77%	n/a		
5 to 10km	56	n/a	19%	n/a		
11 to 15km	7	n/a	2%	n/a		
16 to 20km	2	n/a	1%	n/a		
More than 20km	0	n/a	0%	n/a		

Table 32 – Characteristics of the QLD Regional sample compared to actual population (ABS)

QLD - Regional	Number		Percentage			
Age	Survey	ABS	Survey	ABS	Chi-Square	P-value
18 to 34	77	451,658	26%	28%	0.4255	0.9349
35 to 44	48	309,762	16%	19%		
45 to 54	68	301,408	23%	19%		
55+	107	538,820	36%	34%		
Income	Survey	ABS	Survey	ABS	Chi-Square	P-value
< $26,000	40	154,411	13%	20%	3.3326	0.8526
$26,000 - $41,599	50	139,766	17%	18%		
$41,600 - $62,399	42	143,905	14%	19%		
$62,400 - $88,399	55	100,011	18%	13%		
$88,400 - $103,999	33	42,605	11%	6%		
$104,000 - $155,999	44	67,656	15%	9%		
>$156,000	6	22,339	2%	3%		
Not provided	30	92,727	10%	12%		
Education	Survey	ABS	Survey	ABS	Chi-Square	P-value
Postgraduate Degree	12	n/a	4%	n/a	n/a	n/a
Tertiary degree or study	132	n/a	44%	n/a		
Year 12 or equivalent	83	n/a	28%	n/a		
Year 10 or below	73	n/a	24%	n/a		
Level not determined	0	n/a	0%	n/a		
Household Type	Survey	ABS	Survey	ABS	Chi-Square	P-value
Single person	36	176,673	12%	23%	2.9577	0.5649
Shared house (of unrelated people)	22	31,278	7%	4%		
Couple without children	116	228,374	39%	30%		
Family (at least one adult and related children)	125	319,301	42%	42%		
Other (specify)	1	7,795	0%	1%		
Dwelling Structure Type	Survey	ABS	Survey	ABS	Chi-Square	P-value
House	233	604,203	78%	79%	1.3655	0.8502
Townhouse	13	60,330	4%	8%		
Unit/Apartment	49	82,004	16%	11%		
Other (specify)	0	3,955	0%	1%		
Caravan/mobile home	5	12,113	2%	2%		
Distance to Shopping Centre	Survey	ABS	Survey	ABS		
Less than 5km	217	n/a	72%	n/a		
5 to 10km	51	n/a	17%	n/a		
11 to 15km	9	n/a	3%	n/a		
16 to 20km	11	n/a	4%	n/a		
More than 20km	12	n/a	4%	n/a		

Table 33 – Characteristics of the Adelaide sample compared to actual population (ABS)

SA - Adelaide	Number		Percentage			
Age	Survey	ABS	Survey	ABS	Chi-Square	P-value
18 to 34	37	252,780	15%	29%	2.7296	0.4352
35 to 44	53	159,929	22%	18%		
45 to 54	53	156,734	22%	18%		
55+	96	295,183	40%	34%		
Income	Survey	ABS	Survey	ABS	Chi-Square	P-value
< $26,000	38	94,766	16%	22%	2.5965	0.9197
$26,000 - $41,599	44	79,618	18%	18%		
$41,600 - $62,399	44	78,841	18%	18%		
$62,400 - $88,399	40	55,590	17%	13%		
$88,400 - $103,999	31	24,117	13%	6%		
$104,000 - $155,999	20	41,139	8%	10%		
>$156,000	6	14,373	3%	3%		
Not provided	16	42,336	7%	10%		
Education	Survey	ABS	Survey	ABS	Chi-Square	P-value
Postgraduate Degree	23	n/a	10%	n/a	n/a	n/a
Tertiary degree or study	109	n/a	46%	n/a		
Year 12 or equivalent	63	n/a	26%	n/a		
Year 10 or below	44	n/a	18%	n/a		
Level not determined	0	n/a	0%	n/a		
Household Type	Survey	ABS	Survey	ABS	Chi-Square	P-value
Single person	42	121,274	18%	28%	2.3207	0.6770
Shared house (of unrelated people)	8	15,768	3%	4%		
Couple without children	90	112,344	38%	26%		
Family (at least one adult and related children)	95	176,009	40%	41%		
Other (specify)	4	5,384	2%	1%		
Dwelling Structure Type	Survey	ABS	Survey	ABS	Chi-Square	P-value
House	198	331,337	83%	77%	2.8129	0.5896
Townhouse	8	52,047	3%	12%		
Unit/Apartment	31	45,695	13%	11%		
Other (specify)	1	572	0%	0%		
Caravan/mobile home	1	872	0%	0%		
Distance to Shopping Centre	Survey	ABS	Survey	ABS		
Less than 5km	203	n/a	85%	n/a		
5 to 10km	32	n/a	13%	n/a		
11 to 15km	2	n/a	1%	n/a		
16 to 20km	2	n/a	1%	n/a		
More than 20km	0	n/a	0%	n/a		

Table 34– Characteristics of the SA Regional sample compared to actual population (ABS)

SA - Regional	Number		Percentage			
Age	Survey	ABS	Survey	ABS	Chi-Square	P-value
18 to 34	35	72,752	23%	24%	0.8346	0.8412
35 to 44	38	59,132	25%	19%		
45 to 54	35	60,159	23%	20%		
55+	47	115,779	30%	38%		
Income	Survey	ABS	Survey	ABS	Chi-Square	P-value
< $26,000	33	39,020	21%	25%	2.6179	0.9180
$26,000 - $41,599	35	30,697	23%	20%		
$41,600 - $62,399	24	28,994	15%	19%		
$62,400 - $88,399	15	18,450	10%	12%		
$88,400 - $103,999	19	7,119	12%	5%		
$104,000 - $155,999	14	10,129	9%	7%		
>$156,000	2	2,704	1%	2%		
Not provided	13	16,060	8%	10%		
Education	Survey	ABS	Survey	ABS	Chi-Square	P-value
Postgraduate Degree	5	n/a	3%	n/a	n/a	n/a
Tertiary degree or study	64	n/a	41%	n/a		
Year 12 or equivalent	60	n/a	39%	n/a		
Year 10 or below	26	n/a	17%	n/a		
Level not determined	0	n/a	0%	n/a		
Household Type	Survey	ABS	Survey	ABS	Chi-Square	P-value
Single person	28	40,541	18%	26%	1.1532	0.8857
Shared house (of unrelated people)	4	3,371	3%	2%		
Couple without children	58	48,023	37%	31%		
Family (at least one adult and related children)	63	60,048	41%	39%		
Other (specify)	2	1,185	1%	1%		
Dwelling Structure Type	Survey	ABS	Survey	ABS	Chi-Square	P-value
House	140	135,083	90%	88%	3.9986	0.4062
Townhouse	0	9,360	0%	6%		
Unit/Apartment	12	6,263	8%	4%		
Other (specify)	0	749	0%	0%		
Caravan/mobile home	3	1,652	2%	1%		
Distance to Shopping Centre	Survey	ABS	Survey	ABS		
Less than 5km	82	n/a	53%	n/a		
5 to 10km	25	n/a	16%	n/a		
11 to 15km	15	n/a	10%	n/a		
16 to 20km	12	n/a	8%	n/a		
More than 20km	21	n/a	14%	n/a		

Table 35 – Characteristics of the Perth sample compared to actual population (ABS)

WA - Perth	Number		Percentage			
Age	Survey	ABS	Survey	ABS	Chi-Square	P-value
18 to 34	57	347,690	23%	32%	1.5437	0.6722
35 to 44	44	218,064	17%	20%		
45 to 54	51	204,917	20%	19%		
55+	100	328,726	40%	30%		
Income	Survey	ABS	Survey	ABS	Chi-Square	P-value
< $26,000	38	89,666	15%	17%	1.2580	0.9895
$26,000 - $41,599	29	82,422	12%	16%		
$41,600 - $62,399	45	92,094	18%	17%		
$62,400 - $88,399	40	70,398	16%	13%		
$88,400 - $103,999	25	34,929	10%	7%		
$104,000 - $155,999	39	67,962	15%	13%		
>$156,000	15	28,271	6%	5%		
Not provided	21	62,793	8%	12%		
Education	Survey	ABS	Survey	ABS	Chi-Square	P-value
Postgraduate Degree	14	n/a	6%	n/a	n/a	n/a
Tertiary degree or study	121	n/a	48%	n/a		
Year 12 or equivalent	71	n/a	28%	n/a		
Year 10 or below	46	n/a	18%	n/a		
Level not determined	0	n/a	0%	n/a		
Household Type	Survey	ABS	Survey	ABS	Chi-Square	P-value
Single person	42	132,174	17%	25%	2.0086	0.7342
Shared house (of unrelated people)	21	20,249	8%	4%		
Couple without children	81	138,115	32%	26%		
Family (at least one adult and related children)	105	230,635	42%	44%		
Other (specify)	3	7,361	1%	1%		
Dwelling Structure Type	Survey	ABS	Survey	ABS	Chi-Square	P-value
House	208	418,165	83%	79%	1.6794	0.7945
Townhouse	13	62,252	5%	12%		
Unit/Apartment	30	45,060	12%	9%		
Other (specify)	0	739	0%	0%		
Caravan/mobile home	1	2,080	0%	0%		
Distance to Shopping Centre	Survey	ABS	Survey	ABS		
Less than 5km	220	n/a	87%	n/a		
5 to 10km	26	n/a	10%	n/a		
11 to 15km	3	n/a	1%	n/a		
16 to 20km	2	n/a	1%	n/a		
More than 20km	1	n/a	0%	n/a		

Table 36 – Characteristics of the WA Regional sample compared to actual population (ABS)

WA - Regional	Number		Percentage			
Age	Survey	ABS	Survey	ABS	Chi-Square	P-value
18 to 34	53	104,349	33%	28%	0.5832	0.9003
35 to 44	33	78,573	21%	21%		
45 to 54	32	74,775	20%	20%		
55+	41	120,142	26%	32%		
Income	Survey	ABS	Survey	ABS	Chi-Square	P-value
< $26,000	29	34,357	18%	20%	2.6478	0.9156
$26,000 - $41,599	20	29,086	13%	17%		
$41,600 - $62,399	27	30,742	17%	18%		
$62,400 - $88,399	23	21,892	14%	13%		
$88,400 - $103,999	23	11,047	14%	6%		
$104,000 - $155,999	19	17,943	12%	10%		
>$156,000	3	6,361	2%	4%		
Not provided	15	23,203	9%	13%		
Education	Survey	ABS	Survey	ABS	Chi-Square	P-value
Postgraduate Degree	11	n/a	7%	n/a	n/a	n/a
Tertiary degree or study	60	n/a	38%	n/a		
Year 12 or equivalent	45	n/a	28%	n/a		
Year 10 or below	43	n/a	27%	n/a		
Level not determined	0	n/a	0%	n/a		
Household Type	Survey	ABS	Survey	ABS	Chi-Square	P-value
Single person	30	41,610	19%	24%	1.3070	0.8602
Shared house (of unrelated people)	9	4,836	6%	3%		
Couple without children	47	53,864	30%	31%		
Family (at least one adult and related children)	72	72,812	46%	42%		
Other (specify)	0	1,507	0%	1%		
Dwelling Structure Type	Survey	ABS	Survey	ABS	Chi-Square	P-value
House	136	150,650	86%	86%	0.9211	0.9215
Townhouse	7	11,063	4%	6%		
Unit/Apartment	13	7,552	8%	4%		
Other (specify)	1	1,232	1%	1%		
Caravan/mobile home	2	3,996	1%	2%		
Distance to Shopping Centre	Survey	ABS	Survey	ABS		
Less than 5km	107	n/a	67%	n/a		
5 to 10km	29	n/a	18%	n/a		
11 to 15km	10	n/a	6%	n/a		
16 to 20km	2	n/a	1%	n/a		
More than 20km	11	n/a	7%	n/a		

Table 37 – Characteristics of the Tasmanian sample compared to actual population (ABS)

TAS - Combined	Number		Percentage			
Age	Survey	ABS	Survey	ABS	Chi-Square	P-value
18 to 34	49	95,328	30%	26%	0.2407	0.9708
35 to 44	31	66,894	19%	18%		
45 to 54	32	70,035	20%	19%		
55+	52	129,728	32%	36%		
Income	Survey	ABS	Survey	ABS	Chi-Square	P-value
< $26,000	28	44,446	17%	24%	3.5938	0.8252
$26,000 - $41,599	32	36,781	20%	20%		
$41,600 - $62,399	21	34,457	13%	19%		
$62,400 - $88,399	35	22,017	21%	12%		
$88,400 - $103,999	14	8,177	9%	4%		
$104,000 - $155,999	12	12,862	7%	7%		
>$156,000	7	3,774	4%	2%		
Not provided	15	19,390	9%	11%		
Education	Survey	ABS	Survey	ABS	Chi-Square	P-value
Postgraduate Degree	6	8,100	4%	3%	2.6459	0.6187
Tertiary degree or study	60	129,000	37%	41%		
Year 12 or equivalent	54	64,700	33%	21%		
Year 10 or below	44	108,700	27%	35%		
Level not determined	0	3,200	0%	1%		
Household Type	Survey	ABS	Survey	ABS	Chi-Square	P-value
Single person	19	48,925	12%	27%	4.4717	0.3459
Shared house (of unrelated people)	7	5,771	4%	3%		
Couple without children	63	51,346	38%	28%		
Family (at least one adult and related children)	70	74,114	43%	41%		
Other (specify)	5	1,747	3%	1%		
Dwelling Structure Type	Survey	ABS	Survey	ABS	Chi-Square	P-value
House	134	157,784	82%	87%	1.5508	0.8176
Townhouse	5	7,384	3%	4%		
Unit/Apartment	25	15,239	15%	8%		
Other (specify)	0	722	0%	0%		
Caravan/mobile home	0	754	0%	0%		
Distance to Shopping Centre	Survey	ABS	Survey	ABS		
Less than 5km	117	n/a	71%	n/a		
5 to 10km	25	n/a	15%	n/a		
11 to 15km	6	n/a	4%	n/a		
16 to 20km	6	n/a	4%	n/a		
More than 20km	10	n/a	6%	n/a		

Table 38– Characteristics of the Northern Territory sample compared to actual population (ABS)

NT - Combined	Number		Percentage			
Age	Survey	ABS	Survey	ABS	Chi-Square	P-value
18 to 34	60	52,502	38%	39%	3.9340	0.2687
35 to 44	52	31,158	33%	23%		
45 to 54	37	26,472	23%	19%		
55+	11	26,224	7%	19%		
Income	Survey	ABS	Survey	ABS	Chi-Square	P-value
< $26,000	10	6,893	6%	12%	3.8308	0.7990
$26,000 - $41,599	13	7,463	8%	13%		
$41,600 - $62,399	31	9,952	19%	18%		
$62,400 - $88,399	32	8,274	20%	15%		
$88,400 - $103,999	17	4,223	11%	8%		
$104,000 - $155,999	37	8,470	23%	15%		
>$156,000	5	2,912	3%	5%		
Not provided	15	7,735	9%	14%		
Education	Survey	ABS	Survey	ABS	Chi-Square	P-value
Postgraduate Degree	10	4,200	6%	4%	2.3594	0.6700
Tertiary degree or study	67	42,400	42%	41%		
Year 12 or equivalent	54	29,900	34%	29%		
Year 10 or below	29	24,700	18%	24%		
Level not determined	0	3,200	0%	3%		
Household Type	Survey	ABS	Survey	ABS	Chi-Square	P-value
Single person	20	12,780	13%	23%	2.7580	0.5991
Shared house (of unrelated people)	17	2,881	11%	5%		
Couple without children	43	13,187	27%	24%		
Family (at least one adult and related children)	78	26,271	49%	47%		
Other (specify)	1	805	1%	1%		
Dwelling Structure Type	Survey	ABS	Survey	ABS	Chi-Square	P-value
House	115	39,313	72%	70%	3.4619	0.4837
Townhouse	7	5,644	4%	10%		
Unit/Apartment	37	8,490	23%	15%		
Other (specify)	0	1,052	0%	2%		
Caravan/mobile home	1	1,393	1%	2%		
Distance to Shopping Centre	Survey	ABS	Survey	ABS		
Less than 5km	126	n/a	79%	n/a		
5 to 10km	23	n/a	14%	n/a		
11 to 15km	4	n/a	3%	n/a		
16 to 20km	2	n/a	1%	n/a		
More than 20km	5	n/a	3%	n/a		

Table 39 – Characteristics of the ACT sample compared to actual population (ABS)

ACT - Combined	Number		Percentage			
Age	Survey	ABS	Survey	ABS	Chi-Square	P-value
18 to 34	81	87,915	50%	35%	2.7049	0.4394
35 to 44	24	48,921	15%	20%		
45 to 54	30	45,997	19%	19%		
55+	27	65,719	17%	26%		
Income	Survey	ABS	Survey	ABS	Chi-Square	P-value
< $26,000	12	12,349	7%	11%	2.6319	0.9168
$26,000 - $41,599	10	12,572	6%	11%		
$41,600 - $62,399	21	18,649	13%	16%		
$62,400 - $88,399	23	15,937	14%	14%		
$88,400 - $103,999	28	9,779	17%	8%		
$104,000 - $155,999	34	23,394	21%	20%		
>$156,000	17	12,688	10%	11%		
Not provided	17	11,547	10%	10%		
Education	Survey	ABS	Survey	ABS	Chi-Square	P-value
Postgraduate Degree	30	18,600	19%	8%	3.2234	0.5212
Tertiary degree or study	78	113,700	48%	49%		
Year 12 or equivalent	33	62,700	20%	27%		
Year 10 or below	21	35,700	13%	15%		
Level not determined	0	2,700	0%	1%		
Household Type	Survey	ABS	Survey	ABS	Chi-Square	P-value
Single person	21	27,119	13%	23%	2.6219	0.6230
Shared house (of unrelated people)	14	6,294	9%	5%		
Couple without children	44	30,014	27%	26%		
Family (at least one adult and related children)	82	52,148	51%	45%		
Other (specify)	0	1,344	0%	1%		
Dwelling Structure Type	Survey	ABS	Survey	ABS	Chi-Square	P-value
House	129	89,218	80%	76%	0.5280	0.9707
Townhouse	15	15,660	9%	13%		
Unit/Apartment	18	11,787	11%	10%		
Other (specify)	0	80	0%	0%		
Caravan/mobile home	0	131	0%	0%		
Distance to Shopping Centre	Survey	ABS	Survey	ABS		
Less than 5km	129	n/a	80%	n/a		
5 to 10km	31	n/a	19%	n/a		
11 to 15km	1	n/a	1%	n/a		
16 to 20km	0	n/a	0%	n/a		
More than 20km	1	n/a	1%	n/a		

Appendix D Statistical methods and other technical details

Multinomial Logit Models

Multinomial logit models are used to model relationships between consumer choice of a particular option (from a set of multiple options) and a set of regressor variables (attributes and/or individual specific characteristics). The term “multinomial logit model” includes, in a broad sense, a variety of models. Generalized logit and conditional logit models are used to model consumer choices.

In Choice Modelling, an individual is presented with a set of options and asked to choose the most preferred alternative. Both the generalized logit and conditional logit models are used in the analysis of discrete choice data. In a conditional logit model, a choice among alternatives is treated as a function of the characteristics of the alternatives, whereas in a generalized logit model, the choice is a function of the characteristics of the individual making the choice. In many situations, a mixed model that includes both the characteristics of the alternatives and the individual is needed for investigating consumer choice.

A survey of the literature reveals a confusion in the terminology for the nominal response models (So and Kuhfeld, 2001). The term “multinomial logit model” is often used to describe the generalized logit model. The mixed logit is sometimes referred to as the multinomial logit model in which the generalized logit and the conditional logit models are special cases.

The Proportional Hazard Model

In SAS/STAT, the statistical software package used for this study to estimate the choice models, a Proportional Hazards Regression technique is used to estimate multinomial logit models. The information in Box D1 demonstrates how, under certain conditions, the Proportional Hazards Model collapses to a conditional or mixed multinomial logit model.

The Proportional Hazards Model is designed to estimate the effects of different variables in influencing the times-to-failure of a system (often referred to as the ‘survival time’). However, if the survival time dimension is constrained to zero (that is, the number of periods elapsed before an outcome, or choice, is observed) the model can be shown to equate to a multinomial logit model.

Furthermore, because in this study we used non-labelled (or generic) alternatives, the model simplifies to a binary choice model (zero = no change option and 1 = one of the alternative options selected). Under this modelling structure there are no alternative specific constants.

Box D1: Using Proportional Hazard Models to estimate a Multinomial Logit Model

The CATMOD procedure in SAS/STAT software directly fits the generalized logit model. SAS/STAT software does not yet have a procedure that is specially designed to fit the conditional or mixed logit models. However, with some preliminary data processing, you can use the PHREG procedure to fit these models.

The PHREG procedure fits the Cox proportional hazards model to survival data (refer to SAS/STAT documentation). The partial likelihood of Breslow has the same form as the likelihood in a conditional logit model.

Let z_l denote the vector of explanatory variables for individual l. Let $t_1 < t_2 < \ldots < t_k$ denote k distinct ordered event times. Let d_i denote the number of failures at t_i. Let s_i be the sum of the vectors z_l for those individuals that fail at t_i, and let $\mathcal{R}_i$ denote the set of indices for those who are at risk just before t_i.

The Breslow (partial) likelihood is

$$L_B(\boldsymbol{\theta}) = \prod_{i=1}^{k} \frac{\exp(\boldsymbol{\theta}' s_i)}{[\sum_{l \in \mathcal{R}_i} \exp(\boldsymbol{\theta}' z_l)]^{d_i}}$$

In a stratified analysis, the partial likelihood is the product of the partial likelihood for each individual stratum. For example, in a study of the time to first infection from a surgery, the variables of a patient consist of `Time` (time from surgery to the first infection), `Status` (an indicator of whether the observation time is censored, with value 2 identifying a censored time), `Z1` and `Z2` (explanatory variables thought to be related to the time to infection), and `Grp` (a variable identifying the stratum to which the observation belongs). The specification in PROC PHREG for fitting the Cox model using the Breslow likelihood is as follows:

```
proc phreg;
   model time*status(2) = z1 z2 / ties=breslow;
   strata grp;
   run;
```

To cast the likelihood of the conditional logit model in the form of the Breslow likelihood, consider m artificial observed times for each individual who chooses one of m alternatives. The kth alternative is chosen at time 1; the choices of all other alternatives (second choice, third choice, ...) are not observed and would have been chosen at some later time. So a choice variable is coded with an observed time value of 1 for the chosen alternative and a larger value, 2, for all unchosen (unobserved or censored alternatives). For each individual, there is exactly one event time (1) and $m - 1$ nonevent times, and the risk set just prior to this event time consists of all the m alternatives. For individual j with alternative-specific characteristics $\mathbf{Z}_{jl}$, the Breslow likelihood is then

$$L_B(\boldsymbol{\theta}) = \frac{\exp(\boldsymbol{\theta}' \mathbf{Z}_{jk})}{\sum_{l=1}^{m} \exp(\boldsymbol{\theta}' \mathbf{Z}_{jl})}$$

This is precisely the probability that individual j chooses alternative k in a conditional logit model. By stratifying on individuals, you get the likelihood of the conditional logit model. Note that the observed time values of 1 and 2 are chosen for convenience; however, the censored times have to be larger than the event time to form the correct risk set.

By transforming individual characteristics into alternative-specific variables, the mixed logit model can be analyzed as a conditional logit model.

Source: Ying So and Warren F. Kuhfeld (2001) *Multinomial Logit Models*, http://support.sas.com/techsup/technote/ts722g.pdf

Utility specification of the Choice Model

The utility functions for each option were specified as follows:

No change option: $V_1 = \beta_1 \, RECYCLE_1 + \beta_2 \, LITTER_1 + \beta_3 \, COST_1 + \theta S_i$

Option 2: $V_2 = \beta_1 \, RECYCLE_2 + \beta_2 \, LITTER_2 + \beta_3 \, COST_2 + \theta S_i$

Option 3: $V_3 = \beta_1 \, RECYCLE_3 + \beta_2 \, LITTER_3 + \beta_3 \, COST_3 + \theta S_i$

Where RECYCLE is the percentage of waste packaging recycled under option j, LITTER is the percentage reduction in litter under option j, COST is the additional cost to the household under option j, and S_i is a vector of socio-economic characteristics for individual i.

The model shown above is linear in parameters with no attribute interactions. The β values are the coefficients associated with each of the attributes.

Bootstrapping procedure

Since the attribute price statistic is derived as the ratio of two independent parameter estimates arising from each relevant model, each with its own estimated confidence limit, there is no way to directly test the significance of the price statistics. The existing theory of Gaussian error distributions covers linear transformation situations such as the linear addition of a random number of error distributions but cannot help predict the distribution that results from non-linear process of dividing one estimate by another. Therefore bootstrap analysis is recommended to generate inferences about significance.

The bootstrapping procedure is a useful technique for generating tests such as significance of estimates or differences on statistics where either (a) the required assumptions of error distributions may not be met, (b) parameter estimates are suspected to contain biases arising from a number of sources such as model specification error, poor statistical power due to low sample size or hidden data covariance structures, and (c) the original inference framework is not capable of directly testing the significance of the statistic of interest.

The bootstrap procedure involves the following steps. First, the data is sampled with replacement to generate another sample with the same number of observations as the original, but the ‘with replacement’ sampling has the effect of excluding some of the original observations and including others more than once. Second, the original analysis in its entirety is performed again on the pseudo-sample. The estimates of interested are retained, and in this case one is divided into the other to derive the attribute price statistic. The value estimates are recorded and all other inferences are discarded.

The process above iterates until a statistically large number of independent estimates of the attribute prices are generated, usually between 250 and 1,000, depending on assumptions about error distribution. This can be a resource-intensive process, often fully loading a computing platform’s resources for hours or even days depending on the time required to compute just one derived attribute price. For the waste recycling study, results were based on 250 re-samples

Once completed, the distribution of the attribute prices arising from the iterative pseudo-samples is an independent and robust estimate of the mean attribute price for each model and it’s uncertainty, often expressed as a confidence band at a stated confidence level (95% in this case, which is usual for social sciences including marketing and economics). For further detail on this procedure consult Krinsky and Robb (1986).

Statistical significance of attribute values

As described above, the bootstrapping method was used to test whether each of the attribute prices are significantly different from zero. Significance on the coefficients estimated for the money attribute and the non-monetary attribute of interest does not necessarily imply that the ratio of these coefficients (that is, the attribute price) is significant. Just because two independent estimates are deemed to be

significantly different from 0 at, say, the 95% confidence level, it does not necessarily follow that their ratio is similarly significantly different from 0, even though all estimates arise from the same data. This is because the error distribution that results from dividing one error process by another usually results in a 'rougher', more extreme error distribution with more uncertainty. A correspondingly larger sample size would be required to attain the same relative error confidence bands as the underlying statistics of price sensitivity and service level part-worth.

Pseudo-R-squared

Pseudo-R-squared statistics of overall model fit for Maximum-Likelihood models are similar to R-squared in that both are bounded 0-1. In fact, models with censoring, such as (binomial) logistic models and multinomial logit models of choice, are further bounded below 1 due to the effect of censoring.

Where R-squared and Pseudo-R-squared are dissimilar is where the (somewhat arbitrary and experience-based) threshold is set for acceptability. In the absences of censoring effect that limits the attainment of a perfect '1', the threshold is usually set around .15, which is co-incidentally the 1's compliment of the .85 usually used for ordinary least-squares regression models. This means models need to score above 0.15 to be deemed acceptable. Making further allowances for censoring, as is the case with these models, the threshold is usually lowered to 0.05. It is important to point out that these thresholds do not arise from the direct application of statistical theory but rather from the collective experience of statisticians and analysts, some simulation studies and the empirical generalisations on Pseudo-R-squared statistics arising from studies of a large number of modelling outcomes.

Specification of the litter reduction attribute

The research design was structured to examine people's values for incremental reductions in litter along a continuous scale, measured in percentage increases in litter reduction. In consultation with the steering sub-committee, it was agreed that litter reduction should vary over the range of 0% reduction, to 20% reduction (relative to current levels). As a means of eliciting WTP for reductions within this range, three points were selected on the continuous scale – 0%, 10% and 20% reduction. It was recognised that respondents would have difficulty understanding what a given percentage reduction in litter would "look like" on the ground, so it was deemed necessary to provide respondents with some additional information about the 10% and 20% reductions. The steering sub-committee advised that a 10% reduction in litter would produce a 'noticeable improvement' and a 20% reduction would produce a 'significant improvement'.

There are two ways that the effect of changes in attribute levels on respondent choice of alternatives can be statistically analysed in a choice model. If the attribute levels are measurable on a continuous scale, the standard approach is to use the actual levels for estimating the data relationships in the model. This enables WTP to be estimated for unit changes in the level of the attribute (technically referred to as the marginal rates of substitution between the price attribute and the non-price attribute). Alternatively, if the attribute cannot be measured on a continuous scale, it is standard practice to use "effects coding" as a means of estimating WTP. This produces value estimates for discrete levels of attribute provision, with values measured relative to the 'no-change' base level. An example of this approach is the collection method attribute defined in the E-waste study (URS, 2009). The two levels adopted in that study were (i) kerbside pick up and (ii) drop off. The base (no change) level was unspecified and referred to whatever current collection method exists in the respondent's locality.

In the packaging waste study, litter reduction was modelled using the first of the two approaches described above, because it is desirable to obtain marginal values for incremental changes in outcome and because percentage reductions in litter are measurable on a continuous scale. This approach resulted in an annual, household WTP estimate of $4.15 per 1% reduction in litter over the range of a 10% to 20% reduction. Thus, a 10% reduction in litter is valued at $41.50 per year and a 20% reduction is valued at $83.00 per year. While the values are all relative to the 'no-change' base case of 0% litter

reduction, care needs to be taken in applying the $4.15 figure to litter reductions between the range of 0% to 10% reduction. This is because respondents could have pegged their valuations on two discrete levels of litter reduction (the 10% reduction corresponding to a 'noticeable change' and a 20% reduction corresponding to a significant improvement'). Under this experimental construct, it may be the case that the value function is a stepped function, as opposed to a linear function over the entire range of levels tested (0% to 20% reduction). That is, litter reductions below the 10% threshold may not have been valued as highly – if at all – because these reductions could have been interpreted by respondents as having no noticeable effect. Given this uncertainty, a conservative assumption was made in interpreting the results.

The data from the national sample was re-analysed to examine for possible non-linearity in the value function. This was done by taking logarithmic and quadratic transformations of the litter attribute, re-estimating the model and comparing the difference in model fit between the non-transformed (linear) and the transformed models. This test demonstrated a slight improvement in model fit using the quadratic transformation, which could indicate a minor reduction in marginal willingness to pay for successively higher levels of litter reduction above the 10% level – however this was not a statistically significant result.

Investigations were made into re-entering the litter attribute as discrete, qualitative levels corresponding to 'noticeable' and 'significant' improvements as opposed to using percentage reductions. This involved re-coding the levels using an 'effects code' – that is, 0 and 1 for the two different levels. Unfortunately, the experimental design selected for the choice model did not allow the attributes to enter the model as an effects coded variable.

Calibrating reductions in litter to aesthetic improvements

The purpose of the choice modelling study was not to obtain peoples perceptions of whether a particular level of litter reduction is noticeable or significant. We simply told respondents that a 10% reduction would be noticeable and a 20% reduction would produce a significant improvement. People's preferences and willingness to pay are therefore contingent on this scale.

In concept, it should be possible to simulate the effect of different volumes of packaging litter reduction on streetscapes and visual aesthetics, with perhaps photographs of litter density under various treatment scenarios. The problem is, these field experiments have not been undertaken, so the link between particular levels of litter reduction and visual outcomes is not known.

There is also the complication of uneven distribution of litter. It is often concentrated in highly used public areas or alongside verges of main roads, particularly at traffic lights. Ten tonnes of litter removed from highly visual areas with high litter concentrations is likely to have a different impact on aesthetics (and values) compared to a ten tonne reduction that is achieved by taking litter over a wider area.

Alternative model specifications

In the course of the peer review process, comments were received about the adequacy of the overall specification of the choice model, particularly the way the demographic variables were specified and the estimation method that was used (the Proportional Hazard model).

In response to these comments, PwC examined a number of alternative specifications of the choice model and the findings of this investigation are presented below.

Our approach to testing the effect of different model specifications and estimators was to re-estimate the national model with:

- two different types of estimator (one with a “standard” binomial logit estimator and the other with a Proportional Hazard model estimator), and
- alternative coding and specification for some of the demographic covariate effects.

We then compared overall model fit across each of the alternative models and consistency of the attribute parameters underpinning the WTP results. All of the models used sample data that excluded respondents identified as providing a ‘protest’ bids or invalid bids.

Model comparison

Table 40 summarises the series of model estimators and specifications that were investigated. The accompanying charts (below) demonstrate consistency with respect to the attribute parameter estimates over a range of model estimating frameworks and effect coding specifications.

Model 1 is a standard binomial logit model, which was fitted to the choice data pertaining to the two ‘change’ alternatives. This model has the highest pseudo-R-squared (also known as the Generalised coefficient of Determination — GCD) but does not include any data rows relating to the choice of the constant or null alternative. The Max-rescaled GCD for this reference model is 0.2631. The Max-rescaled GCDs are not shown across all models for comparison as they are dependent on the extent of censoring, which varies as the constant null alternative data rows are necessarily included in the model, and so are not useful for comparing models based on unlike data, such as those in this table. The non-max rescaled GCD is however suitable for comparing all models in this table. This is the value reported in column five of the table.

Model 2 is based on the same data as Model 1 but utilises the conditional binomial logit estimator as realised via the Proportional Hazard model estimating framework. Instead of explicit reference coded demographic effects, a strata specification is used in this model to partial out all unspecified heterogeneity associated with both location (eg metro and rural states) and experimental design run (or scenario) levels. The GCD is of the same order of magnitude as the standard (or reference) binomial model.

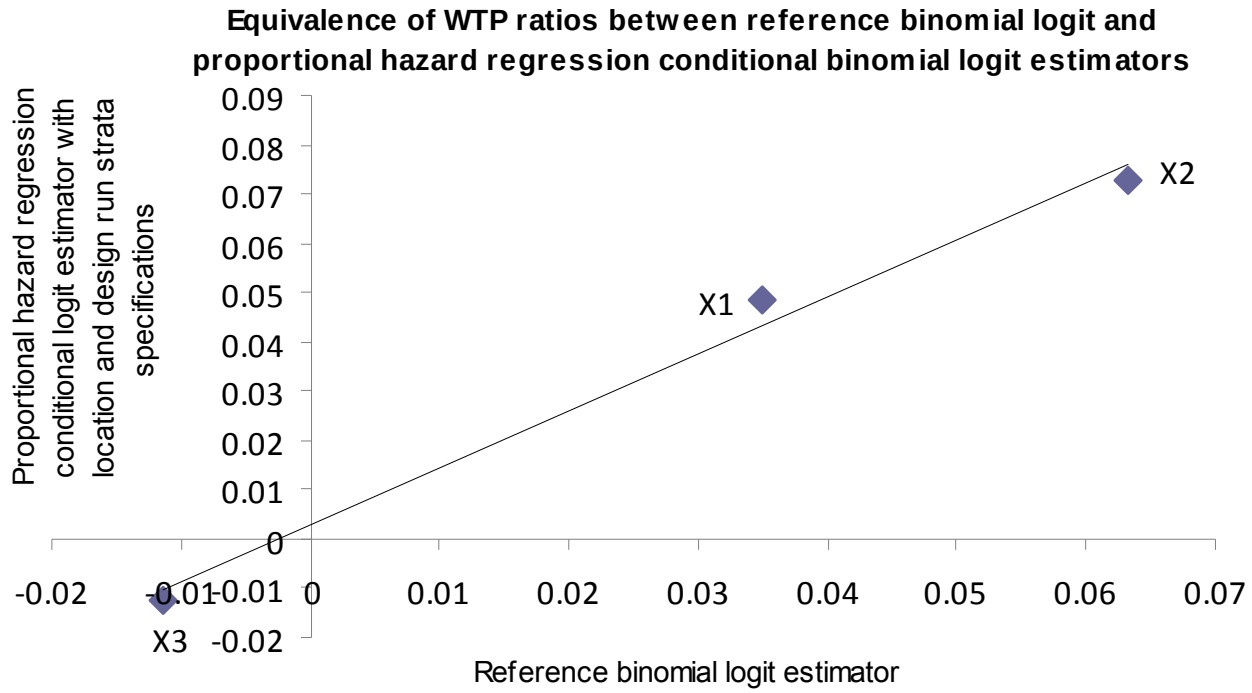
Table 40 - Comparison of alternative model specifications

Model Description	Model number	Number of observations	Likelihood Ratio	GCD
Standard binomial logit with reference effect-coded demographic covariate estimates. No status quo alternative.	1	35,448	7,676.3	0.195
Proportional hazard regression (conditional	2	35,448	6,700.8	0.172

Model Description	Model number	Number of observations	Likelihood Ratio	GCD
binomial logit). No status quo alternative				
Proportional hazard regression (conditional binomial logit). With status quo alternative but not demographics specified.	3	70,896	8,732.7	0.116
Proportional hazard regression (conditional binomial logit). With status quo alternative and reference effect-coded demographics	4	70,896	6,188.3	0.084
Proportional hazard regression (conditional binomial logit). With status quo alternative and mostly linear coded demographics	5	70,896	6,186.8	0.084
Proportional hazard regression (conditional binomial logit). With status quo alternative and mostly dummy coded demographics	6	70,896	6,192.2	0.084

Figure 20 demonstrates graphically and geometrically the equivalence of the parameter estimates for % recycling (X1), % litter reduction (X2) and annual cost (X3) arising independently from both estimating frameworks.

Figure 20 - Comparison of attribute parameter estimates for Model 1 and Model 2



Since all conditional logit estimates have an unavoidable common embedded scale factor inversely proportional to the variance of the data (after M. Ben Akiva), then as both model specifications and data change, so does the embedded scale factor. The clearest way to demonstrate equivalence amongst models based on a variety of different data, as these models necessarily are, is to use the graphical

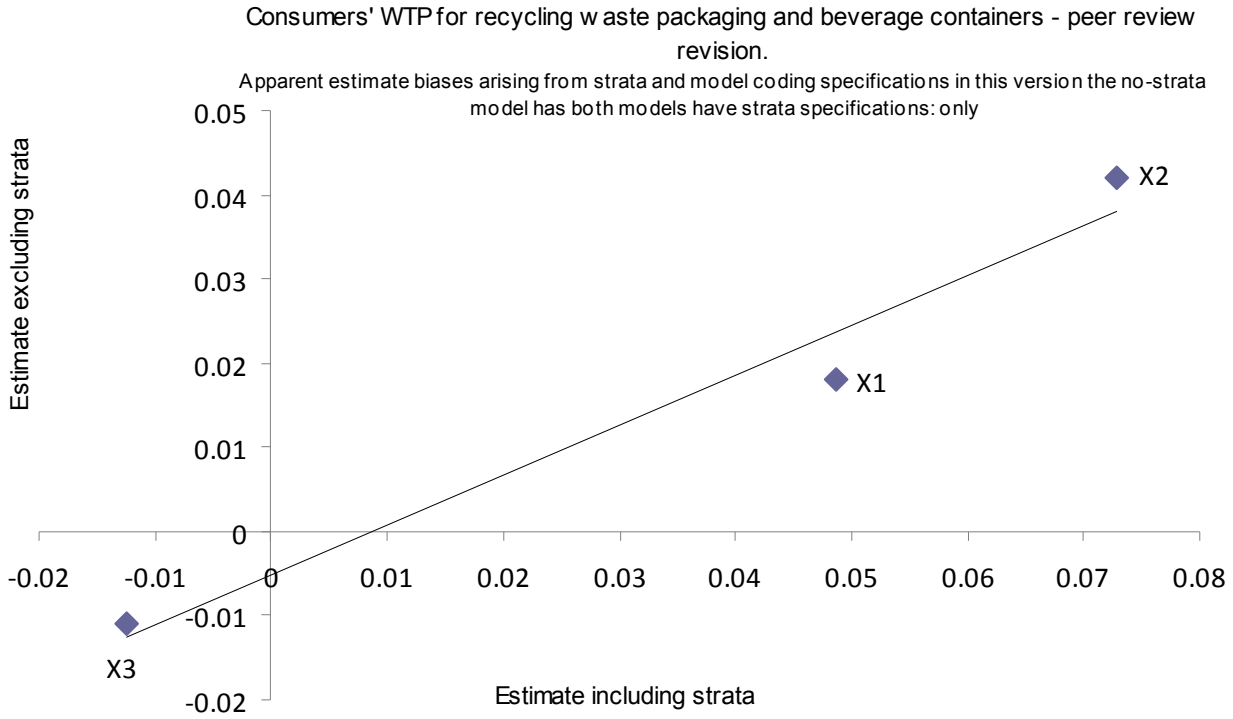
scale factor estimation technique (after J. Louviere), shown above. The scale factor is simply the slope of the line passing (nearly) through all points and the origin. Here we can clearly see that the estimates from both models are equivalent when a single relative scale factor between the two different model specifications is assumed.

Furthermore, since the main findings of this study surround the ratios of the linear coded effect estimates of X1 and X2 to X3, by the geometry of similar triangles we can see immediately that the ratios arising from both models are graphically and visually quite similar.

Next we compare Model 2 to Model 3. Model 3 is the first model in this comparison sequence to use the full information from the study data by including the status quo alternative. This model uses the Proportional Hazards Regression estimation framework and a similar strata specification of location and design run that usefully partials out most of the 'nuisance' unmeasured heterogeneity covarying with the strata factors. This model does not explicitly specify any demographic factors. The inclusion of the status quo alternative results in a doubling of the number of observations, but a reduction in the goodness of fit (indicated by the lower GCD relative to Model 2). This is partly due to the form of experimental design used for the choice experiment, which has retrospectively been found to be less than ideal for modelling changes in attribute levels relative to a status quo alternative (held constant across all choice alternatives).

However, as shown in Figure 21, the parameter estimates for each of the attributes are consistent between the two quite different model specifications and data. As with the previous chart, the horizontal axis is the parameter estimate for reference model, in this case Model 2, and the vertical axis is the parameter estimate for the extension model, in this case Model 3. Again we note that a straight line can be drawn that passes approximately through all points and the origin, and again by the property of similar triangles we are assured that the models are still scalable using a single relative scale factor.

Figure 21 - Comparison of attribute parameter estimates for Model 2 and Model 3.



The next three models compared (Models 4, 5 and 6) all use the Proportional Hazards Regression conditional logit estimator but without location and design run strata specification. The models differ in respect to the way the demographic variables are specified:

- Model 4 — reference effect-coded;
- Model 5 — linear effect; and
- Model 6 — dummy effect coded.

In all three models, stepwise regression was used to retain only those effects that had support for significance at the 95% confidence level.

All three alternative coding schemes yield models with similar Likelihood Ratios (LRs) and Generalised Coefficients of Determination (GCDs). The three scale factor comparison graphs below, comparing all three to Model 2, similarly demonstrate consistency and reliability of the attribute parameters. A further reduction in model GCD is unavoidable as the demographic factors specified and measured do not contain all of the heterogeneity, both measured and unmeasured, confounded with the strata factors of location and design run.

In conclusion, this series of different model specifications shows that there is equivalence and consistency of estimates between all three demographic effect coding schemes, between both explicit and implicit specification of effects representing heterogeneity, between binary logistic and proportional hazard regression estimators, between models with and without constant null alternative specifications and between data with and without constant null alternative data rows.

Figure 22 – comparison between Model 2 and Model 4 (reference effect-coded demographics). As per the previous comparisons, a straight line approximately passes through all points and the origin, and therefore the parameter estimates are visualised as similar for both models.

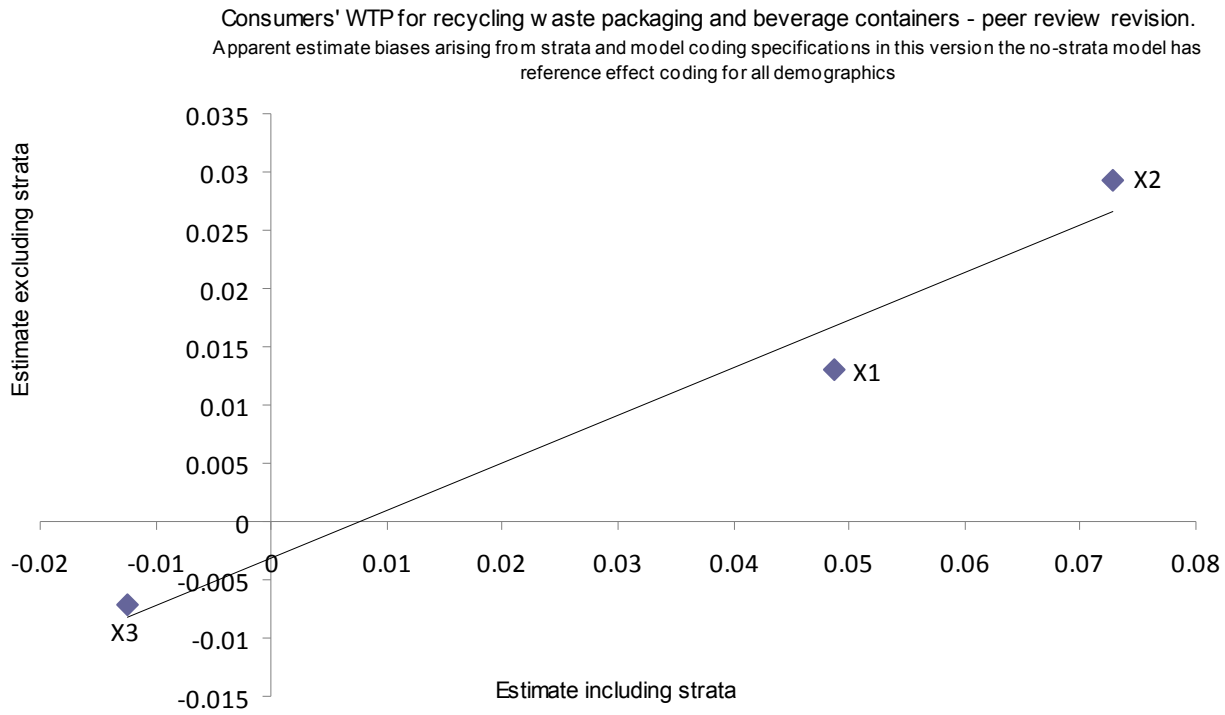


Figure 23 - Comparison of Model 2 and Model 5 (linear effect coded demographics).

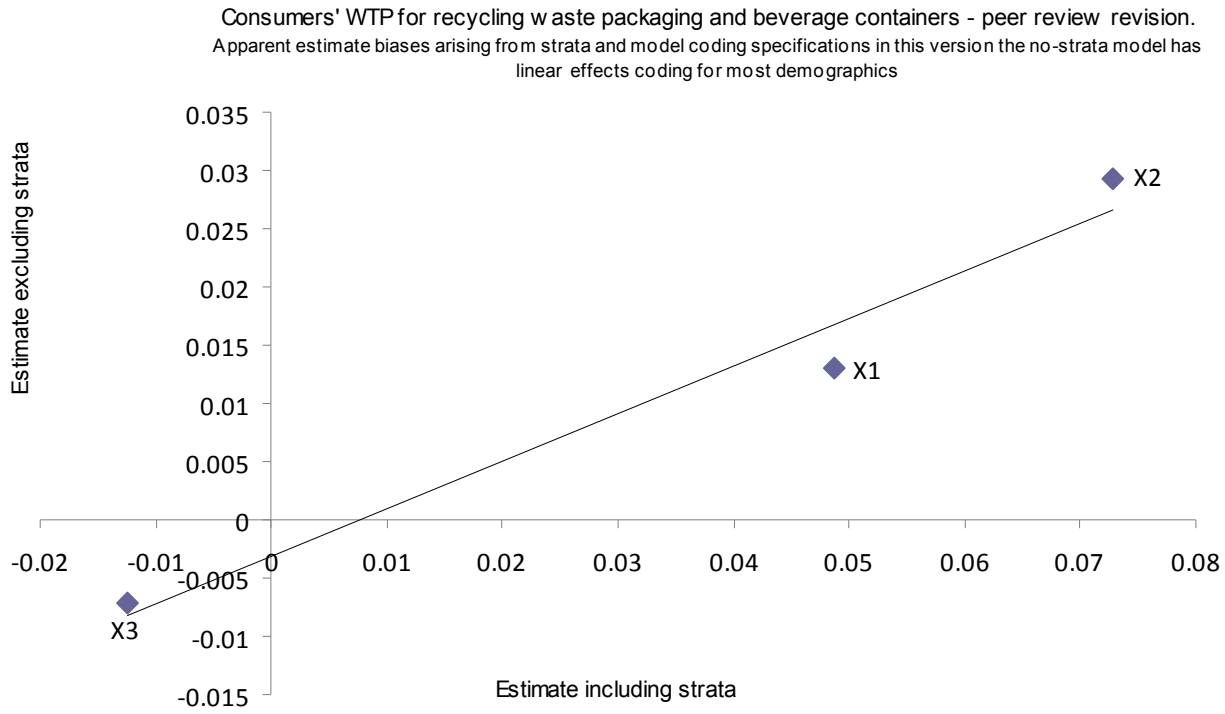
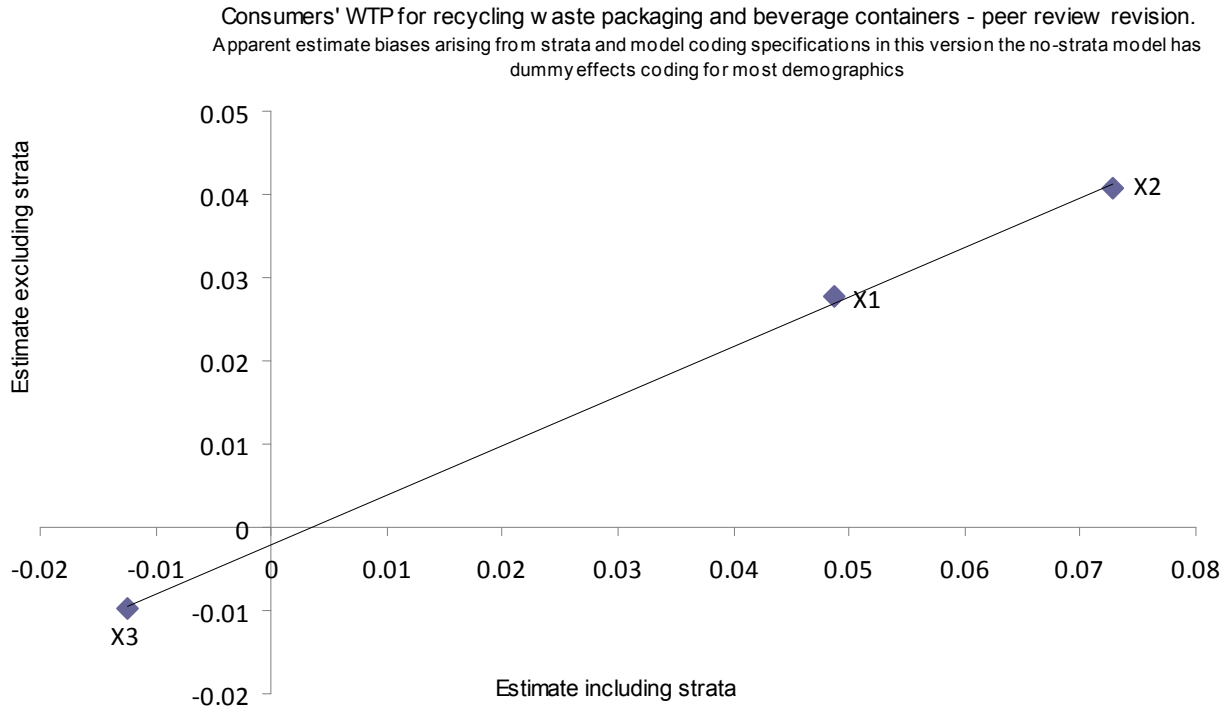


Figure 24 - Comparison of Model 2 and Model 6 (dummy effect coded demographic variables).



Appendix E Choice model parameters and attribute values

This appendix provides the coefficients and standard errors calculated for each of the sub samples and for the National samples. Models were calculated using a step-wise regression technique and only variables that were significantly different to zero are included in these results. Attribute value estimates are also summarised, together with 95% confidence intervals.

Variables used for explaining choices

Variable	Description
Option attributes	
Percentage of waste packaging recycled	Four levels: 55%, 65%, 75% and 85%
Percent reduction in litter	Three levels: 0%, 10% and 20%
Annual cost	Additional cost to household each year through one or a combination of ways including an increase in product prices, general taxes, levies and/or council rates.
Respondent socioeconomic characteristics	
Age	Five age categories
Education	Eight education categories plus “other”.
Income	12 income categories, plus a “Don’t know” category and a “Don’t wish to say” category.
Sex	Male/Female
Household structure	Five categories, plus “Not specified” and “other” categories.
Housing type	Four categories, plus “other” category.
Weekly beverage container consumption	Five categories: 0-10 11-20 21-50 51-80 More than 80
Distance to shopping centre	Five categories: Less than five kilometres 5 to 10 km 11-15 km 16 – 20 km More than 20 km

Summarised results

Mean attribute values for each sample

	Means ($ per 1% increase)		Lower 95% Confidence Limit		Upper 95% Confidence Limit	
	Litter Reduced	Waste Recycled	Litter	Waste	Litter	Waste
ACT	NS	2.32		0.16		2.90
Australia	4.15	2.77	3.39	2.19	5.22	3.77
Darwin	NS	NS				
Metro Melbourne	3.08	1.42	0.66	0.31	5.21	2.31
Metro Adelaide	3.14	1.98	0.35	0.68	6.42	4.07
Metro Brisbane	NS	NS				
Metro Hobart	NS	NS				
Metro Perth	3.68	1.61	0.48	0.04	7.60	3.20
Metro Sydney	3.93	1.90	2.17	1.66	7.18	3.67
Other NT	NS	NS				
Other NSW	NS	1.95		0.18		2.24
Other QLD	4.03	1.90	1.73	0.74	6.76	3.91
Other S.A	NS	NS				
Other Tasmania	NS	2.83		0.09		3.95
Other Victoria	NS	2.44		1.49		3.49
Other W.A	NS	NS				

NS = attribute value not significantly different from $0 at the five per cent level.

Australia

Observations (respondents): 2945				
Cox and Snell Psuedo-R-Squared: 0.05497				
Variable	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq
Percentage of waste packaging recycled	0.02769	0.00191	210.7457	<.0001
Percent reduction in litter	0.04073	0.00309	173.3310	<.0001
Annual cost	-0.00963	0.0001923	2509.4619	<.0001
Sex Female	-0.85551	0.15623	29.9860	<.0001
Sex Male	-1.22583	0.15640	61.4323	<.0001
Age 18 to 34	-0.15355	0.03505	19.1894	<.0001
HH_Income $104,000 - $129,999	0.41527	0.06027	47.4721	<.0001
HH_Income $13,000 - $25,999	-0.18940	0.05051	14.0603	0.0002
HH_Income $130,000 - $155,999	0.61629	0.08198	56.5179	<.0001
HH_Income $33,800 - $41,599	0.21554	0.06270	11.8180	0.0006
HH_Income $66,821 - $88,399	0.24231	0.04837	25.0955	<.0001
HH_Income Don’t wish to say	-0.23712	0.05741	17.0565	<.0001
HH_Structure not specified	-1.07615	0.33300	10.4435	0.0012
Housing_type Townhouse	-0.25684	0.06516	15.5362	<.0001
Education Graduate Diploma or Certificate	0.17408	0.03849	20.4492	<.0001
Education Year 10 or less (or equivalent)	-0.16211	0.04236	14.6452	0.0001
Weekly beverage container consumption	0.00505	0.0008157	38.3015	<.0001

Melbourne

Observations (respondents): 348				
Cox and Snell Psuedo-R-Squared: 0.07274				
Variable	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq
Percentage of waste packaging recycled	0.01456	0.00200	53.1398	<.0001
Percent reduction in litter	0.03206	0.00861	13.8660	0.0002
Annual cost	-0.01066	0.0005738	345.0266	<.0001
HH_Income $130,000 - $155,999	2.45009	0.38922	39.6246	<.0001
HH_Structure Family (at least one adult and related children)	0.48905	0.09159	28.5081	<.0001

Regional Victoria

Observations (respondents): 222				
Cox and Snell Psuedo-R-Squared: 0.05428				
Variable	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq
Percentage of waste packaging recycled	0.02188	0.00264	68.8193	<.0001
Percent reduction in litter	0.03085	0.01127	7.4905	0.0062
Annual cost	-0.00887	0.0006933	163.5176	<.0001
HH_Income Under $13,000	-1.57968	0.33646	22.0434	<.0001

Metro Sydney

Observations (respondents): 401				
Cox and Snell Psuedo-R-Squared: 0.05242				
Variable	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq
Percentage of waste packaging recycled	0.01988	0.00191	108.6208	<.0001
Percent reduction in litter	0.03748	0.00777	23.2783	<.0001
Annual cost	-0.00871	0.0005065	295.6122	<.0001
Age 18 to 34	-0.66079	0.09262	50.9040	<.0001
Age 35 to 44	-0.98443	0.11052	79.3418	<.0001

Regional NSW

Observations (respondents): 346				
Cox and Snell Psuedo-R-Squared: 0.07976				
Variable	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq
Percentage of waste packaging recycled	0.01730	0.00207	69.5456	<.0001
Percent reduction in litter	0.02283	0.00863	6.9961	0.0082
Annual cost	-0.01095	0.0005744	363.2854	<.0001
HH_Income Don't wish to say	-0.94850	0.16214	34.2195	<.0001
HH_Structure Family (at least one adult and related children)	0.49310	0.09211	28.6601	<.0001
Distance_to_shopping 11 to 15km	1.16426	0.23383	24.7903	<.0001
Distance_to_shopping 16 to 20km	-1.30134	0.28648	20.6341	<.0001
Education Bachelor Degree	0.97359	0.16874	33.2900	<.0001

Metro Brisbane

Observations (respondents): 242				
Cox and Snell Psuedo-R-Squared: 0.07877				
Variable	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq
Percentage of waste packaging recycled	0.01628	0.00264	38.1104	<.0001
Percent reduction in litter	0.03623	0.01038	12.1929	0.0005
Annual cost	-0.00969	0.0006866	199.1238	<.0001
Sex Male	-0.59292	0.11044	28.8233	<.0001
Age 35 to 44	0.70595	0.15975	19.5275	<.0001
Age 55 plus	-0.70149	0.12990	29.1600	<.0001
HH_Income $104,000 - $129,999	0.90005	0.23470	14.7060	0.0001
HH_Income $33,800 - $41,599	0.68020	0.23098	8.6719	0.0032
HH_Income $41,600 - $51,999	-1.04351	0.22349	21.8007	<.0001
HH_Structure not specified	-1.80071	0.66625	7.3049	0.0069
HH_Structure Couple without children	0.48788	0.13409	13.2385	0.0003
Housing_type Unit/Apartment	0.80989	0.17660	21.0312	<.0001
Education Year 8 or below (or equivalent)	2.42432	0.49665	23.8277	<.0001

Regional Queensland

Observations (respondents): 260				
Cox and Snell Psuedo-R-Squared: 0.08772				
Variable	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq
Percentage of waste packaging recycled	0.02404	0.00308	60.9112	<.0001
Percent reduction in litter	0.04709	0.01084	18.8652	<.0001
Annual cost	-0.01138	0.0007567	226.1508	<.0001
Sex Male	-0.42215	0.12067	12.2392	0.0005
Age 45 to 54	-0.29609	0.13404	4.8796	0.0272
HH_Income $13,000 - $25,999	-0.53854	0.18823	8.1857	0.0042
HH_Income $26,000 - $33,799	1.75796	0.33199	28.0391	<.0001
HH_Income $41,600 - $51,999	-0.41348	0.19891	4.3209	0.0376
HH_Income $52,000 - $62,399	0.80158	0.32960	5.9146	0.0150
HH_Income $88,400 - $103,999	-0.45614	0.17790	6.5741	0.0103
HH_Income Don’t know	-0.91260	0.42488	4.6134	0.0317
HH_Income Don’t wish to say	-0.90009	0.19970	20.3157	<.0001
HH_Income Under $13,000	-1.33172	0.46447	8.2208	0.0041
HH_Structure Shared house (of unrelated people)	-0.83068	0.19997	17.2557	<.0001
Distance_to_shopping 16 to 20km	2.39815	0.61167	15.3718	<.0001
Distance_to_shopping Less than 5km	-0.31697	0.13332	5.6529	0.0174
Education_Tafe Certificate/Diploma	-0.68753	0.28069	5.9998	0.0143
Education Bachelor Degree	0.34652	0.16122	4.6195	0.0316
Education Year 8 or below (or equivalent)	-2.80675	0.39399	50.7499	<.0001
Weekly beverage container consumption	0.01445	0.00314	21.2035	<.0001

Metro Adelaide

Observations (respondents): 200				
Cox and Snell Psuedo-R-Squared: 0.07639				
Variable	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq
Percentage of waste packaging recycled	0.02246	0.00282	63.5424	<.0001
Percent reduction in litter	0.03367	0.01118	9.0647	0.0026
Annual cost	-0.01032	0.0007625	183.2618	<.0001
Age 45 to 54	-0.47089	0.13416	12.3195	0.0004
HH_Income $13,000 - $25,999	-1.13004	0.20414	30.6440	<.0001
HH_Income $156,000 or more	-1.71424	0.41200	17.3122	<.0001
HH_Income $33,800 - $41,599	-1.02453	0.22727	20.3223	<.0001
HH_Income $66,821 - $88,399	-0.46427	0.16439	7.9758	0.0047
HH_Income Don’t wish to say	-1.48649	0.27032	30.2393	<.0001
HH_Structure Family (at least one adult and related children)	-0.60887	0.12516	23.6675	<.0001
Education Graduate Diploma or Certificate	0.66073	0.15024	19.3403	<.0001
Education Year 8 or below (or equivalent)	-1.33600	0.36407	13.4664	0.0002

Regional South Australia

Observations (respondents): 134				
Cox and Snell Psuedo-R-Squared: 0.05433				
Variable	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq
Percentage of waste packaging recycled	0.01281	0.00328	15.2803	<.0001
Percent reduction in litter	0.03858	0.01375	7.8785	0.0050
Annual cost	-0.00963	0.0009003	114.2863	<.0001
Distance_to_shopping Less than 5km	0.60446	0.14553	17.2528	<.0001

Metro Perth

Observations (respondents): 224				
Cox and Snell Psuedo-R-Squared: 0.06005				
Variable	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq
Percentage of waste packaging recycled	0.01437	0.00244	34.6544	<.0001
Percent reduction in litter	0.03429	0.01057	10.5227	0.0012
Annual cost	-0.00889	0.0006913	165.2254	<.0001
HH_Income $66,821 - $88,399	1.14334	0.20100	32.3548	<.0001

Regional Western Australia

Observations (respondents): 139				
Cox and Snell Psuedo-R-Squared: 0.07020				
Variable	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq
Percentage of waste packaging recycled	0.02415	0.00459	27.6952	<.0001
Percent reduction in litter	0.05550	0.01646	11.3667	0.0007
Annual cost	-0.01282	0.00113	127.7384	<.0001
Age 35 to 44	2.16283	0.31061	48.4849	<.0001
HH_Income $104,000 - $129,999	-1.46268	0.38933	14.1142	0.0002
HH_Income $13,000 - $25,999	-1.85196	0.29924	38.3031	<.0001
HH_Income $41,600 - $51,999	-2.11819	0.31436	45.4028	<.0001
HH_Income $52,000 - $62,399	-2.06312	0.31501	42.8938	<.0001
HH_Income $66,821 - $88,399	-1.07908	0.32807	10.8186	0.0010
HH_Income Don’t wish to say	-2.82052	0.37099	57.8008	<.0001
HH_Income Under $13,000	-1.33109	0.45355	8.6132	0.0033
HH_Structure Single person	1.08508	0.27526	15.5400	<.0001
Housing_type Unit/Apartment	0.86155	0.34928	6.0843	0.0136
Distance_to_shopping More than 20km	1.64691	0.42318	15.1459	<.0001
Education Postgraduate degree	-1.20164	0.35247	11.6228	0.0007
Education Year 12 or less (or equivalent)	-0.69691	0.20686	11.3499	0.0008
Weekly beverage container consumption	0.03632	0.00589	38.0140	<.0001

Metro Hobart

Observations (respondents): 56				
Cox and Snell Psuedo-R-Squared: 0.09686				
Variable	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq
Percentage of waste packaging recycled	0.02712	0.00534	25.7814	<.0001
Percent reduction in litter	-0.00228	0.02193	0.0108	0.9173
Annual cost	-0.01345	0.00161	69.6875	<.0001

Regional Tasmania

Observations (respondents): 92				
Cox and Snell Psuedo-R-Squared: 0.08228				
Variable	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq
Percentage of waste packaging recycled	0.02231	0.00410	29.5871	<.0001
Percent reduction in litter	0.02873	0.01678	2.9313	0.0869
Annual cost	-0.00920	0.00113	65.7409	<.0001
HH_Structure Single person	-2.14581	0.27219	62.1509	<.0001
Distance_to_shopping More than 20km	-1.85524	0.27753	44.6861	<.0001

Darwin

Observations (respondents): 95				
Cox and Snell Psuedo-R-Squared: 0.12027				
Variable	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq
Percentage of waste packaging recycled	0.01901	0.00438	18.8017	<.0001
Percent reduction in litter	0.03073	0.01883	2.6626	0.1027
Annual cost	-0.00998	0.00113	77.8702	<.0001
HH_Structure Couple without children	1.74138	0.29285	35.3594	<.0001

Regional Northern Territory

Observations (respondents): 46				
Cox and Snell Psuedo-R-Squared: 0.21187				
Variable	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq
Percentage of waste packaging recycled	0.03592	0.00810	19.6390	<.0001
Percent reduction in litter	0.04232	0.03246	1.7000	0.1923
Annual cost	-0.00782	0.00203	14.9036	0.0001
Education Year 10 or less (or equivalent)	-2.95505	0.35736	68.3779	<.0001

Australia Capital Territory

Observations (respondents): 139				
Cox and Snell Psuedo-R-Squared: 0.07335				
Variable	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq
Percentage of waste packaging recycled	0.01918	0.00335	32.6803	<.0001
Percent reduction in litter	0.03790	0.01449	6.8434	0.0089
Annual cost	-0.00997	0.0009248	116.2893	<.0001
Age 45 to 54	1.27208	0.27072	22.0789	<.0001

Appendix F CDS participation model parameters and coefficients

A binomial logit model was fitted to the CDS participation question data to assess the statistical significance of individual factors that may be responsible for explaining the decision to participate. The results of this modelling are presented in the table below.

Table 41: Results from analysis of CDS participation question responses – National Sample

	Significance (p-value)	Change in probability of participation
Constant	0.0017	
Distance to shopping centre or nearest town	Not significant	
Weekly household consumption of beverage containers	0.000	4.00%
Deposit	0.0037	2.98%
Number of choice sets in which the 'no payment' option was selected	0.0000	-3.25%
Income	0.0025	-3.46%
Age	0.0480	3.86%
Sex	Not significant	-
South Australia resident	0.0022	0.71%
Education level	Not significant	-

Technical details of binary logit model

Observed data on stated participation in a CDS comprises binary data, where y = 1 is the decision to participate and y = 0 is the decision not to participate. A binary logit model was used to examine the factors responsible for influencing an individual's decision to participate. This modelling approach assumes that an individual will seek to maximize their utility when making decisions. The respondent derives utility Uo from not participating and U1 from participation, with these utility functions defined by a vector of parameters to be estimated (Bx) and a random component (ε). Mathematically, this is given by

U0 = B0x + ε0 from the decision not to participate (y= 0) and U1 = B1x + ε0 from the decision to participate (y=1).

The choice to participate reveals that U1 is greater than U0 or, rearranging the above equation, ε0 – ε1 < B0x - B1x.

In order to estimate values for the beta coefficients, an assumption must be made about how the random components are distributed. If a logistic distribution is assumed (as is the case for the binary logit model), the probability of an individual (i) choosing to participate is given by the following formula.

Prob [y=1] = exp(Bxi)/[1+exp(Bxi)]

Maximum likelihood estimation method is to calculate values for the beta coefficients. This procedure finds values for the coefficients that maximize the likelihood of achieving the observed participation decisions for each individual in the sample. See Greene (2003) for further technical details on the binary logit model.

Appendix G Moderators guide for focus group sessions

Introduction

Thanks for coming.

For those of you who haven't participated in a focus group before just a couple of things to note:

- One person to talk at a time.
- Frank and honest opinions are what we are looking for.
- If you hold a different view or have a different approach speak up.
- Everyone needs to be involved.

Discussion is being taped [and people viewing], however confidentiality is assured by the stringent ethics of MRSA. The group will go for about 1 ¼ hours.

Before we go any further I would like you all to quickly introduce yourself by way of:

- first name
- current family/ household situation ie single / married etc.

Today I'd like to talk about recycling…

Firstly, how are we recycling at the moment [allow spontaneous reaction –home, work place, day to day]

- What are we recycling? [Explore]

[Taking each in turn: ASK] Take me through a typical week. What do we do? (At home /work etc)

- Do we have bins in our home for separate items?
- How often does recycling get collected at kerbside /at the workplace?
- What about other items – furniture / hard rubbish / other goods - what do we do?
- Explore (do we go to the tip/ hard rubbish collections at kerbside etc)

Is recycling (and the ability to recycle) important to us? [Explore fully]

- Why is that? [Explore fully]
- If not, why not?
- What are the benefits of recycling?

Has recycling become more or less important in our lives in recent times?

- Why is that? [What factors have made it more of a priority (or less) for us?]

Recycling packaging waste and beverage containers

Tonight, we are particularly interested in your views on recycling packaging waste and beverage containers.

What do we think about the recycling of packaging [such as plastics, paper, cardboard, foam etc – that surrounds goods we purchase- like TVs, fridges, food products …most goods really?

Is it easy to recycle this type of waste?

- How?
- What has been put in place to make recycling easy? [Explore –for household /workplace /public places]
- What impediments exist that stop us from recycling more?
- How could recycling of that packaging be made easier for you…the consumer? [Obtain all spontaneous response]

And what about beverage containers (from glass, plastic etc for milk, alcohol, etc)? [Ask the same questions above]

Are we doing enough to recycle packaging and beverage container waste?

- What are the benefits of recycling this type of waste?
- Should we recycle more?
- If so, in what way? [What else should be done to help us recycle?]

Do you have a preference for recycling some types of materials over others?

- If so, which ones and why?

Paying for recycling

To our way of thinking, who pays for recycling? [Explore spontaneous response and prompt if necessary: Us, ratepayers, local councils]

How do we feel about paying for recycling?

- Are we willing to pay more for better (or more opportunities) to recycle?
- If yes, how much? What's reasonable?

Recycling schemes

[READ] In SA, people can return cans / bottles to a central location and get refunded – what do we think about that?

- Would we do that?
- Why / why not?
- What would make us consider it? [Probe: amount of refund / accessibility etc]

[READ: A national initiative is being considered to increase the level of recycling for packaging & beverage containers.

- What do we think of that?
- What would be the benefits (or drawbacks)?
- How could / should it work?

Response to potentially increasing level of recycling in Australia

[READ: At the present time, Nationals recycle about 54% of 4.4 million tonnes of packaging waste. It costs more to collect and recycle this than the value of materials recovered from the recycling process.

- What do we think about this?
- Is it surprising? If so, in what way?

[READ: Any national program to increase the rate of recycling will involve higher costs to process the additional material collected.

Would you be prepared to pay more to achieve a higher rate of recycling?

If yes, how much? If not, why not?

If you were asked to vote on the introduction of a national program, what information would you need to help you make a decision?

Wrap up

Thank you and close.

Appendix H Summary of focus group discussions

This appendix provides summaries of the discussions held during the eight focus group sessions organised to gain understanding about the way people thing about recycling packaging waste and beverage containers.

The focus groups were held in:

- Perth (WA) – 2 sessions
- Sydney (NSW) – 2 sessions
- Ballarat (Vic) – 2 sessions
- Adelaide (SA) – 2 sessions

The moderator's guide (attached in Appendix G) illustrates the structure of the discussion in each focus group. In order to gain an understanding about any variations in the way people think about recycling between the different States, the moderators guide was not changed between sessions.

The summary of each session has been presented as consistently as possibly, however even with the same moderators guide, some variation in focus is present due to the varying options of individuals in each group.

Perth Focus Group I (Younger group)

General recycling

General Thoughts

- Confusion about:
  - lids
  - washing out bottles etc
  - recycling plastic bags
  - changes over time are confusing
  - differences between councils
  - glossy magazines
  - paper with staples
  - labels
  - Plastic wrappers
  - Anything that is old/dirty.
- People want to do it, but they are not sure what to do.
- I think most of the recycling stuff ends up in the tip.
- Recycling plant in Perth broke down.
- People are now more aware of the need to recycle.

What we currently recycle

- Bottles.
- Paper/newspaper.
- Glass.
- Tins.
- Gardening materials.

How many bins?

- 2 bins (recycling and waste) (no one believes that it works).
- 3 bins (green materials, recycling, waste).

Collection

- Fortnightly.

Hard rubbish

- Green waste is picked up by council from kerb twice per year.
- Bulk rubbish material pick up periodically.
- Some councils offer a skip delivery service.
- Salvation Army takes furniture but they are fussy.

Work

- Bugger all recycling happens at work.
- Cardboard and photocopy paper is recycled.

Packaging waste and beverage containers

What do we recycle?

What makes it easy?

- Target bags are recyclable.

Impediments?

- Recycling bins get too full and some recycling get put into general waste.
- Recycling needs to be made easy.
- Don’t want to drop stuff at a depot.

It’s a lot of effort to soak off the labels

- People with disabilities could do that job though.

Improvement ideas

- We should have more recycling bins around shopping centres.
- Cling wrap goes straight into the general rubbish, they won't recycle that.
- If we were required to drop recyclable off at a depot it wouldn't work:
  - people are lazy by nature
  - nobody would do it
  - fines for not recycling properly may work
  - people in Belgium are very pedantic. They will get a fine if they don't do it right.
- Have guidelines been provided about what the recycling:
  - yes, probably once a year or when we first moved into our new house and got a new bin
  - the people are required to remove labels that won't work.
- Adds on TV are required instead of pamphlets.
- People need to be informed /educated about what happens to the waste.
- Would prefer more transparency on our rates bill about how much is being spent on recycling.

Benefits of recycling

- Less landfill is a big benefit.

Paying for recycling

Who pays?

- We do!
- Through our rates!
- But does everyone pay rates?
- No, I am renting, so the landlord pays.

Willingness to pay

- Don't mind, so long as the money is well spent.
- Don't want it (the waste) to go into a big hole in the ground.
- Provided at least ⅓ of the yellow bin contents is recycled, I'd be happy.
- Don't want to just see people employed – want to see recycled materials go into a new product; eg aluminium smelted down.

Different recycling schemes

Container deposit schemes

- SA still has it (a CDS). I wish we had it here.
- The 5c deposit 'cleaned up the roads' – when we had it.

- You have to pay a deposit for the can.
- CDS is encouraging children to recycle could apply a refund on a weight basis.
- Will help stuff (cans/bottles) being picked up off the street.
- Our schools would get on board to a CDS big time if it was introduced.
- Scouts and schools could raise money.
- If a refund was available for stuff in addition to cans and bottles, I'd go for a drive every week to drop staff off.
- Yes good idea, but would need public awareness.

Cost more to recycle than the value of material recovered

- Not surprised at all, you've got to pay wages.
- It's a catch '22'.
- Not a lot of profit in recycling. Firms and big industry will try to put money into new technologies to not recycle products, when they can buy the raw materials.
- There's a lot of people that would prefer a new product rather than a recycled one.
- Eg recycled paper, why use something that is old, brown and recycled when you can buy a new, virgin product? Same applies to paper plates – it is a perception thing.
- Similar to recycling of sewage for drinking – yuck factor.
- Recycled photocopy paper gets jammed.

Increasing recycling in Australia

- Yes, but not too much more, to a reasonable level, say $200- 300 per year per household.
- Its our social responsibility – we need to start doing things now for the future.
- We seem to be paying but we aren't seeing the results. There are too many restrictions on what can be recycled.
- Money should be spent on improving technologies.
- A lot of people would say 'stick it' if required to pay $200 – 300. A lot of people are struggling.
- They already slug us through council rates:
  - If we were required to pay more, we would expect products to be cheaper at some point, relative to new products. (Eg cheaper photocopy paper).
  - Money should go into R&D for new technologies.
  - Why don't we learn from what's being done in Europe – eg Germany.
  - Realise that land is cheaper here.
  - Everything is going down hill. I don't want my kids to grow up in a cesspit.
  - So have to act now, even if we don't reap the benefits for 5-10 years.
  - Europe has a different view on recycled waste water.
  - People happy to drink it.
  - People in Australia need to be educated – we are spoilt rotten here.

  - Scandinavia has a high tax rate, but everything is taken care of. Good system.
  - CDS – I wouldn't do it at home because too much effort to take cans/bottles back and store it somewhere.
- Reverse vending machines in Germany seen to work well.
- 70% of deposit gets refunded and 30% goes into R&D or wherever to pay for recycling (eg 80c per can, with 10c refund).

Perth Focus Group II (Older group)

General recycling

General Thoughts

- Recycling not working – ends up in general waste anyway.
- Confusion with:
  - washing out containers etc
  - numbers on plastics
  - plastic bags.
- They want you to do as much as possible so I do (eg take labels off):
  - need to read the yellow bin lid.

What we currently recycle

- Plastics.
- Cans.

How many bins?

- 3 bins (Burswood City Council).
- Different systems for different councils/shires.

Collection

Hard rubbish

Work

- Photocopying paper gets recycled.

Other

- Poisons to be deferred to a depot (recycling centre) but they charge you

Packaging waste and beverage containers

What makes it easy?

- Get notified with a sign on bin if putting wrong stuff in.
- Local council has to set up structures for us to recycle.

Impediments?

- Plastic bags from shops are useful for disposing of things.
- Must take lids off, make it easier for people to recycle.

  - If it's left in, whole container will go to landfill.
- Not much advertising/public awareness on what we should do. Government says 'recycle if you want to' (that's a lazy approach).
- Council's dilemma: They collect cans, but no market.
- They don't get much for them (the recycling firms).
- Recycling plants are smelly. And the WA plant had a big fire - the stockpile caught fire.
- People collecting wastepaper are going out of business because there is no money in it.
- 10 – 20% is probably recycled but rest probably goes under ground.
- Not able to recycle packing foams or food wrapping (ends up in bin):
  - Plastic cling wrap at work – gets taken away by a recycler.
- They tell you they don't want it.
- We, as consumers, don't really know what we can/can't recycle.
- Beverage containers need to use a lot of water to wash and remove labels, so easier to chuck out.

Improvement ideas

- Need more public education.
- Teach kids in school.
- If I buy something, I don't want it prettied up.
- Manufactures should reduce packaging.
- We're getting more packaging on things than what we used to.
- Cans have tabs attached to them – a good thing reduces litter.
- One of the worst things is plastic bags:
  - All end up in the bin.
  - They do break down though.
  - And if plastic bags go I would have to purchase bin liners instead.
- Cloth bag no replacement, because no protection if something leaks in supermarket.
- Collection points needed.
- We have to be told where to put it.
- We don't get enough info on what to do - Need an advertising campaign.
- Targeted advertising.
- Every shire is different:
  - Used to get a lot of information, but has dropped off.
  - Some Councils know that it will cost them to recycle, so not keen on promoting it.
- State Government should coordinate recycling – we pay taxes and this is a global problem.

Benefits of recycling

- We are a wasteful society.

- Yes important to do something.
- Cost of dumping it is increasing.
- Have to do something now, before too late – for sake of our children.
- Is there a guilt factor about throwing things out? - Yes or No (Just want to get rid of it).

Paying for recycling

Who pays?

- $X extra on your rates may be required, but people would baulk at this.

Different recycling schemes

Container deposit schemes

- In SA deposit scheme means that Adelaide is cleaner.
- Good idea.
- Encourages poor people, pensioners and kids to collect and return.
- I would rather be paid to recycle than have to pay someone to take it.
- Adelaide streets are really clean.
- Should be mandatory for the company to pay for the recycling of their packaging. They should be responsible for recycling it. They own the container.
- But company will charge you for it <ie recycling> to cover their costs!

Increasing recycling in Australia

Willingness to pay

- Most of us would gladly pay more.

Information needs

- Want to know where the money is going.
- Need to know it is effective.
- I would be WTP more for recycling so long as we know what the results are.
- Even if there is a local collect point to drop things off, I'd support it.
- I don't trust that the stuff is being recycled.
- I think it should be made tough to manufacturers (it's difficult to avoid packaging).
- Although acknowledge that need packaging for hygiene and tamper proof.
- Also centralised distribution process means more packaging required.
- Differential tax on products that are heavily packaged?
- Would agree with that, we would be hit by tax and Council charge.

Should recycling be done at a national level?

- If there was a good solution at national level I'd supplier.
- I would need to have faith in who's running it.
- Would our State/local area get sufficient attention?

Would you be surprised to know that 54% of packaging waste gets recycled each year, and that the cost of recycling exceeds the value of materials collected?

- Yes, surprised that the recycling rate is so high.
- Litter in Perth – getting worse.
- Need education.
- We've dropped the ball on recycling.
- People would pay more, if made easier for people to recycle.
- People will lose faith in recycling if they don't see results.
- Needs to become a habit.
- Everyone happy to do their bit.
- But need to see results – eg
- What is produced from recycled material?
- It's going to be hard to avoid foam packaging to protect goods.
- More trees cut down (cardboard).
- Need some mandates on manufacturers about what materials they use for packaging.
- Must be recyclable.

Environment is not as important as it used to be to voters and the Government (except downturn)

Sydney Focus Group I (Younger group)

General recycling

General Thoughts

- We consume too many bottles.
- Use clothing collection bins.
- Sometimes goes to bin (but not recently):
  - most don't know where tips are now.
- Recycling is important for people.
- Recycling is not more important.
- Confusion about requirements for recycling:
  - taking off lids
  - types of plastic that can be recycled
  - different councils do different things.

What we currently recycle

- Boxes.
- Cans.
- Bottles.
- Paper/cardboard.
- Mobile phone.
- Glass.
- Green waste.
- Printer toners.

How many bins?

- Number of bins vary:
  - 2 bins
  - 3 bins
  - 4 bins (Grass/plastic/paper/general).

Collection

- Weekly (some).
- Fortnightly (some).
- Possibly less for green waste.

Hard rubbish

- Picked up once or twice a year.
- Some people go to the tip.
- Common belief that council pays.
- Possible whitegoods and computer pickup service (booked through phone or internet):
  - reverse garbage
  - free (but pay through rates).

Work

- No recycling bins.
- Construction – all about money – so don't recycle.
- Sometimes businesses have paper and toner bins.
- Some recycle bottles.
- Foam is compacted.
- Some workplaces plastic cups get thrown out.
- Some workplaces have plastic recycling for cups etc.
- 'There's no system for it'.
- 'Sometimes you even take things home to recycle'.

Public

- Some bins in public have multiple holes.

Packaging waste and beverage containers

- Packaging is getting bigger and bigger.
- there is a lot of packaging waste.
- it has increased (Woolworths vs. market).

What do we recycle?

- Cardboard.

What makes it easy?

- Target have disposable bags.
- Bunning's don't give out bags.
- Everyone is more conscience about recycling now.
- Unusual item drop-off at fire stations.
- It has become a habit.
- Councils make general waste bins smaller.

- Recycling bins in public.
- Recycling bins in some workplaces, but not all.

Impediments?

- Some councils only accept some plastics (certain numbers).
- Don't know if they can recycle hydrocarbons.
- Don't have local drop off points.
- Cost more in petrol to get it back to IKEA (could take it back next time and have discount on next purchase).
- Confusion about what can be recycled.
- Confusion about requirements of recycling:
  - taking off lids/caps
  - putting things in bags.

Improvement ideas

- People recycle more based on convenience than to ensure it is recycled or to reduce waste.
- Need to have it picked up or close drop off point (at work or supermarkets).
- Some suspicious of council as council worker says it doesn't happen.
- Should be rewarded for recycling.
- Deposit schemes with financial incentive (like SA):
  - take back to store
  - 'for 5c I wouldn't recycle [cans], but I'm sure someone else would'
  - refund system like in SA 'works there…why not here?'
- Discount on next purchase for taking back to store.
- Would change our behaviour if deposit return (although not is unit because nowhere to store).
- Delivery truck to take back foam etc.
- Ban the use of the foam.
- Pay per pickup for general waste but not recycling.
- Pick-up less frequent for general waste and more frequent for recycling.
- More onus on manufacturers.

Benefits of recycling

- Feel better.
- It's a responsibility.
- 'Only if I know what good was happening'.
- Personal/national pride.
- Prevents use of finite resources.

- ‘The world would just be a big tip’.
- ‘To save the environment’.
- Creating a better world.
- ‘Keeping Australia green’.

Paying for recycling

- Consumers should pay as part of purchase price.
- A user pays system would be fairer.

Who currently pays?

- We do pay – nothings free (taxes).
- Everyone through rates.
- Not sure how much of the rates go to recycling.

Different recycling schemes

Education campaign

- Public education.
- Start with advertising.
- Emphasis on manufacturing to reduce.
- Make signs ‘this will go to landfill as it’s not recyclable’.

Container deposit schemes

- Should work here.

Reverse recycling

- A place to take things that people might use.
- A place to purchase cheap goods recycled by others.

Scheme to give out lotto tickets for people that recycle.

Increasing recycling in Australia

Willingness to pay

- Most don’t want to pay more.
- There might be a cost to do nothing, so willing to pay now (even if not financially cost effective today).
- If we spend more we want to know hard facts on what’s happening.

Information needs

- Should give prize to councils that recycle the most.
- Australia should get recognition as ‘green’.
- What do we need to recycle more of? More paper?
- Teach in schools.
- Information in pamphlets/on bill.
- Stickers on bins.
- Facts about what is being recycled.
- Knowledge that everyone has to recycle.
- Knowledge that Australia will get recognition for recycling a lot.

Sydney Focus Group II (Older group)

General recycling

General Thoughts

- ‘I recycle everything I can get my hands on’.
- ‘I don’t think enough people recycle’.
- ‘recycling is important to us’.
- Confusion about how to recycle:
  - what about contaminating bins
  - lids
  - rinsing.
- Need for education about how to recycle (specifics).
- ‘awareness if everything’.
- need to increase education in schools (kids are already good at recycling).

What we currently recycle

- Glass.
- Paper.
- Food stuffs.
- Plastic.
- Tins.
- Gardening.
- Plastic bags.
- Mobile phones.

How many bins?

- 4 bins (grass, plastics, paper and general).
- 3 bins (Plastic/tin/paper, gardening).
- 2 bins (general recycling/general rubbish).

Collection

- Some people still go to the tip.
- Every 2 weeks.

Hard rubbish

- Couple of times a year/quarterly.
- Some can book in a pickup.
- Some councils make it hard because you need to put certain stickers on everything.
- Hard rubbish does not get recycled.

Work

- Paper.
- Less recycling in the workplace.
- Many different bins at work.

Public

- Recycling bins in public places for beverage containers.

Packaging waste and beverage containers

What do we recycle?

- Boxes.

What makes it easy?

- Kmart makes you buy bags.
- Biodegradable bags in supermarkets.

Impediments?

- Having to wash out bottles.
- Travelling to the tip (not in many suburbs).

Improvement ideas

- Requirement to pay for packaging.
- Ability to take packaging back to retailer.
- Building in cost to depose packaging into price of goods.
- Incentive to take back packaging.
- Change materials for packaging.
- Reduce packaging.
- Put the onus on manufacturers.
- Should be user pays.
- Replace foam with other material.

Benefits of recycling

- Healthier life.
- Better planet.
- Reduces landfill.
- Stop destroying trees.

Paying for recycling

Who pays?

- The public (in rates) (about 25% of bill).
- Maybe about $80 per quarter.

Different recycling schemes

Container deposit schemes:

- Should be reintroduced.

Increasing recycling in Australia

Willingness to pay

- No one complained with the environment levy came in.
- Most people are not complaining about paying more for recycling.
- Depends on how much extra.

Information needs

- Basis (ie user pays).
- Long-term benefits.
- Guarantees that it's being done.
- Percentage of income.

Ballarat Focus Group I (Younger group)

General recycling

General thoughts of the group

- Recycling is an important issue for society.
- We can't follow down the path (level of recycling) we have been on.
- Need more education.
- More use of resources and less reuse in today's world.
- Businesses need to do more.
- Councils need to do more in public areas.

What we currently recycle

- Paper – including newspapers, printer paper, magazines and Christmas cards.
- Bottles.
- Compost.
- Green bags.
- Water.
- Mobile phones.
- Possibly recycle - batteries and globes.

How many bins?

- General waste/
- Mixed recycled bin/
- Can purchase green bin/

Collection

- Once a fortnight.
- Many believe that weekly collection is required due to bins being too full after a fortnight.
  - many put recyclables into general waste when recycling is full
  - bins are not big enough.

Hard rubbish

- No pickup service in local councils.
- Can no longer take to Salvos depot.
- Need hard rubbish collection to prevent build up of unused items on properties.
- Council skips have been put out in poorer areas.

Tips

- Charge high amounts:
  - Mattresses $28.

Work

- Ink cartridges.
- Paper.
- Water.

Packaging waste and beverage containers

What do we recycle?

- Toy packaging.
- Food packaging.
- Boxes.

What makes it easy?

- Council leaflet drop.
- Buying in bulk – less overall packaging.
- Litter free lunches at schools.
- Recycling bin next to waste bin in kitchen.

Impediments?

- Confusion about what materials can be recycled (foam, polystyrene).
- Confusion about composite material products.
- Confusion about requirements to recycle (need to wash or remove lids).
- Changes in council requirements.
- Differences between councils in different areas.

Improvement ideas

- Information stickers on bins.
- Less packaging use.
- More advertising.
- Chart for kitchen.
- Reusable containers (eg Tupperware).

Benefits of recycling

- Reduces carbon footprint.

Paying for recycling

Who pays?

- Consumers pay – council fees.
- Belief that Melbourne gets more for their money than Ballarat.

Different recycling schemes

Container deposit schemes

- Great for kids pocket money.
- Great for charity organisations.
- Reduces litter.

Increasing recycling in Australia

Willingness to pay

- Some willing to pay more.

Information needs

- Cost and benefits received.
- Want to know where the recycling goes and the outcomes of that recycling.

Ballarat Focus Group II (Older group)

General recycling

General Thoughts

- We have to recycle.
- It's important to recycle.
- Too much packaging / all packaging should be recyclable.
- Would help to understand what happens to recycling bin contents.
- Trust and faith issue came up multiple times:
  - People did not trust that recycling wasn't being put in landfill
  - Contaminated load may get put in landfill.

What we currently recycle

- Paper – newspapers, junk mail, printing paper, magazines.
- Glass – bottles.
- Aluminium.

How many bins?

- 2 bins (sometimes bins are divided into two parts).
- Compost and worm farms.

Collection

- Fortnightly – everyone agreed that weekly collection was required.
- Can purchase additional bins.

Hard rubbish

- Need collection:
  - don't have a car
  - cannot get rid of large items any other way.
- Expensive to take to tip:
  - mattresses $20
  - bed base $20
  - $50 to hire skip.

Work

- Ink cartages.

Packaging waste and beverage containers

What do we recycle?

- Plastic bottles, glass, cartons, toy packaging, plastic bags.

What makes it easy?

- Regular kerbside collection.

Impediments?

- Confusion about what can be recycled (mixed materials, foam etc).
- Different rules between councils.

Improvement ideas

- Too much packaging – but need some packaging for protection of items.
- need to reduce packaging in the first place.
- Increase level of advertising.
- Have more products that advertise that they are made from recycled material.

Benefits of recycling

- Save environment.
- Prevent destroying the environment.
- Prevent toxic material leaching into soil (oven cleaners, batteries etc):
  - Chemists should take in old medications (1 day a month).

Paying for recycling

Consumers

- Rates.
- Cost of goods.

Different recycling schemes

CDS

- Good for kids pocket money.
- Education for kids.
- Bottle drives for charity.
- Large transport costs make it not worthwhile.
- Would prevent some bottles left in the street.

Increasing recycling in Australia

- Half willing to pay more.
- Half believe they already pay enough.
- Would like to see the outcome of recycling.
- Produces should pay (Don't seem to understand that the costs will be past onto the consumers).
- Should do something because we are running out of landfill.
- It's cheaper to use landfill, that's why companies (many without a conscience) tend not to recycle.

Adelaide Focus Group I (Younger group)

General recycling

General Thoughts

- Confusion about:
  - taking lids off
  - washing containers
  - certain materials like foam
  - how much of what is putting in recycling actually recycled.
- Would like to recycle:
  - TVs
  - computers
  - fridges.
- Need education about why it is important to recycle.
- Recycling needs to be easy to do for the general public.

What we currently recycle

- Cardboard.
- Bottles.
- Cans.
- Shopping bags.
- Mobile phones.

How many bins?

- 3 bins (recycling, green and general rubbish).
- General waste bin is half the size.

Collection

- Fortnightly (agreement that this in not enough):
  - Have to squash down or put in general rubbish.

Hard rubbish

- Some get ‘dumping’ vouchers (depending on council):
  - Voucher to take traveller full of hard rubbish to tip for free and get trailer of mulch.
- Some get hard rubbish collection (depending on council).

Work

- Some workplaces have organic, paper, recycling and waste (with no rubbish bin at desk).
- No don't have much recycling.

Public Places

- Some have noticed a change lately.

Packaging waste and beverage containers

What makes it easy?

- It's the norm.

Impediments?

- Needs to be easy.

Improvement ideas

- Need to be able to recycle things like foam.
- Build in the price – like the CDS.
- All packaging should be recyclable.
- Replace certain packaging with recyclable packing.
- Put it back on the producers and retailers.
- TV advertising to show people what they can recycle.
- Stickers to put on bins.

Benefits of recycling

- Running out of resources.
- Better for environment 'Saves the animals and the ocean'.
- CDS teaches children.
- Cleaner streets.

Paying for recycling

Who pays?

- Rate payers.
- Most believe that a user pays system would be better.

Different recycling schemes

Container deposit schemes

- Children get really excited.
- Teaches children.
- Easy enough (but sometimes long line).
- Privately run.

Increasing recycling in Australia

- Don't want any more bins.

Willingness to pay

- Generally not willing to pay more.
- Some willing to pay more if they knew what was being done 'If I knew they were going to do a better job, then I'd happy to pay'.

Information needs

- Exactly what can be recycled.
- How much are we already paying in rates.
- How much it will cost.
- How will costs change from year to year.
- What is being done.
- How efficient recycling is.
- 'Is our money worth it?'
- 'Are we [currently] doing things wrong'.

Adelaide Focus Group II (Older group)

General recycling

General Thoughts

- ‘I don’t think we do enough’.
- Some people don’t know where to take things.
- People don’t know where to take chemical etc.
- Confusion about what can be recycled.
- Confusion about how to recycle (eg cleaning of bottles).

What we currently recycle

- Mulch and lawn clippings.
- Clothing.
- Paper.
- Cans.
- General recycling.
- Garden waste.
- Bottles.
- Water (in rainwater tanks).
- Reuse postage waste.

How many bins?

- Depends on area (usually 2 or 3).

Hard rubbish

- Once or twice a year.

Packaging waste and beverage containers

- Need packaging for protection.
- Would like to be able to recycle all packaging.

What do we recycle?

- Cardboard.

What makes it easy?

- Convenience of kerbside recycling.

Impediments?

- Can't recycle foam etc.
- Not convenient to recycle (in terms of taking things to recycling plants).

Improvement ideas

- User pays.

Benefits of recycling

- Better for the environment.

Paying for recycling

Who pays?

- The community in council rates.
- Some agree the user should pay.

Different recycling schemes

Container deposit schemes

- 'We always take ours'.
- People go through bins to find cans.
- Everyone recycles can and bottles in SA with deposit.

Increasing recycling in Australia

Willingness to pay

- User pays.

Information needs

- Transparency in process.
- Transparency of efficiency.

Appendix I Telephone interview responses following pilot

First Name	Location	General feedback?	Was any of the information provided confusing?	Was any of the information provided surprising?	Was the information presented believable/credible?	Were any of the questions confusing, or difficult to understand?	Were there any questions you couldn't answer as you wanted?	Postcode
John	Melbourne	It was very straight forward, the choice options got a bit boring and monotonous	Nothing	No	Yes	All made sense	There were some places where I didn't like any of the options presented and wanted to say 'none of these'	3805
Leanne	Melbourne	No	No	Not really – I keep up reasonably well with what happens	Yes	No	No	3205
Catherine	Melbourne	Quite easy to understand and do	Not at all	No	Yes	No	No	3038
Rex	Brisbane	All good- no problems	No -generally good	No	Yes	No	No	4032
Jeff	Brisbane	Clear, informative	Clear	No	Yes	No	No	4122
Dell	Brisbane	Good	OK	We must do more-it's not hard to change	yes	No	No	4104

Telephone interview responses following pilot

First Name	Location	General feedback?	Was any of the information provided confusing?	Was any of the information provided surprising?	Was the information presented believable/credible?	Were any of the questions confusing, or difficult to understand?	Were there any questions you couldn't answer as you wanted?	Postcode
June	Brisbane	Mostly clear -have to read more than other surveys	No but had to take time	Yes- we should recycle more	yes	No	No	4075
Anthony	Regional NSW	Excellent questionnaire, easy to do	Not at all	No	Completely	No	No	2257
Bruce	Regional NSW	Had no problems, very straightforward	Not at all, very clear	No, Already claims an understanding of recycling	Yes, believes the % and his understanding of the statements was ok	No	Unlike other surveys this was not the case in this instance. Forcing me into a choice was fine	2460
Cindy	Regional NSW	Pretty easy to complete	Clear and easy to understand	She thought people did more recycling than what was stated, was surprised by the stat but believed it	Yes	No	No, all good	2528

Telephone interview responses following pilot

First Name	Location	General feedback?	Was any of the information provided confusing?	Was any of the information provided surprising?	Was the information presented believable/credible?	Were any of the questions confusing, or difficult to understand?	Were there any questions you couldn't answer as you wanted?	Postcode
Bianca	Regional NSW	Pretty straightforward, made me think about recycling more	No, easy to understand	The % of what is recycled was lower than thought	Yes	No	Not at all	2340
Adele	Regional NSW	Quite clear and an easy questionnaire to do	no	Some of the new concepts were pleasantly surprising	Yes	no	no	2481
Heather	Regional Queensland	No, it won't that confusing for me. I followed it fine.	No	No	Yep, pretty much	No	No	4575
Debbie	Regional Queensland	No, it was pretty clear	Not at all, it was pretty basic	Yes, 55% recycling seemed quite high. I didn't realise it was that high - I thought we only recycled about 1%!	I suppose so - you wouldn't lie would you?	Not at all	No	4218

Telephone interview responses following pilot

First Name	Location	General feedback?	Was any of the information provided confusing?	Was any of the information provided surprising?	Was the information presented believable/credible?	Were any of the questions confusing, or difficult to understand?	Were there any questions you couldn't answer as you wanted?	Postcode
Steve	Regional SA	All ok -went smoothly	No - generally good	Suggestions of increased recycling as currently poor in local shire	Yes	No	No	5540
Peter	Regional SA	Easy to understand	Nil	No	Yes	No	No - unlike some surveys where you get rail-roaded	5523
Barry	Regional SA	Generally a very good survey. Had to follow the instructions carefully	No - generally good	Discussion of increased recycling interesting as current council has few initiatives	Yes	No	No	5264
Peter	Regional SA	Generally ok -but a little unsure	Options (for conjoint) I wasn't sure as I gave third option but then the next questions didn't refer to my response	Interesting	Yes -very interesting	as before	No	5575

Telephone interview responses following pilot

First Name	Location	General feedback?	Was any of the information provided confusing?	Was any of the information provided surprising?	Was the information presented believable/credible?	Were any of the questions confusing, or difficult to understand?	Were there any questions you couldn't answer as you wanted?	Postcode
Chantarle	Regional SA	Interesting survey	No	More interesting that there could be a movement towards greater recycling efforts	yes	No	No	5606
Beverly	Regional SA	OK - although wasn't aware of recycling centres	No - generally good	Interesting	Yes	No	No	5417
Rhonda	Regional WA	It was quite easy to do, and I enjoyed doing it. [The conjoint] seemed you were being asked to choose between the same things for the same amount - didn't make much sense to me but easy to do.	No, other than those weird combinations	Yes, it was interesting. The percentage recycled was news to me - we don't have recycling bins here.	Yes	No	No	6312
Kevin	Regional WA	Not really, no.	No, pretty well put together	No, don't think so. It was general knowledge stuff.	Yes	All understandable	No	6410

Telephone interview responses following pilot

First Name	Location	General feedback?	Was any of the information provided confusing?	Was any of the information provided surprising?	Was the information presented believable/credible?	Were any of the questions confusing, or difficult to understand?	Were there any questions you couldn't answer as you wanted?	Postcode
Kerry	Regional WA	Not really, understood it well, not confusing at all	No	It was interesting to know the statistics on recycling, helped me answer the later questions	The expensive scenarios were a bit unrealistic - too expensive for most	None at all	Not really, probably would like more options cost-wise	6236
Angie	Regional WA	nothing a problem, nothing difficult, talked about paying extra for recycling - there was no question asking how I would prefer to cover that cost	no, quite good - one of the first I've actually read! Often don't bother reading lots of text but this taught me something	not really, wouldn't have thought they recycled as much as they did - a lot of towns have no recycling	all sounded believable - no over the top statements	a little difficult with the ones with the 3 choices - a little unsure what they meant, what does a 20% reduction look like? Difficult to imagine what these options would look like in real life	no	6230

Appendix J Key survey design issues

Key design issues

Prior to designing the specific components of the survey several key issues were identified:

- Determining whether a local or national frame was required. Current recycling practices in each State/Territory and region/city differ (particularly SA), as do the levels of recycling currently being achieved. This presented the design challenge of how this was to be communicated to respondents and determining whether the base case option presented to respondents be tailored to match their State/location.

  Following the focus groups it was determined that as the proposal on the table for investigation is a national waste recycling initiative, with national targets for recovery, it would be appropriate to ask people about their preferences for national outcomes. All respondents were therefore presented with an identical base case that reflects the national average of current recycling practices and outcomes.

- Whether it was possible to 'ring-fence' non-market values from market values. In evaluating a national policy the choice modelling results will be called upon to provide the non-market values, while market values can be determined using other methods. The concern arises as to whether the values estimated using the choice modelling questionnaire are pure 'non-market' values or whether there is a mix of market and non-market values. Care must be taken not to double count these values in the benefit cost analysis.

  It is not possible to be definitive about where people anchor their choices and values. This survey was designed to steer respondents' attention to the non-market elements of value through the careful provision of background information and clearly defining the attributes. For example, we wanted to avoid people considering the market value of land occupied by landfill. Thus, any reference to landfill was phrased as 'environmental improvements due to less waste going to landfill' as opposed to 'space saved by less waste going to landfill'.

  A set of diagnostic questions was also provided to respondents prior to the choice experiments that seek to identify respondent views and attitudes about waste recycling – ie whether they think it is important and why. The answers to these questions assisted in interpreting what proportion of respondents included market values in their responses to the choice experiment.

- Whether attributes and values held by the community could be linked back to policy outcomes. The strength of choice modelling is that it can be used to tease out separate values held by people for individual aspects (or attributes) of a policy proposition. In the context of waste recycling, the core aspects that appeared to be important to people in the focus groups, and that can be linked back to the outcomes of any one of a number of policy options are:
  - How much will it cost the respondent?
  - How much waste will be recovered?
  - What level of impact will it make on litter?
  - How easy will it be for the respondent (ie collection method)?

  Using this approach, people were not asked directly to state their preferences for a particular policy mechanism. While these options could be mentioned in the background information, they are not referred to in the choice experiment. Instead, post survey, possible outcomes of each policy alternative are constructed (described in terms of the attributes above), and the values obtained from the questionnaire are then applied to determine the estimated values of the policy.

- Whether an appropriate payment vehicle could be selected. In the questionnaire an annual and fortnightly payment frequency were presented and the payment was define at the household level (because that is how council rates are charged).

  Due to the range of policy options under consideration a number of possible payment mechanisms were identified that could have been pursued in the questionnaire. Options include:

  – an increase in council rates
  – an increase in product prices (net of any deposit refund under a CDS)
  – an increase in general taxes
  – price premiums for products with recycled materials in them
  – fines for people not complying with recycling requirements.

  Other, related issues include frequency of payment, whether the payment is a household cost or individual cost and whether information needs to be provided to the respondent about how other households/individuals may be charged (for example, would it be means tested or a variable cost depending on amount of waste packaging generated by the consumer).

  The main pre-requisite for selecting a payment mechanism is that it is a plausible and realistic for respondents. If possible, it should align to the actual mechanism that may be introduced if a national waste management scheme was introduced. Most people in the focus groups indicated that they were aware that they are currently paying for recycling collection services through council rates. Most also understood the principle of charging for recycling through increased product prices. The concept of fining people for 'doing the wrong thing' was also suggested in some groups, but people recognized the difficulties of policing this and the public back-lash to a system of fines.

  As discussed above, the purpose of a choice experiment is not to ask people directly to state their preference for a particular payment method. The aim is for the analyst to adopt a payment method that is realistic for respondents, incorporate it into the choice experiment as an attribute, and then observe how respondents' trade-off increases in monetary cost against changes in other non-monetary attributes.

  It is quite possible that if a national waste packaging initiative is adopted, there will be a combination of payment mechanisms, comprising council rates and increased product prices. This being the case, it would make sense for the questionnaire to adopt a generic approach and simply state to respondents that they would be required to pay an additional $X per year, for example – through either increases in rates, increases in product prices or both. This approach would not undermine the capacity to use the survey results for evaluating a specific policy option – eg ADF or CDS because both these policies require a measure of the amount people are willing to pay (in aggregate) to achieve an increase in waste recovery – and values for other outcomes of these policy options (such as collection method, litter reduction, breadth of materials collected).

Key issues determining need for simplified attribute selection

1 Difficultly in incorporating a deposit-refund mechanism in the choice model.

A number of difficulties were identified of incorporating a refund in the choice experiment. For the purpose of calculating willingness to pay, it is important that there is no ambiguity about the monetary cost that households are being asked to pay – either from the respondent's perspective or the analyst's perspective. Complete control over this variable is necessary for the analysis. This condition is difficult, if not impossible, to satisfy with a deposit/refund.

If the 'cost to household' attribute was specified as being net of any refund, this would mean that those respondents who choose not to redeem their deposit would be paying more than those that return their containers – thus preventing us from calculating individual willingness to pay. The monetary impost is unknown.

The possibility of overcoming this problem by incorporating a deposit/refund as one of the choices in the collection method attribute and specifying a particular value (cents/item) for the deposit was also considered. This information would be required, as respondents would want to know how much deposit they are being asked to pay. However, this does not overcome the problem of calculating WTP because the container consumption levels of each respondent will be different.

Even if the above problem could be overcome, through for example making some assumptions about the likely annual consumption rates of each respondent, a person's choice of a deposit-refund option may not necessarily imply that they would opt to redeem the deposit. It may be that they would support such as scheme for the community but not personally return their containers.

2 Difficulty in developing a plausible scenario to measure 'inconvenience'.

In the absence of a refund mechanism, it is difficult to develop a scenario that would motivate respondents to drop off their containers to a collection centre – short of a mandatory requirement (which is clearly not on the policy agenda). Another alternative was considered, which was to reduce the frequency of the current kerbside recycling service as a means of motivating people to utilise drop-off centres. By observing people's take-up (or otherwise) of this option, we could estimate willingness to pay to avoid incurring an inconvenience cost.

Yet this approach was considered problematic because (i) a reduction in kerbside service is not consistent with policy intentions and (ii) a pre-test of this approach with a small sample of respondents found that people strongly objected to reducing kerbside frequency, and (iii) respondents questioned whether the option of offering drop-off centres in place of reduced kerbside frequency would be sufficient to deliver an aggregate increase in container recycling.

3 Perceived inter-dependency between the attributes and other communication problems

The small pre-test found that people were having difficulty interpreting the meaning of some of the attributes and perceived a degree of interdependency between the attributes.

For example, people had difficulty relating to the 'type of waste targeted' attribute because they weren't sure what types of packaging waste are currently 'accepted'.

There was some confusion about how the different 'away from home' collection options (ie workplace, public place) would achieve the stated increase in recycling rate.

On the basis of the above difficulties, the decision was taken to simplify the choice model to just three attributes, thus removing the ‘type of waste targeted’ attribute and the ‘at home’ and ‘away from home’ collection methods. The implication of this decision is that the choice experiment no longer incorporates a measure of inconvenience, so it is not possible to calculate respondent’s inconvenience cost associated with the CDS. This deficiency has been addressed by following up the choice sets with two questions that specifically relate to the CDS.

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