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Identifying the Beliefs which Predict Environmentally Friendly Behaviour in the Brisbane Area: A Foundation for Informed Interventions

Lee-Ann Wilson

Institute of Health and Biomedical Innovation
Queensland University of Technology
Brisbane, QLD, 4059

Dr Esben Strodl

School of Psychology and Counselling
Queensland University of Technology
Brisbane, QLD, 4059

Prof Gavin Turrell

School of Public Health
Queensland University of Technology
Brisbane, QLD, 4059

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ABSTRACT: *A move to more sustainable living can provide immediate and long term health and environmental benefits. The Green Living Study consisted of a mail survey of 1186 South East Queensland residents and an online survey of a further 451 individuals, primarily from South East Queensland, and explored the predictors of environmentally friendly behaviour. This paper explores the underlying beliefs that were found to predict specific environmentally friendly behaviours, such as walking for transport, switching off lights when not in use, switching off unused appliances at the wall and shopping with reusable bags. Beliefs explored included social norms, advantages and disadvantages of performing the behaviours, and issues of control over ones behaviour. The findings showed that people's environmentally friendly behaviours may be influenced by convenience, saving money and saving face; i.e. is it easy to do, will I be better off, and will I be seen as 'different'? Understanding the beliefs which directly predict behaviour can help inform public policy and educational initiatives. A number of models for transferring this knowledge into policy and practice will be discussed.*

Keywords: *Sustainable Living, Environmentally Friendly Behaviour, Underlying Beliefs, Walking for transport, Switching off Lights*

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Introduction

Over recent decades there has been an increasing concern with issues of environmental sustainability. Rampant consumerism has led to pollution of land, oceans and atmosphere (IPCC, 2007). Climate change is increasingly being linked with extremes in weather: including hurricanes, floods and droughts. With these events comes loss of life, injury, and damage to crops and infrastructure. Researchers have focused on two distinct pathways in relation to climate change, mitigation and adaptation. It is now quite firmly accepted that no amount of mitigation will prevent significant climate change over the coming century (IPCC, 2007); however, we still have an obligation to change our relationship with the environment, and act sustainably, so that the damage is minimised as much as possible. We must adapt to a new sustainable culture; where we are less reliant on cars, eat foods with a lower carbon footprint, and where we are conscious of the energy we consume.

While most people know what they should be doing in order to protect the environment (Gagnon Thompson and Barton, 1994), relatively few are doing it. Embracing sustainability will have both direct and indirect influences on public health. For example, increasing active transport and public transport use, and decreasing reliance on private motor vehicles will have the direct effect of improving cardiovascular health amongst the population (Dora, 1999). It will also have the indirect

effect of reducing CO₂ and other toxic emissions from cars, thereby reducing ozone, and reducing the incidence of asthma in the community (Jackson, 2003). Lower energy consumption in the home (through simple measures such as switching off lights or appliances when not in use), at a societal level, has the potential to reduce CO₂ emissions and aid in the mitigation of climate change. At an individual level, these behaviours would reduce electricity costs, allocating more money to where it is needed. Similarly, switching to reusable shopping bags rather than plastic is an important step in protecting marine life and reducing pollution from manufacturing (Moore, 2008).

Evidence based research has the potential to reveal mechanisms driving public conscientiousness about sustainable living and to highlight pathways through which people can optimize their environmentally friendly behaviours. The Theory of Planned Behaviour (TPB) (Ajzen, 1991) is a well validated decision-making model that allows for an examination of people's underlying beliefs and has much support in the social and health domains (Armitage and Christen, 2003). According to the TPB, intention to perform a given behaviour and the individual's actual control over performing the behaviour predict behavioural performance. Intention, in turn, is influenced by the degree to which a person is in favour of performing a particular behaviour (attitude), the degree to which a person feels social pressure to perform a behaviour (subjective norm), and the degree to which a person feels they have control over performing the behaviour (perceived behavioural control) (Ajzen, 1991).

Underlying the TPB is the assumption that the antecedents of attitude, subjective norms, and perceived behavioural control are corresponding behavioural (costs and benefits), normative (pressure to comply with important others' approval or disapproval), and control beliefs (motivating or inhibiting factors), respectively, that reflect an individual's intention and subsequent behaviour (Ajzen, 1991). Assessing the belief-based determinants of attitude, subjective norms, and perceived behavioural control allows researchers to establish the beliefs that differentiate those who perform a given behaviour from those who do not. A number of studies have explored these underlying beliefs in order to increase understanding of health behaviours (Rhodes et al., 2007, White et al., 2007, Wilson and White, 2008), including environmentally friendly practices (Fielding et al., 2008).

In the specific case of environmentally friendly behaviour, recent research suggests that descriptive norms, rather than the purely subjective norms assessed by the TPB, and tailored messages to reinforce these norms can be effective in shaping people's environmentally friendly behaviour (Goldstein et al., 2008, Cialdini, 2003, Nolan et al., 2008, Schultz, 1999). Schultz (1999) provided normative information describing the amount of waste recycled by an average neighbourhood. Families who received this message increased both the amount and frequency of

their roadside recycling. Similar results were found in a hotel setting where normative messages which highlighted the number of people who hung and reused their bathroom towels increased towel reuse by more than 28% (Goldstein et al., 2008). Nolan et al. (2008) surveyed 810 Californians and found that the provision of factual normative information regarding energy conservation behaviour (descriptive norms) was more predictive than other normative beliefs. This was despite the fact that participants themselves reported that such beliefs about others behaviour would have little influence on their behaviour.

Using an extended TPB theoretical framework, i.e. including descriptive normative beliefs, this study aims to investigate the beliefs that differentiate those who do or do not walk for transport, switch off lights when leaving a room, switch off appliances at the wall when not in use and shop with reusable bags. Specifically, the study assessed beliefs relating to the costs and benefits associated with the above specific behaviours (behavioural beliefs), beliefs about which important referents would approve or disapprove of the specific behaviours (subjective normative beliefs), beliefs about supportive or inhibiting factors and (control beliefs) and beliefs about the degree to which important referents have adopted the behaviours (descriptive norms).

Method

Participants and Procedure

Prior to any data collection, the university human research ethics committee approved the study. The design of the Green Living Project was collaborative and multi-disciplinary from its inception (Bikhchandani et al., 1998). Using methods from both Public Health and Psychology disciplines, key stakeholders from local and state government, electricity providers, and relevant research fields were consulted. The results of two separate surveys are included in this paper. First, a mail based survey explored the predictors of walking for transport and switching off lights when leaving a room. Second, an internet based survey explored the predictors of switching off appliances at the wall when not in use and shopping with reusable bags. For the mail based survey individuals aged 18 – 67 were randomly selected from 11 Electorates from the Australian Electoral Commission roll (See Table 1). Of those, 2,000 were randomly selected from Electorates within the Brisbane Local Government Area and 1,000 were randomly selected from those three electorates within the Moreton Bay Region (Figure 1), which did not overlap with the Brisbane Local Government Area. Those sampled were asked to complete a paper and pen survey. Of the 3,000 questionnaires that were mailed, 113 were subsequently considered 'ineligible' (e.g. not at last known address, overseas) and 1,186 were returned with usable data to give a response-rate of 42% (1,186/2835).

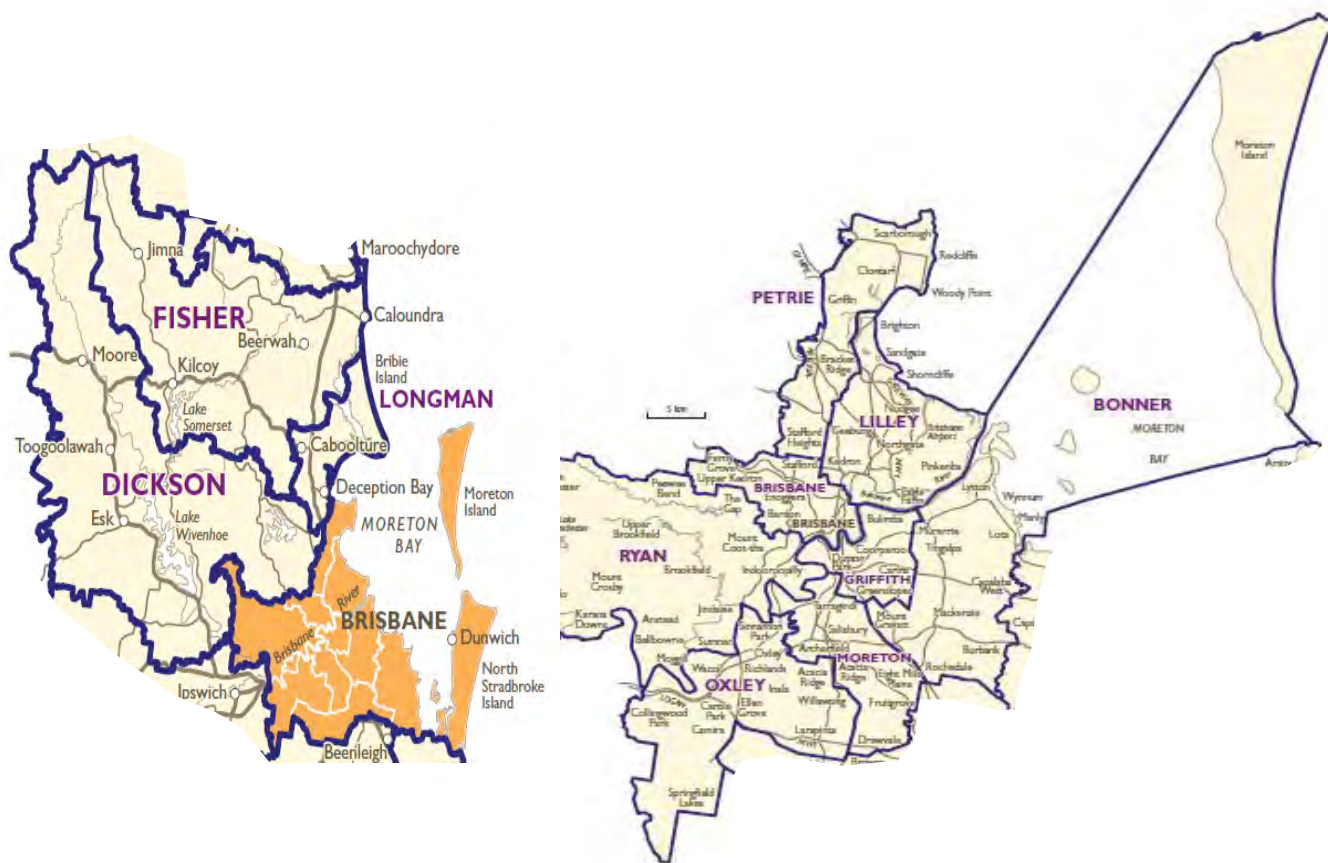


Figure 1. Green Living Mail Study areas, consisting of eleven Federal Electorates

For the online survey a number of channels were employed (bulk email lists, sign-up sheets, word of mouth and a facebook page), through which individuals were invited to participate in the study. Those interested were able to click on a web link and were taken to a survey site; hosted through Queensland University of Technology. In total, 451 individuals aged 18 - 80 completed the online survey. Only four of these participants were over the age of 67 and so the age range can be considered similar to that used in the mail based survey. In addition to the standard survey questions, those participating in the online survey were asked to provide their post code so their City and State of residence could be determined. Nine participants (6.9%) lived outside of Queensland. Table 1 shows the Demographic characteristics of the samples, including Age, Gender, Education, and Household Income, presented separately for the mail survey and the online survey.

Table 1. Demographic Characteristics of the Two Samples

	Online %	Mail %
Age	<i>n</i> =451	<i>n</i> = 1184
18 - 22	6.0	7.3
23 - 27	17.7	6.5
28 - 32	18.0	7.6
33 - 37	6.2	9.3
38 - 42	8.4	9.5
43 - 47	7.1	12.1
48 - 52	10.4	11.7
53 - 57	6.7	12.5
58 - 62	4.8	13.2
63 and over	4.7	10.2
Gender	<i>n</i> =450	<i>n</i> = 1186
Male	32.4	39.0
Female	67.4	61.0
Education	<i>n</i> =480	<i>n</i> = 1129
Bachelor's degree or higher	64.1	32.9
Diploma/Associate Diploma	8.2	14.3
Certificate (trade/business)	8.4	21.3
Year 12 (Senior/6 th form)	7.3	13.2
Year 11 or less	2.7	17.3
Other	1.2	1.0
Household Income	<i>n</i> =472	<i>n</i> = 1112
\$0 - \$25,999	5.3	8.3
\$26,000 - \$41,599	6.0	7.9
\$41,600 - \$51,999	7.1	8.5
\$52,000 - \$72,799	13.5	15.3
\$72,800 - \$129,999	32.4	26.6
\$130,000 pa or more	23.3	16.2
Don't know	3.3	4.3
Don't want to answer this	9.1	12.9

Measures

The target behaviours assessed in the mail survey were the number of times participants had walked for transport for 10 minutes or more over the preceding four weeks and how regularly participants switched

off lights when leaving a room. The target behaviours assessed in the online survey were switching off appliances at the wall when not in use and use of reusable shopping bags. The last three behaviours were measured on a five point scale (never, rarely, sometimes, often, and always).

Two separate pilot studies were conducted via email to a convenience sample (Mail Survey: $N = 12$, Internet Survey: $N = 8$) to elicit the salient behavioural, normative, and control beliefs (Bikhchandani et al., 1998) as recommended by Fishbein and Ajzen (Fishbein and Ajzen, 1975). Using content analysis, the most commonly reported advantages (e.g., saving money) and disadvantages (e.g., inconvenience), referents approving or disapproving (e.g., family, friends), and factors preventing each environmentally friendly behaviour (e.g., lack of time) were used to assess the behavioural, normative, and control belief-based measures, respectively. Further details regarding this pilot study and the methods of the Green Living Study as a whole can be found in (Bikhchandani et al., 1998)

All belief-based items were scored on 7-point Likert scales, scored *extremely unlikely* (1) to *extremely likely* (7). To assess behavioural beliefs, participants were asked to rate how likely particular costs and benefits would result if walked for transport or switched off lights when leaving a room. For normative beliefs, participants were asked to rate how likely particular referents would think they should walk for transport or switch off lights when leaving a room. Participants indicated how likely internal and external factors would prevent them from walking for transport or switching off lights when leaving a room. It should be noted that internal consistency is not a necessary feature of belief composites as no assumption is made that the salient beliefs are internally consistent (Jackson, 2003); thus, alpha coefficients were not computed for the behavioural, normative, and control belief-based measures.

Results

For belief-based analyses, responses were re-coded so that they were dichotomous. In the case of walking for transport, recoding discriminated those who did not walk for transport from those who did. For switching off lights, switching off appliances at the wall when not in use and shopping with reusable bags, recoding discriminated those who performed the behaviour never, rarely or sometimes from those who performed the behaviour often or always. Using SPSS 17.0, multivariate analyses of variance (MANOVA) were conducted to examine the influence of beliefs on whether or not people engaged in each of the behaviours. The results of the multivariate tests are presented in Table 2.

Table 2. Results of Wilks' Lambda multivariate tests of significance for four environmentally friendly behaviours.

	<i>df1</i>	<i>df2</i>	<i>F</i>	η^2
Walking for transport				
Behavioural beliefs	15	716	4.12*	.079
Normative beliefs	5	740	5.01*	.033
Control beliefs	9	726	1.21	<i>ns</i>
Descriptive norms	2	757	7.91*	.020
Switching off lights				
Behavioural beliefs	8	797	5.64*	.054
Normative beliefs	4	802	5.98*	.029
Control beliefs	6	792	5.28*	.038
Descriptive norms	2	812	10.93*	.026
Switching off appliances at the wall				
Behavioural beliefs	7	443	28.42*	.310
Normative beliefs	4	446	17.63*	.137
Control beliefs	10	440	4.54*	.093
Descriptive norms	2	445	18.59*	.077
Shopping with reusable bags				
Behavioural beliefs	10	440	33.44*	.432
Normative beliefs	6	440	9.83*	.117
Control beliefs	8	442	1.21*	.180
Descriptive norms	2	445	34.56*	.134

* $p < .001$

To explore where the differences exist between the groups, dependent variables (i.e., beliefs) were examined at the univariate level. Bonferonni adjustments were used to control for familywise type 1 error. A description of the findings for each of the environmentally friendly behaviour is included below. Please refer to Table 3 through 6 for the mean differences in groups between those who did and did not engage in each of the examined behaviours. Significance levels are presented at .05 and with a Bonferroni correction.

Belief-based Analyses for walking for transport

Univariate analyses (Table 3) revealed that those participants who walked for transport were significantly less likely than those who did not to believe that walking for transport would take too

much time, would be inconvenient and that they would get tired. They were more likely to believe that they would be happier and it would relieve stress if they walked for transport.

In terms of normative beliefs, analyses indicated that those participants who walked for transport were more likely to believe that their family and their doctor would think that they should walk for transport. For control based beliefs, participants who walked for transport were more likely to indicate that a safe route and whether they had a car would influence their decision to walk for transport. Finally, for descriptive norms, participants who walked for transport were significantly more likely to believe that their closest friend and their neighbours also walked for transport.

Table 3. Mean differences in behavioural, normative, and control beliefs for participants walking for transport

Walking for transport	<i>Not walking</i>	<i>Walking</i>
Behavioural Beliefs	<i>n</i> = 224	<i>n</i> = 508
I would reduce my carbon emissions	5.97	5.81
It would be good for the environment	6.11	6.0
I would be attacked by dogs or birds	3.22	3.02
I would have more energy	5.42	5.41
It would take too much time	5.22	4.38***
I would save money	5.07	5.00
I would be happier	4.47	4.81*
I would not be safe in the traffic	3.18	2.98
I would risk getting skin cancer	3.78	3.52
It would be inconvenient	5.35	4.39***
It would be good for my health	6.01	6.13
It would be a good way to relieve stress	5.13	5.61***
I would get too tired	3.79	3.15***
The weather would make it difficult	4.29	4.02
I would get to know my local community	4.44	4.52
* <i>p</i> <.05, *** <i>p</i> <.003		
Normative Beliefs	<i>n</i> = 223	<i>n</i> = 523
My family	3.66	4.34***
Environmentalists	6.38	6.43
The Government	5.55	5.63
My Doctor	5.52	5.80*

The National Heart Foundation	6.21	6.21
<i>*p</i> <.05, <i>*** p</i> <.010		
Control Beliefs	<i>n</i> = 219	<i>n</i> = 517
If there was a shower at my destination	3.59	3.70
If there was a safe route	4.49	4.87*
If I did not have a car	5.60	5.87*
If I were more fit	3.89	3.96
If my destination was close by	5.46	5.59
If there was better public transport	5.16	5.14
If I had the time	5.01	5.15
If I was more motivated	4.26	4.52
If the weather was bad	4.26	4.50
<i>*p</i> <.05, <i>*** p</i> <.006		
Descriptive Norms		
Closest friend	0.97	1.83***
Neighbours	1.20	1.64*
<i>*p</i> <.05, <i>*** p</i> <.025		

Belief-based Analyses for switching off lights

Univariate analyses (Table 4) revealed that those participants who indicated that they switched off lights often or very often were less likely than those who switched out lights never, rarely or sometimes to believe that they would need to switch the lights on again a few minutes later and that they would feel less safe with the lights out. They were more likely to believe that their electricity bill would be lower, that switching off lights would reduce their carbon emissions, that switching off lights would be good for the environment and that they won't have to replace their light bulbs as often.

In terms of normative beliefs, analyses indicated that those participants who switched off lights often or very often were more likely to believe that their family would think that they should switch off lights when they leave a room. For control beliefs, analyses showed that participants who switched out lights often or very often were more likely to indicate that their friends telling them they should switch out lights and if they were trying to save money would influence their decision to switch out lights. Finally, in terms of descriptive norms, analyses revealed that participants who switched off lights often or very often were significantly more likely to believe that their closest friend and their neighbours also switch off lights when leaving a room.

Table 4. Mean differences in behavioural, normative, and control beliefs for participants switching off lights when leaving a room

Switching off Lights	Sometimes	Often
Behavioural Beliefs	<i>n</i> = 66	<i>n</i> = 740
My electricity bill would be lower	5.24	5.86***
I would reduce my carbon emissions	5.44	6.03***
It would be good for the environment	5.44	6.18***
I won't have to replace light bulbs as often	4.41	5.27***
I would have to switch the light on again a few minutes later	4.91	4.36*
I would feel less safe with the lights out	3.32	2.59***
My home would feel colder	2.48	2.60
I might stumble and fall in the darkness	3.33	2.91
* <i>p</i> <.05, *** <i>p</i> <.006		
Normative Beliefs	<i>n</i> = 70	<i>n</i> = 737
Environmentalists	6.59	6.78
My family	4.97	5.71***
The Government	5.59	5.92
Electricity companies	2.53	3.03
* <i>p</i> <.05, *** <i>p</i> <.013		
Control Beliefs	<i>n</i> = 68	<i>n</i> = 731
My friends telling me I should	3.38	4.06***
If I were trying to save money	4.91	5.84***
Being reminded	4.78	5.15
If it was inconvenient	4.18	4.11
Household members who are afraid of the dark	3.85	3.74
A desire to be in a well-lit environment	4.19	3.75
* <i>p</i> <.05, *** <i>p</i> <.008		
Descriptive Norms	<i>n</i> = 70	<i>n</i> = 745
Closest friend	3.04	3.45***
Neighbour	2.83	3.25***
* <i>p</i> <.05, *** <i>p</i> <.025		

Belief-based Analyses for switching off appliances

Univariate analyses (Table 5) revealed that those participants who indicated that they switched off appliances often or very often were less likely than those who switched out lights never, rarely or often to believe that it would be inconvenient and that they would have to reset their clocks, timers, channels etc. They were more likely to believe that their electricity bill would be lower, that switching off appliances would reduce their carbon emissions, and be good for the environment, that their appliances would have a longer life and that their home would be safer.

In terms of normative beliefs, analyses indicated that those participants who switched off appliances often or very often were more likely to believe that their family and electricity companies would think that they should switch off lights when they leave a room. For control beliefs, analyses showed that participants who switched off appliances often or very often were more likely to indicate that the degree of inconvenience and if they were trying to save money would influence their decision to switch out lights. Finally, in terms of descriptive norms, participants who switched off appliances often or very often were significantly more likely to believe that their closest friend and their neighbours also switch off appliances when not in use.

Table 5. Mean differences in behavioural, normative, and control beliefs for participants switching off appliances when not in use

Switching off Appliances	Not	Switching Off
Behavioural Beliefs	<i>n</i> = 194	<i>n</i> = 257
My electricity bill would be lower	5.24	5.89***
I would reduce my carbon emissions	5.49	6.10***
It would be good for the environment	5.66	6.26***
It would be inconvenient	5.25	3.21***
My appliances would have a longer life	4.15	4.78***
I would have to reset clocks/timers/channels etc	5.56	4.28***
My home would be safer	4.62	5.10***
<i>*p</i> < .05, *** <i>p</i> < .003		
Normative Beliefs	<i>n</i> = 194	<i>n</i> = 257
Environmentalists	6.65	6.73
My family	4.25	5.35***
The Government	5.29	5.50
Electricity companies	2.52	3.11***

* $p < .05$, *** $p < .010$

Control Beliefs	$n = 194$	$n = 257$
Being reminded	5.16	5.40
If I were trying to save money	5.39	5.82***
If it was inconvenient	4.77	4.07***
If my appliances did not need to be reset	5.77	5.47*
Being able to reach the switches easily	5.94	5.70
My friends telling me I should	4.28	4.62*
If I were going away for a few days or more	6.01	6.31*
If I use an item frequently	4.53	4.97*
If I have complex cabling arrangements	4.30	4.40

* $p < .05$, *** $p < .006$

Descriptive Norms	$n = 193$	$n = 255$
Closest friend	2.27	2.83***
Neighbours	2.13	2.38***

* $p < .05$, *** $p < .025$

Belief-based Analyses for shopping with reusable bags

Univariate analyses (Table 6) revealed that those participants who shopped with reusable bags were significantly less likely than those who did not to believe that shopping with reusable bags would be expensive, would be inconvenient, that they would find it difficult to remember to bring the bags and that they would have to buy rubbish bags. They were more likely to believe that it would be good for the environment, would reduce the amount of plastic bags lying around their house, would protect waterways and wildlife, and that less plastic would need to be produced.

In terms of normative beliefs, analyses indicated that those participants who shopped with reusable bags were more likely to believe that their family would think that they should shop with reusable bags. For control beliefs, analyses showed that participants who shopped with reusable bags were less likely to believe that it would be inconvenient. They believed they would be more likely to shop with reusable bags if their friends told them they should, if the bags were always in their car or if they had to pay for the plastic shopping bags. Finally, in terms of descriptive norms, participants who shopped with reusable bags were significantly more likely to believe that their closest friend and their neighbours also shopped with reusable bags.

Table 6. Mean differences in behavioural, normative, and control beliefs for participants shopping with reusable bags.

Shopping with Reusable Bags	Not Reusable	Reusable
Behavioural Beliefs	<i>n</i> = 151	<i>n</i> = 300
It would be good for the environment	5.87	6.59***
I would be inconvenient to carry them around with me	4.47	2.53***
I would reduce the amount of plastic bags lying around my home	5.25	6.27***
It would protect our waterways	5.52	6.51***
It would protect wildlife	5.52	6.47***
It would save the supermarkets money	5.21	5.60*
Less plastic would need to be produced	5.46	6.16***
I would find it difficult to remember to bring them with me	5.59	3.13***
It would be expensive to buy the bags	3.88	2.42***
I would have to buy rubbish bags	5.43	4.24***
<i>*p</i> <.05, *** <i>p</i> <.003		
Normative Beliefs	<i>n</i> = 151	<i>n</i> = 300
Environmentalists	6.83	6.82
My family	4.99	5.88***
The Government	5.45	5.60
Retailers	5.25	5.20
Reusable bag manufacturers	6.14	6.43*
Plastic bag manufacturers/suppliers	2.28	2.08
<i>*p</i> <.05, *** <i>p</i> <.010		
Control Beliefs	<i>n</i> = 151	<i>n</i> = 300
My friends telling me I should	4.05	4.65***
If it was inconvenient	4.78	3.90***
Being reminded	5.32	5.49
If the bags were always in my car so I wouldn't forget them	5.34	6.06***
If there were some kind of reward program	5.14	4.92
If the reusable bags were free	5.42	5.06*
If I could still get free rubbish bags	5.08	4.58*

If I had to pay for plastic shopping bags	5.19	5.73***
* $p < .05$, *** $p < .006$		
Descriptive Norms	$n = 150$	$n = 298$
Closest friend	2.92	3.70***
Neighbours	2.81	3.10***
* $p < .05$, *** $p < .025$		

Discussion

A number of beliefs which predict walking for transport, switching off lights when leaving a room, switching off appliances at the wall and shopping with reusable bags have been identified. Importantly, discriminating beliefs included behavioural, normative and control beliefs from the TPB as well as the descriptive normative beliefs. By way of example, those who walked for transport were more likely to believe that it would be a good way to relieve stress (behavioural belief). The belief that family would approve of switching off lights when leaving a room was a significant determinant of whether people switched off lights (normative belief). Convenience was a significant determinant of switching off appliances when not in use (control belief) and the belief that one's closest friend shops with reusable bags was associated with shopping with reusable bags (descriptive normative belief).

Implications and Strengths

Understanding the beliefs predicting specific environmentally friendly behaviours is very useful in terms of future policy and environmental education. According to Brisbane City Council's corporate sustainability policy, they are working towards a Brisbane that is 'a city to look forward to living in – a clean and green city that is smart, prosperous, accessible, inclusive, creative and healthy, and that leads the region by example' (Brisbane City Council, 2010). Similarly, Moreton Bay Regional Council's climate change policy aims to 'raise awareness of climate change and better manage local greenhouse gas emissions' (Moreton Bay Regional Council, 2009). In order to meet these policy guidelines, councils must understand their people; understand what motivates people and understand the types of interventions that are most likely to result in a 'cleaner', 'greener' and 'healthier' region.

By identifying specific beliefs which predict behaviour, these beliefs can be targeted in social marketing campaigns. For example, in a study conducted by Goldstein, Cialdini and Griskevicius (2008) descriptive norm messages such as 'The majority of guests who stayed at our hotel, do recycle their towels at least once' were effective in increasing the percentage of hotel guests who reused their towels. This same method could be utilised by local councils and other key

stakeholders. For example, the message 'Eighty percent of people in your neighbourhood switch off lights when they are leaving a room' would likely be effective in encouraging people to switch off lights. An important caveat is, however, that such messages should be true (Goldstein et al., 2008).

Behaviour change interventions which include modelling of a desired behaviour are generally effective (Bikhchandani et al., 1998). We have found that people are more likely to shop with reusable bags if they believe their friends and neighbours also shop with reusable bags. Therefore, based on the findings of this study and existing evidence around the efficacy of observational learning, a media campaign might show a typical suburban street with people storing their reusable shopping bags in their car or show someone who sees their friends or neighbours at the supermarket and notices that they are shopping with reusable bags. Wherever possible, people should be encouraged to talk to their friends and neighbours about their efforts to live sustainably.

It is important to fully understand the various factors that influence a particular behaviour. For example, to encourage more people to switch off appliances at the wall it may be necessary to cover two fronts. Firstly, emphasising the benefits in terms of saving money by reducing energy consumption and secondly, by better understanding and addressing issues of convenience. Many participants indicated that switching off appliances at the wall when not in use was inconvenient because they would lose their settings or because plugs were hidden behind furniture and were difficult to get to. These are challenging behavioural control based challenges that will require innovative solutions.

It is useful to look at the behaviours individually, i.e. if a particular group or organisation are seeking to change a specific behaviour, such as increasing walking for transport, then any relevant or suitable beliefs significantly associated with that behaviour could be targeted, e.g. 'Did you know that, apart from improving your overall health and fitness, walking to work can help you relieve stress?' However, it is also helpful to look at the behaviours together. Looking across the four behaviours examined, commonalities can be identified that may be useful in encouraging environmentally friendly behaviour generally.

Of note, family were important referents for all four behaviours, as was the perceived behaviour of one's closest friend. Moreton Bay Regional Council have an Education for Sustainability program and, based on the findings of this research, it would be appropriate to include more family and friend inclusive activities in their lesson plans. Beliefs in regards to the convenience of performing each of the examined behaviours were also consistent predictors. It is easy to see how making particular behaviours more convenient (e.g. providing showering facilities at work places) or highlighting the perceived benefits of behaviours (e.g. walking for transport may greatly improve your health) could encourage these behaviours.

The design of the Green Living Project was collaborative and multi-disciplinary from its inception (Bikhchandani et al., 1998). The beliefs explored were elicited in a grounded and theory based approach and the findings have good face validity. Further, using mixed methods, employing both a mail survey and an internet based survey, has provided insight into the possible implications of each method. With a mail based survey method it is easier to achieve a representative sample and to target your sample to particular geographic areas. Internet surveys, on the other hand, are much cheaper to conduct; however, the sample may be biased by self-selection, particularly in terms of socio-economic factors (average age of respondents, income and education). In the case of the current study, highest level of education achieved, in particular, was markedly different between the two samples. This is likely because the internet study was marketed through university mailing lists. Participants in the internet survey were also much more likely to be self-selecting based on an interest in environmental sustainability.

Conclusions and Recommendations

Tackling environmental issues is an immediate and serious concern for policy makers, local governments, and environmental groups, to name a few, and a great deal of time and money has already been invested in educating the public and introducing new schemes. Unfortunately, while most people know what they should be doing in order to protect the environment (Gagnon Thompson and Barton, 1994), very few are doing it. The aim of this research has been to explore the predictors of environmentally friendly behaviour with an interdisciplinary, collaborative approach utilising established psycho-social theory. A number of important discriminating beliefs have been identified and these can readily be applied to educational initiatives and social marketing efforts.

Specifically, to address behavioural beliefs, it would be beneficial to highlight any advantages associated with environmentally friendly behaviours (e.g. saving time or money). To address normative beliefs, educational programs can involve families and friendship networks, as these groups are known to influence behaviour. For addressing control beliefs, desired actions should be facilitated (e.g. having a reminder system for shopping with reusable bags) and impeding factors should be minimised (e.g. making switching off appliances more convenient) wherever possible. Finally, to target descriptive normative beliefs, social marketing campaigns and educational initiatives should highlight the ways in which people 'just like me' (i.e. friends and neighbours) are already engaging unsustainable behaviours.

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