

## Attitudinal, normative, and control beliefs underlying people's curbside household waste recycling decisions

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### Abstract

This study examined the beliefs underlying people's decision-making, from a theory of planned behaviour (TPB) framework, in the prediction of curbside household waste recycling. Community members in Brisbane, Australia ( $N = 148$ ) completed a questionnaire assessing the belief based TPB measures of attitudinal beliefs (costs and benefits), normative beliefs (important referents), and control beliefs (barriers) in relation to engaging in curbside household waste recycling for a 2-week period. Two weeks later, participants completed self report measures of recycling behaviour for the previous fortnight. The results revealed that the attitudinal, normative, and control beliefs for people who performed higher and lower levels of recycling differed significantly. A regression analysis identified both normative and control beliefs as the main determinants of recycling behaviour. For normative beliefs, high level recyclers perceived more approval from referents such as partners, friends, and neighbours to recycle all eligible materials. In addition, the strong results for control beliefs indicated that barriers such as forgetfulness, lack of time, and laziness were rated as more likely to hamper optimal recycling performance for low level recyclers. These findings provide important applied information about beliefs to target in the development of future community recycling campaigns.

**Keywords:** *theory of planned behaviour; beliefs; recycling; attitudes; barriers.*

Despite high household recycling rates in Australia (only 1% of households had not recycled or reused household materials in the past year; Australian Bureau of Statistics (ABS), 2007), there is still a substantial proportion of households not recycling or reusing all eligible recyclable materials including aluminium (19%), steel cans (30%), glass (10%), plastic bottles (10%) and paper/cardboard/newspapers (9%) (ABS, 2006). Many studies have been conducted to identify the factors that are associated with individuals' decisions to engage in recycling behaviour in international contexts (for a review, see Schultz, Oskamp, & Manieri, 1995), but less is known about

why, despite high recycling rates, Australians do not recycle all that they can. Commonly examined factors in the international literature that relate to regular recycling include personal factors such as demographics and personality (e.g., Gamba & Oskamp, 1994; Simmons & Widmar, 1990) and situational factors including norms that reflect if performing recycling is common among certain groups/neighbourhoods (e.g., Hopper & Nielson, 1991; Vining & Ebreo, 1992). In addition to these predictors, positive (e.g., environmental reasons; Vining & Ebreo, 1990) and negative (e.g., mess, lack of storage space; Werner & Makela, 1998) beliefs and attitudes towards engaging in recycling have been found to significantly influence recycling (e.g., Oskamp, Harrington, Edwards, Sherwood, Okuda, & Swanson, 1991). One theory that has been useful in predicting recycling intentions and behaviour from people's attitudes and includes situational factors via a consideration of norms and control perceptions is the Theory of Planned Behaviour (TPB; Ajzen, 1991).

### Theory of Planned Behaviour

The TPB proposes intention as the strongest predictor of behaviour. Intention, in turn, is predicted by attitude, subjective norm, and perceived behavioural control (PBC) (Ajzen, 1991). Attitudes are the positive or negative evaluations of a particular behaviour. Subjective norms refer to the perceived pressure from important others to perform or not perform behaviour. Perceived behavioural control refers to the perceived ease or difficulty of performing behaviour, with PBC expected to directly impact behaviour.

An important feature of the TPB is that attitude, subjective norm, and PBC are determined by underlying beliefs (Ajzen, 1991). Attitudes are created by a person's beliefs about the costs and benefits of behavioural performance (attitudinal beliefs). Subjective norms relate to a person's beliefs about whether important others would support (or not support) their behaviour (normative beliefs). Perceived behavioural control is based on a person's beliefs about

the specific barriers that may occur to stop them performing behaviour (control beliefs) (Ajzen, 1991).

Assessing the belief-based determinants of attitude, subjective norms, and PBC allows researchers to establish the beliefs that differentiate those who perform a given behaviour from those who do not. These beliefs can increase our understanding of a range of behaviours including other environmental behaviours (e.g., Fielding, Terry, Masser, Bordia, & Hogg, 2005; Harland, Staats, & Wilke, 1999; Taylor & Todd, 1995). There are examples also for examining TPB beliefs for recycling (e.g., Boldero, 1995; Cheung, Chan, & Wong, 1999; Taylor & Todd, 1995), although Boldero's (1995) study is the only one to have undertaken an in-depth comparison of the beliefs to differentiate between recyclers and non-recyclers.

In one of the few Australian studies, Boldero (1995) examined beliefs about recycling newspapers among householders in an Australian community sample and found that the perceived approval of important referents (e.g., friends, neighbours) differentiated between paper recyclers and non-recyclers. Attitudinal beliefs about the benefits of newspaper recycling (e.g., protect the environment) did not distinguish non-recyclers from recyclers, however, the cost belief of inconvenience did. There was some evidence that control (situational) factors, such as restrictions on storage space, differentiated between the two groups. Thus, Boldero's belief-based analysis provided insight into the underlying cognitive processes that influence people's recycling behaviour but was limited to the examination of a single recycling product (i.e., newspapers) only.

### The Present Study

The aim of the present study, then, was to use the belief basis of the TPB to identify the underlying beliefs that influence recycling behaviours, particularly those beliefs that are most effective in promoting household recycling of all eligible materials. The research questions relating the underlying individual beliefs to decisions to recycle all eligible materials were: (1) which costs and benefits differentiated between people engaged in high and low levels of recycling?; (2) whose approval for recycling, among important identified referents, distinguished between high and low level recyclers?; and (3) which barriers to recycling distinguished between high and low level recyclers? The final research question explored which of these belief sets (attitudinal, normative, control) were most related to people's recycling behaviour.

The current study measured self-reported curbside household waste recycling in a community sample in Brisbane, Australia. Curbside recycling is provided to all households in Brisbane by the Brisbane City Council (the largest local council in Australia). This ease of access to services suggests that the less than perfect recycling rates is most likely due to psychological and lifestyle factors, highlighting the importance of research examining householders' underlying beliefs. The underlying beliefs assessed were: (1) attitudinal beliefs

relating to the costs and benefits of recycling, (2) normative beliefs about the approval of important others for pro-recycling decisions, and (3) control beliefs reflecting the barriers that impede recycling behaviour. Identifying beliefs that differentiate between high and low level recyclers will help to inform campaigns promoting recycling of all eligible materials.

## Method

### Elicitation Study

In accordance with Ajzen and Fishbein's (1980) recommendations, an elicitation study was conducted to identify the important attitudinal, normative, and control beliefs for curbside household recycling. Approximately 15 university students (from an advanced level undergraduate psychology subject and higher degree research students) recruited members of the general public, as part of a convenience sample of friends, work colleagues, and family members, who all had access to curbside household recycling bins provided by the local council. Participants were 20 householders (10 males, 10 females) with an average age of 34.30 years ( $SD = 15.04$  years; range = 19 to 66 years). In locations convenient for them (e.g., homes, cafes), participants completed a hard copy version of an open-ended questionnaire asking them to nominate the costs and benefits of household recycling, the individuals/groups of people who would approve or disapprove of household recycling, and the factors that would prevent or motivate household recycling. Completed questionnaires were returned in sealed envelopes and there was no incentive provided for participation. The six most commonly reported costs and benefits served as the attitudinal beliefs in the main study; the five most commonly stated referents approving or disapproving of recycling formed the normative belief items; and the seven most frequently listed factors preventing recycling behaviour comprised the control belief items in the main questionnaire.

### Main Study

**Participants** Participants were 148 members of the general public in Brisbane, Australia, who had access to the local council's curbside household recycling bins. Participants were recruited by approximately 15 university students (from an advanced level undergraduate social psychology subject and higher degree research students) and were part of a convenience sample of friends, colleagues, and family members. The sample comprised 65 (43.9%) males and 83 (56.1%) females. The mean age of participants was 36.33 years ( $SD = 15.27$ ; range = 17 to 78 years). Most participants were married/de facto (48%) or single (42%) with the remaining participants either divorced or widowed (10%). Based on the Australian and New Zealand Standard Classification of Occupations (ANZSCO, 2006), participants were classified in the following occupation groupings: professionals (22.6%),

clerical and administrative workers (22.6%), students (21.9%) managers (8.9%), sales workers (5.5%), community and personal service workers (5.5%), technicians and trade workers (4.8%), home duties (4.1%), pensioner/retired (2.7%), labourers (0.7%) and unemployed (0.7%).

**Design and Procedure** The study used a prospective design with two waves of data collection. In locations convenient for them (e.g., homes, cafes) and for no incentive, participants completed a hard copy version of a Time 1 questionnaire assessing the TPB attitudinal, normative, and control beliefs. Completed questionnaires were returned in sealed envelopes and there was no incentive provided for participation. Two weeks later, participants self-reported their recycling behaviour during the previous fortnight. Time 1 and Time 2 data were matched by a participant-generated code.

**Measures** Based on local council guidelines (Brisbane City Council, 2005), household recycling was operationalised in the present study as *putting out for recycling all paper/cardboard, glass, aluminium/steel products, cartons and plastic products that can be recycled*. The belief and behaviour measures were assessed at the same level of specificity in terms of context, action and time (Ajzen & Fishbein, 1970). Attitudinal, normative and control beliefs items in the Time 1 questionnaire were constructed in line with recommendations (Ajzen & Fishbein, 1980). Belief items were measured on 7-point Likert scales ranging from 1 *extremely unlikely* to 7 *extremely likely*. To assess attitudinal beliefs, respondents indicated the likelihood that six outcomes, both benefits (e.g., reducing waste) and costs (e.g., being inconvenienced) would be consequences of performing household recycling. For normative beliefs respondents reported the likelihood that five referents (e.g., spouse or partner, family) would think that they should recycle. For control beliefs, respondents indicated the likelihood that seven barriers (e.g., forgetfulness, lack of time) would prevent them from engaging in household recycling. Table 1 provides a full listing of beliefs.

Two weeks later, participants completed self-report measures assessing the extent to which they had engaged in household recycling during the previous 2-week period. To measure behaviour, respondents answered one item indicating how much of their household garbage that can be recycled was put out for recycling during the past 2 weeks; *none at all* [1], *hardly anything* [2], *about 25% of the recyclable material* [3], *about half of the recyclable material* [4], *about 75% of the recyclable material* [5], *almost everything* [6], *everything* [7].

## Results

### Overview of Data Analysis

Most participants reported recycling about 75% of recyclable material in the previous fortnight ( $M = 5.17$ ,  $SD = 1.56$ ). A median split ( $Mdn = 6.00$ ) on the behaviour scale scores was used to create a group of high recyclers (recycling more than 75% of recyclable material) and low recyclers (recycling about or less than 75% of recyclable material).

The attitudinal, normative, and control beliefs differentiating between householders engaging in high and lower levels of recycling were examined (Table 1). To answer the research questions relating to individual beliefs, three one-way multivariate analyses of variance (MANOVAS) were conducted with household recycling behaviour as the independent variable and belief measures as the dependent variables. To control for Type 1 error, Bonferroni adjustments of significance levels were utilised in the MANOVAs. For the normative belief items, participants had the option to tick “not applicable” to the list of salient referents (e.g., they may not have had a partner); therefore, the sample size was lower for the normative beliefs scale than for behavioural or control beliefs.

To address the final research question about which of the belief sets (attitudinal, normative, control) are most related to people’s recycling behaviour, a multiple regression analysis was conducted to assess the relative contribution of each set of attitudinal, normative, and control beliefs in predicting household recycling. Scales were created for each belief set such that high scores reflected an endorsement of the likelihood that the belief would occur (Cronbach’s alphas = .70, .84, and .81, for the attitudinal, normative, and control belief scales, respectively). The multiple regression analysis was repeated to assess any impact of the major demographic factors. For this analysis, the demographic factors of sex and age were entered on the first step, with the belief scales entered on a second step; these analyses produced the same pattern of results for the belief scales as for the analysis without demographic factors included and neither demographic factor significantly predicted behaviour at the final step of the analysis.

### High Versus Low Recyclers

To answer the first research question about the common costs and benefits differentiating between high and lower level recycling groups, a one-way MANOVA was performed. According to Wilks’ criterion, a significant multivariate effect was identified between the recycling groups for attitudinal beliefs,  $F(6, 136) = 2.17$ ,  $p < .05$ ,  $\eta^2 = .09$ . Univariate analyses revealed that high recyclers were more likely to perceive reducing waste as a beneficial outcome (High  $M = 5.91$ ,  $SD = 1.33$ ; Low  $M = 5.24$ ,  $SD = 1.58$ ) and were less likely

than low recyclers to perceive being inconvenienced, as a cost of recycling (High  $M = 2.85$ ,  $SD = 1.83$ ; Low  $M = 3.70$ ,  $SD = 1.81$ ).

A one-way MANOVA was performed in relation to the second research question which addresses the issue of whose approval, among important identified referents for recycling decisions, distinguishes between high and lower level recycling groups. A significant multivariate effect was also found between the recycling groups for normative beliefs,  $F(5, 109) = 2.35$ ,  $p < .05$ ,  $\eta^2 = .10$ . Univariate analyses indicated that high recyclers were more likely than low recyclers to report spouse/partner (High  $M = 5.94$ ,  $SD = 1.51$ ; Low  $M = 4.87$ ,  $SD = 1.95$ ), friends and peers (High  $M = 5.54$ ,  $SD = 1.23$ ; Low  $M = 4.83$ ,  $SD = 1.59$ ), and neighbours (High  $M = 5.13$ ,  $SD = 1.35$ ; Low  $M = 4.45$ ,  $SD = 1.53$ ) would approve of them recycling.

To answer the third research question about the major perceived barriers that differentiate between high and lower level recycling groups, a one-way MANOVA was performed. A significant multivariate effect was identified between the recycling groups for control beliefs,  $F(7, 138) = 7.99$ ,  $p < .001$ ,  $\eta^2 = .29$ . Univariate analyses revealed that low recyclers were more likely than high recyclers to perceive factors such as forgetfulness (High  $M = 2.72$ ,  $SD = 1.70$ ; Low  $M = 4.62$ ,  $SD = 1.92$ ), lack of time (High  $M = 2.65$ ,  $SD = 1.72$ ; Low  $M = 4.21$ ,  $SD = 1.87$ ), accessibility of bin (High  $M = 2.24$ ,  $SD = 1.64$ ; Low  $M = 3.65$ ,  $SD = 2.13$ ), laziness (High  $M = 2.63$ ,  $SD = 1.58$ ; Low  $M = 4.49$ ,  $SD = 1.89$ ), and poor weather (High  $M = 1.93$ ,  $SD = 1.18$ ; Low  $M = 3.08$ ,  $SD = 1.81$ ) as preventing recycling.

Table 1  
*Mean Differences in Beliefs of High Recyclers and Low Recyclers*

	Low Recycler M (SD) <i>n</i> = 63	High Recycler M (SD) <i>n</i> = 80
<b>Attitudinal Belief</b>		
Reducing waste	5.24 (1.58)	5.91 (1.33)***
Being inconvenienced	3.70 (1.81)	2.85 (1.83)***
Conserving natural resources	5.57 (1.33)	5.91 (1.00)
Placing demands on your time	3.70 (1.91)	3.09 (1.91)
Dealing with mess	4.13 (1.77)	3.88 (1.98)
Looking after the environment	5.86 (1.35)	6.21 (1.09)
*** $p < .007$		
<b>Normative Belief</b>	<i>n</i> = 47	<i>n</i> = 68
Spouse or partner	4.87 (1.95)	5.94 (1.51)***
Family	5.47 (1.27)	6.03 (1.16)
Friends and peers	4.83 (1.59)	5.54 (1.23)***
Neighbors	4.45 (1.53)	5.13 (1.35)***
Environmental groups/government	6.28 (1.16)	6.46 (1.00)
*** $p < .008$		
<b>Control Belief</b>	<i>n</i> = 63	<i>n</i> = 80
Forgetfulness	4.62 (1.92)	2.72 (1.70)***
Lack of time	4.21 (1.87)	2.65 (1.72)***
Accessibility of bin	3.65 (2.13)	2.24 (1.64)***
Laziness	4.49 (1.89)	2.63 (1.58)***
No room in bin	3.75 (2.04)	3.25 (2.05)
Poor weather	3.08 (1.81)	1.93 (1.18)***
Lack of knowledge about what is recyclable	3.25 (1.68)	2.51 (1.78)
*** $p < .01$		

### Predicting Recycling Behavior from Beliefs

The final research question addressed the issue of which of the belief sets (attitudinal, normative, control)

are most related to people's recycling behaviour. To assess which beliefs are most influential in determining recycling behaviour, a multiple regression analysis was conducted to assess the relative importance of the

attitudinal, normative, and control belief sets for predicting recycling behaviour. Means, standard deviations, and bivariate correlations for the independent variables and dependent variable are presented in Table 2. All of the belief scales were significantly correlated with behaviour. The scales for attitudinal beliefs, normative beliefs, and control beliefs were the predictors with behaviour as the dependent

measure. Together, the belief-based measures explained a significant percentage of variance (26%) in behaviour,  $F(3, 143) = 17.01$ ,  $p < .001$  (Table 3). Normative and control beliefs, but not attitudinal beliefs, were significant predictors of curbside household waste recycling.

Table 2

*Means, Standard Deviations and Bivariate Correlations for the Belief Scales and Behaviour*

	<i>M</i>	<i>SD</i>	1	2	3	4
1. Behavioural beliefs	5.14	1.01	-	.38***	-.49***	.37***
2. Normative beliefs	5.50	1.10		-	-.30***	.33***
3. Control beliefs	3.11	1.31			-	-.46***
4. Behaviour	5.17	1.57				-

*Note.* *M* = mean; *SD* = standard deviation.

\*\*\* $p < .001$ .

Table 3

*Belief Regression Analyses Predicting Recycling Behaviour*

Variable	<i>R</i>	<i>R</i> <sup>2</sup>	$\beta$	<i>sr</i> <sup>2</sup>
Attitudinal beliefs	.51	.26***	.15	.02
Normative beliefs			.17*	.02
Control beliefs			-.34***	.08

*Note.* ( $N = 147$ ). \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

## Discussion

Despite nationwide statistics indicating that most people engage in recycling, participants in this study reported recycling, on average, 75% of recyclable material within a two-week period, suggesting that there is still a substantial proportion of eligible materials not being recycled. In response to the first research question about common costs and benefits, people who recycled at higher, rather than lower levels were significantly more likely to see the benefits of reducing waste as a positive outcome of recycling all recyclable items and did not believe they would be inconvenienced by doing so. In relation to the second research question about important referents, high level recyclers perceived more support from spouse/partner, friends/peers, and neighbours for recycling than low level recyclers. For the third research question addressing perceived obstacles to recycling, low level recyclers, as opposed to those recycling at higher levels, perceived the majority of listed barriers (i.e., forgetfulness, lack of time, access to bin, laziness, poor

weather) as more likely to impede their recycling of all recyclable materials. In response to the final research question about the relative importance of the belief sets on recycling behaviour, the contribution of these normative and control beliefs (but not attitudinal beliefs) to recycling decisions was further supported in the regression analysis, explaining a reasonable proportion of the variance (26%) in the recycling behaviour.

In general, the results of the present study support previous research (e.g., Boldero, 1995; Ewing, 2001; Gamba & Oskamp, 1994; Oskamp et al., 1991) highlighting the role of normative referents, including friends and neighbours, in people's decisions to recycle. In a similar vein to other research (e.g., Boldero, 1995), attitudinal beliefs emerged as relatively less important in differentiating between people recycling at high, as opposed to lower levels and, in this study, attitudinal beliefs did not predict recycling behaviour. Both Boldero's study and the present research, however, found that being inconvenienced (a cost) distinguished between the two recycling groups despite the provision

of accessible curbside recycling programs. The finding that control beliefs differentiated low and high level recyclers and had a relatively stronger influence on recycling behaviour is consistent with Boldero's study and other research findings control factors such as insufficient storage emerging as a belief discerning recyclers from non-recyclers.

These significant results for control beliefs, however, are in contrast to other TPB recycling research in the UK suggesting recycling as largely a volitional behaviour which should be unaffected by perceived barriers due to the increased access to recycling facilities such as curbside recycling programs and people's increased experience with recycling (Tonglet, Phillips, & Read, 2004). Instead, the findings of the present study suggest that barriers do still have a substantial impact on people's recycling decisions, at least in this Australian sample, with identified barriers reflecting internal impediments (e.g., laziness, lack of time) as much as external considerations (e.g., poor weather, accessibility of bin). It is important to note that more internal barriers significantly differentiated between the two recycling groups than the external barriers in the present study, suggesting greater practical efforts could be made to manage these perceived barriers.

The findings that a range of beliefs emerged in the present study as important in determining people's recycling decisions have applied implications. Recycling campaigns could encourage the recycling of all eligible materials by promoting the notion that significant referents would want the individual to recycle all possible refuse. It is important, then to increase the perceived approval of partners, friends, and neighbours for recycling. Increasing the perceived approval of neighbours could be achieved by using strategies to promote recycling all recyclable materials as the norm including messages such as "this street is a recycling street" that communicates the approval of neighbours and is supported by evidence suggesting that people's knowledge of local area based recycling statistics increases recycling rates (e.g., Hopper & Nielsen, 1991; Schultz, 1999). In addition, individuals should be encouraged to feel that they have control over any barriers, both internal (e.g., forgetfulness, laziness) and external (e.g., accessibility of bin, poor weather), that may inhibit their recycling behaviour. Initiatives that serve as a reminder to recycle all recyclable material (for example, fridge magnets and bin stickers reminding people of all eligible recyclable products) and that emphasise that recycling does not have to be an overly effortful practice could be used to encourage recycling. To reduce the impact of barriers to recycling (e.g., forgetfulness), an investigation of implementation intentions (i.e., specifying the when, where and how of actions; see Gollwitzer, 1999) may also prove useful in increasing recycling rates, including alternative plans for when barriers (e.g., poor weather) arise. Finally, there may be some advantage in reiterating the benefit of reducing waste gained by recycling and that this can

be achieved with minimal cost such as that offered by the convenience of local government provided curbside recycling.

Despite the use of a community sample for a behaviour that has not been examined using a well validated theoretical framework within an Australian context for some time, some limitations of the present research should be noted. Although efforts to obtain a heterogeneous community sample were made, a substantial proportion of the participants were students or professional and clerical workers. In addition, the average age was younger than that of the general population. Future studies should seek to gain a more diverse community sample to confirm the findings in a broader population. In addition, it would be interesting to see if more differences may be observed between individuals who are located at the higher versus very low ends of the recycling behaviour scale (i.e., those who are engaging in no or very little levels of recycling versus those who are always or nearly always compliant in their recycling actions). We were unable to perform such analyses in the present study due to the small participant numbers (15.5%) below the recycling behaviour scale mid-point and future research with larger sample sizes may elucidate those belief differences involving non-recyclers to enable targeted belief campaigns for this specific cohort. Further, it would be useful to undertake customer segmentation research to identify patterns of recycling behaviours across different demographic groups (e.g., younger versus older people; working versus non-working groups).

Overall, the present research found some support for the underlying TPB beliefs influencing curbside household waste recycling behaviour in a community sample. More evidence was provided for normative and control beliefs than attitudinal beliefs. At a community intervention level, the findings suggest that a future focus of recycling campaigns could be to emphasise the impact of significant others and fostering a sense of efficacy over potential barriers to behavioural performance in an effort to encourage optimal levels of curbside household waste recycling.

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### **Conflicts of Interest**

No conflicts of interest exist.

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## **Research Profile**

**Katherine M. White** is a social psychologist whose research interests are in attitude-behaviour relations. Her focus is on understanding the determinants of people's decisions for important social and health behaviours. As part of collaborative research teams, she has sought to understand the drivers of behaviours such as sun safety, blood donation, and volunteering.

**Melissa K. Hyde** is a postdoctoral research fellow in the Behavioural Basis of Health, Griffith Health Institute, Griffith University (previously at Queensland University of Technology). Her research focuses on understanding people's decisions to consent to organ/tissue donation, especially encouraging family to communicate their organ donation wishes. She also has an interest in altruistic/helping behaviour and the community and social impact of cancer