Journal of Biodiversity and Environmental Sciences (JBES)
ISSN: 2220-6663 (Print) 2222-3045 (Online)
Vol. 4, No. 1, p. 173-186, 2014
http://www.innspub.net

RESEARCH PAPER OPEN ACCESS

An analysis of household waste prevention behaviours (case study: Fereidan Township)

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Article published on January 24, 2014

Key words: Household waste, behaviour, intention, attitude, environmental problems.

Abstract

Environmental problems such as, urban garbage and produce Waste in urban areas are the results of human behavior. Only change in human behavior can reduce these environmental problems. Thus studying attitude and behavior of people is a precondition to change this situation. So the main objective of this study was analysis of household Waste Prevention Behaviours. To achieve this objective, the theory of planned behaviour (TPB) was used to guide an analysis. In addition to TPB variables, the Environmental Concern, Environmental knowledge and Environmental values were considered. Statistical population was 10000 person in Freidan Township that 120 person were chosen by random sampling methoding on the basis of Cochran formula. The main tool of this research was questionnaire which has been formed of 9 parts. For estimating the reliability of the questionnaire Cronbach's alpha was calculate and it was (0.62 - 0.93). Content validity was approved using expert opinion of faculty members of the Razi University, department of Agricultural extension and education. The data were analyzed using Multiple Regression Analysis and Path Analysis by Spss software. The findings from the empirical work show that the vast majority of the studied population shared high environmental concerns, and generally appeared to endorse pro-environmental values.

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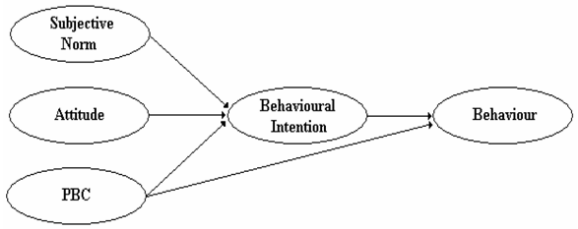
Introduction

Nowadays major challenges is the growing waste mountain, a problem recognized by all nations in the 1992 Conference on Environment and Development, and regarded as a major barrier in the path towards sustainability (UNCED, 1992). The past few decades have seen a dramatic increase in waste production, reflecting unprecedented global levels of economic activity (Gandy, 1994; Sitarz, 1994). These radical increases can be observed in all the waste streams of modern and growing economies, but it's municipal solid waste (MSW) that has caught the immediate attention of policy makers internationally(Kasfikis, 2005).

The recognition that waste constitutes a social problem has been instrumental in expanding the dialogue about how to respond to the waste management challenge. As is true for most important social problems, addressing the waste crisis requires both individual and collective changes (DETR, 2000; Coleman & Kerbo, 2003). As such, the role that individual households can play in this effort has been increasingly acknowledged. Firstly, the participation of households is seen as of paramount importance to any waste management scheme, recycling in particular. Recycling involves large capital costs and, thus, it's imperative that it makes good economic sense. It should come as no surprise, therefore, that there is an abundant literature on household recycling behaviour and on the (un)willingness to recycle, since "*in the case of recycling, economics and ethical values depend on each other*" (Hawkins & Muecke, 2003). Secondly, there have been urgent calls to promote the higher priorities of the waste hierarchy, with a simultaneous emphasis in the necessity for changes in household behaviour. As Joos *et al.* (1999) have pointed out, aspects concerning the consumption behaviour of households and changing value systems are no less important than the technical or economic aspects in waste management research and decisionmaking. Particularly since the Earth Summit in 1992, these aspects have been increasingly emphasised in waste management policy (Thogersen & Grunert-Beckmann, 1997), but have been met with limited success (Jackson, 2005). Moreover, Promoting waste prevention is very necessary, and Promoting waste prevention means sending signals to households about the socio-environmental costs of their lifestyles and decision-making(Jackson, 2005 , Kasfikis, 2005).



Source: Adapted from Ajzen (1991)

Fig. 1. Path model for the Theory of Planned Behaviour.

This Research describes an analysis, guided by the theory of planned behaviour (TPB) (Ajzen, 1985, 1987), of Household Waste Prevention Behaviours. The study was conducted in Fereidan Township (IRAN) and the surrounding area, a city that Generate very much Household Waste and have poor recycling facilities at the time of data collection. The TPB (Ajzen, 1985, 1987) is based on the assumption that some conscious reasoning is involved in the formation of intentions to perform a behaviour, and that this behaviour is at least partly under the control of the individual. According to the theory, behaviour is predicted by attitudinal factors, normative factors, and perceived behavioural control (PBC). At The Theory of Planned Behaviour (TPB), Attitudes reflect the evaluation of the behaviour and its outcome, while the subjective norm reflects the extent to which people important to the individual are perceived to support the behaviour, and the extent to which the individual is motivated to comply or conform. PBC reflects the extent to which the individual feels able to perform the behaviour. These three factors are thought to influence behaviour through their impact upon intentions to behave. However, PBC may also have a direct impact upon actual behaviour, particularly when the behaviour is perceived to be difficult to perform(Knussen *et al,* 2004). (Fig. 1) is a

path diagram of the TPB, showing the effect that PCB has on behaviour both directly and indirectly (through influencing the behavioural intention). Likewise, the current study includes additional variables with an aim to encapsulate environmental worldviews and socio-demographic parameters.

Therefore the purpose of this study was to An Analysis of Household Waste Prevention Behaviours in Fereidan Township. Specifically, the objectives of the study were to:

1) Describe the demographic profile of Fereidan Township Householders.

2) Investigation of the sample's more specific views and attitudes towards waste prevention; an enquiry into the environmental values of the studied sample (to NEP scale); a measurement of the sample's general environmental concern; a measurement of the sample's general environmental knowledge.

3) Examine the TPB model and to explore the contribution of TPB variables to the variance of intentions to Prevention household waste.

Materials and methods

Study area

Statistical population was 10000 persons in Freidan Township that 120 person were chosen by random sampling methoding on the basis of Cochran formula.

Methods

The main method of present research is survey research with cross – sectional method. The main tool of this research was questionnaire which has been formed of 9 parts (Table 1): the questions related to The socio-demographic composition of the sample, questions related to Environmental Concern, questions related to Environmental knowledge, questions related to Environmental values (NEP scale), questions related to Attitude towards waste prevention, questions related to Perceived Behavioural Control (PBC), questions related to Subjective norm, questions related to Behaviours and Behavioural Intentions(WPPP) and questions related to Behaviours and Behavioural Intentions (WPTR).

Reliability & Validity

For estimating the reliability of the questionnaire Cronbach's alpha was calculate and it was (0.62 – 0.93). Content validity was approved using expert opinion of faculty members of the Razi University, department of Agricultural extension and education and collected data were analyzed by SPSS software.

Table 1. Reliability analysis (Alpha).

Scale Name	*No. of items in the scale*	*Alpha Value*
Environmental Concern	4	0.69
Environmental knowledge	7	0.85
Environmental values (NEP scale)	10	0.72
Attitude towards waste prevention	10	0.78
Perceived Behavioural Control (PBC)	5	0.62
Subjective norm	3	0.72
Behaviours and Behavioural Intentions (WPPP)	14	0.93
Behaviours and Behavioural Intentions (WPTR)	14	0.91

Result and discussion

Descriptive analysis

The demographic composition of the sample is summarised in Table (2) There appears to be a bias in the sample towards females (60%). The 18-24 age group is quite under-represented (28%), as is the '65 and over' age group (2%). There is also a bias towards married (70%), as opposed to householders who are single (30%, aggregated). Respondents with university level education account for (37.5 %) of the sample. About 29.2 % of respondents had income level of less than 10,000,000 Rls. Where as, only 4.2% had more than 30,000,001 Rls. of monthly income and 20% of respondents opted not to disclose this information.

Table 2. The socio-demographic composition of the sample.

CHARACTERISTIC		*N*	*%*
Gender	Male	47	39.2
	Female	73	60.8
	Total	120	100
Age	18-24	34	28.3
	25-44	40	33.3
	45-64	44	36.7
	65 and over	2	1.7
	Total	120	100
Marital Status	Single	36	30
	Married	84	70
	Total	120	100
Education	Senior high school	28	23.3
	Diploma	40	33.3
	Post diploma	12	10
	Bachelor science	29	24.2
	Masters science	4	3.3
	No Response	7	5.8
	Total	120	100
Income (Monthly - Rls.)	Less than or equal to 10,000,000	35	29.2
	10,000,001 – 20,000,000	41	34.1
	20,000,001 – 30,000,000	15	12.5
	30,000,001 and more	5	4.2
	No Response	24	20
	Total	120	100
The amount of waste (Daily)	Under 2 kg	69	57.5
	3 – 5 kg	37	30.8
	6 – 8 kg	11	9.2
	8 kg and over	3	2.5
	Total	120	100
More types of waste	Plastic	48	40
	Food	68	56.7
	Other	4	3.3
	Total	120	100

Note: 'No Response' indicates that the respondent selected the 'Prefer not to say' option. These are treated as 'missing values' later in the data analysis stage.

Environmental concern

Nearly 73.4 % of respondents stated that they had a 'high' or 'very high' concern for the environment. This compares with only 20% and 3.3% and 3.3% of respondents that stated 'Neutral' and 'Low ' and ' Very Low ' concerns respectively. In a similar trend, 73.4% of the sample stated that being part of an environmentally-conscious community was 'important' or 'very important' for them. In contrast, 16.6% stated this was of neutral importance, and only 10% (12 respondents) expressed that it was 'unimportant' or 'very unimportant'. In response to the statement *'Nothing I do impacts the environment because I am only one person'*, 60% of respondents state that they 'disagree' or 'strongly disagree'. Respondents that were unsure regarding the statement accounted for 3.4% of the sample, and the respondents that stated that they 'agree' or 'strongly agree' accounted for an aggregated 36.7% as well. These are important findings as they confirm that the large majority of the (sample) population is aware that they incur impacts on the environment as a result of their actions, implying that they see themselves as part of the wider environmental issue. With regards to the statement *'Environmental protection makes no difference*

to the quality of my life', the findings follow a similar trend. 66.8% of respondents 'disagree' or 'strongly disagree', compared to 26.6% who were 'unsure', and 6.6% who found themselves in line with the statement. Again, these findings are indicative of a recognition that protecting the environment is an vital element in maintaining a good quality of life, agreeing heavily with the findings from the previous questions. It is noteworthy, however, that the survey carried out by DEFRA (2002) reveals that only one in ten people regarded the environment as an important issue that affected their quality of life. Nevertheless, all the above findings compose a picture that confirms the views encountered in the literature that members of the public are not lacking general environmental concern (Table 3).

Table 3. Findings from survey about environmental concern.

Environmental concern		*F*	*%*
Environmental concern	Very high	60	50
	High	28	23.4
	Neutral	24	20
	Low	4	3.3
	Very Low	4	3.3
	Total	120	100
Being part of an environmentally-conscious community	very important	36	30
	Important	52	43.4
	Neither important nor unimportant	20	16.6
	Unimportant	12	10
	Very Unimportant	0	0
	Total	120	100
Nothing I do impacts the environment because I am only one person	Strongly Agree	0	0
	Agree	44	36.7
	Unsure	4	3.4
	Disagree	60	50
	Strongly Disagree	12	10
	Total	120	100
Environmental protection makes no difference to the quality of my life	Strongly Agree	0	0
	Agree	8	6.6
	Unsure	32	26.6
	Disagree	52	43.4
	Strongly Disagree	28	23.4
	Total	120	100

Environmental knowledge

The findings from the term-familiarity questions are shown in (Table 4) Not surprisingly, considering the wide media attention that has been given to these issues, The meanings of 'Climate Change' and 'Waste Minimisation' were known by 80% and 86% of the studied sample. 'Biodiversity' was known by 46.66% of the studied sample. There was 28 respondents that had never heard the term 'Biodiversity'.

Finally, the percentage of respondents stating that they knew the meaning of 'Global Warming' was 76.7%. Moreover, 6.7% stated that they had heard the term but didn't know its meaning, and 16.7% stated that they had not heard the term at all. Similar trends can be seen for 'Greenhouse effect' (70%, 10%, and 20% respectively) and 'Ozone depletion' (70%, 9.2%, and 28.8% respectively). The term 'Sustainable Development' was the term unknown to most respondents (46.7%, 56 respondents), with only 16.7% stating that they knew its meaning.

Table 4. Findings from survey Familiarity with environmental terminology.

Environmental Terminology	*Know the Meaning*		*Have heard of but don't know the meaning*		*Have not heard*	
	F	**%**	**F**	**%**	**F**	**%**
Biodiversity	56	46.66	36	30.0	28	23.3
Climate Change	96	80.0	16	13.3	8	6.7
Waste Minimisation	104	86.6	11	9.2	5	4.2
Global Warming	92	76.7	8	6.7	8	16.7
Greenhouse effect	84	70.0	12	10.0	24	20.0
Ozone depletion	84	70.0	11	9.2	25	28.8
Sustainable Development	20	16.7	44	36.7	56	46.7

Environmental values (NEP scale)

The New Ecological Paradigm (NEP) scale is a measure of endorsement of a "pro ecological" world view. It is used extensively in environmental education, outdoor recreation, and other realms where differences in behavior or attitudes are believed to be explained by underlying values, a world view, or a paradigm. The scale is constructed from individual responses to 10 statements that measure agreement or disagreement (Table 5).

Table 5. Endorsement of environmental values.

NEP scale	*Opinion*	*N*	*%*	*MIN*
1. We are approaching the limit of the number of people the Earth can support.	Strongly Agree	24	20.0	2.80
	Agree	36	30.0	
	Unsure	0	0	
	Disagree	60	50.0	
	Strongly Disagree	0	0	
2. Humans have the right to modify the natural environment to suit their needs.	Strongly Agree	36	30.0	3.73
	Agree	52	43.3	
	Unsure	12	13.3	
	Disagree	12	13.3	
	Strongly Disagree	0	0	
3. When humans interfere with nature it often produces disastrous consequences.	Strongly Agree	40	33.3	2.16
	Agree	68	56.7	
	Unsure	4	3.3	
	Disagree	8	6.7	
	Strongly Disagree	0	0	
4. Human ingenuity will insure that we do not make the Earth unlivable.	Strongly Agree	28	23.3	3.63
	Agree	44	36.7	
	Unsure	32	26.7	
	Disagree	8	6.7	
	Strongly Disagree	8	6.7	
5. Humans are seriously abusing the environment.	Strongly Agree	32	26.7	2.20
	Agree	44	36.7	
	Unsure	36	30.0	
	Disagree	4	3.3	
	Strongly Disagree	4	3.3	
6. The Earth has plenty of natural resources if we just learn how to develop them.	Strongly Agree	48	40.0	4.06
	Agree	32	26.7	
	Unsure	40	33.3	
	Disagree	0	0	

	Strongly Disagree	0	0	
7. Plants and animals have as much right as humans to exist.	Strongly Agree	56	46.7	1.90
	Agree	20	16.7	
	Unsure	44	36.6	
	Disagree	0	0	
	Strongly Disagree	0	0	
8. Despite our special abilities, humans are still subject to the laws of nature.	Strongly Agree	40	33.3	2.30
	Agree	24	20.0	
	Unsure	44	36.7	
	Disagree	4	3.3	
	Strongly Disagree	8	6.7	
9. The so-called "ecological crisis" facing humankind has been greatly exaggerated.	Strongly Agree	10	8.4	2.56
	Agree	15	12.5	
	Unsure	36	30.0	
	Disagree	31	28.8	
	Strongly Disagree	28	23.4	
10. The balance of nature is very delicate and easily upset.	Strongly Agree	12	10.0	2.53
	Agree	48	40.0	
	Unsure	44	36.7	
	Disagree	16	13.3	
	Strongly Disagree	0	0	

Source: Dunlap *et al.* (2000).

aQuestion wording: "Listed top are statements about the relationship between humans and the environment. For each one, please indicate whether you Strongly Agree, Agree, are Unsure, Disagree or Strongly Disagree with it."

bNOTE: For each item, the brackets contain the mean scores of the whole sample (Mean). Scored on a 5-point Likert scale :

(1=Strongly Agree to 5= Strongly Disagree, for NEP item 1,3,5,7,8,10)

(1=Strongly Disagree to 5= Strongly Agree, for NEP item 2,4,6,9).

Results of the New Econloglcal Paradigm Scale (Abbrevlated version)

The item with the lowest mean score was NEP 7 (1.90), regarding the rights of plants and animals to exist. 63% of respondents 'strongly agreed' or 'agreed' with the statement, clearly showing a pro-environmental stance. The next item that appeared to be most popularly endorsed (by 90% of respondents) was NEP 3 (2.16), regarding the belief that "*when humans interfere with nature it often produces disastrous consequences*". NEP 5 (2.20), stating that "*humans are severely abusing the environment*" was also endorsed by a large proportion of the sample (63%). Furthermore, 53% of the sample endorsed the belief expressed by item NEP 8 (2.30) stating that *"Despite our special abilities, humans are still subject to the laws of nature"*. Regarding the statement that "*The balance of nature is very delicate and easily upset*" (NEP 10, mean score: 2.53), 50% of the respondents stated that they 'agree' or 'strongly agree'. Interestingly, only 21% of the sample (25 respondents) stated that they 'agree' or 'strongly agree' with the statement that "*The environmental crisis has been greatly exaggerated*" (NEP 9, mean score 2.56). A noticeable 30% stated that they were 'unsure', and 52% stated that they 'disagree' or 'strongly disagree', meaning that the majority of the sample believe that the environmental crisis is a valid alarm. Overall, it appears through these findings that the vast majority of respondents endorse pro-environmental beliefs. There is particularly strong agreement with the (anti-) anthropocentric worldviews that Dunlap et al. (2000) have stipulated, as well as with the worldviews around the delicate balances of nature and the disturbance incurred by humans. In line with the findings, it can be said that the majority of the respondents demonstrate a

combination of high environmental concern with proenvironmental values.

Attitude towards waste prevention

According to table (6), in order to classify the respondents Attitude the scores of statements were summed and the total score was obtained. Then, according to the highest (50) and the lowest score (10), the scores of any respondents were recorded and for examination of respondents Attitude 3 classes (positive, Average, negative) were considered.

Table 6. Distribution of Respondents Attitude towards waste prevention.

Rank	*Attitude*	*Frequency*	*Percent*
1	Negative (Mark < 31)	18	15
2	Average (31 ≤ Mark <42)	48	40
3	Positive (42 ≤ Mark)	54	45
Total	- 50 10	120	100

Considering table (6), it is shown that most respondents have positive Attitude (45%), and 40% has Average Attitude and just 15% has negative Attitude towards waste prevention**.**

[1] Use (ISDM) for classify $A\langle \bar{x}-\frac{1}{2}SD$ $\bar{x}-\frac{1}{2}SD$ $\langle B\langle \bar{x}+\frac{1}{2}SD$ $C\rangle \bar{x}+\frac{1}{2}SD$ (Gangadharappa *et al,* 2007).

Behaviours and behavioural intentions (WPPP)[1]

(Fig. 2) brings the findings related to WPPP behaviours and behavioural intentions under the same graph. The first point to note by looking at the reported behaviours on the left side is the varying nature of these activities as indicated by how often respondents reported that they carry them out. For example, compared to only 5.8% (7 respondents) that reported that they 'always' buy goods with the least packaging possible, 26.6% (32 respondents) reported that they 'always' buy their fruit and vegetables loose. This highlights the practical differences in undertaking the various behaviours (e.g. finding food choices with the least packaging is nothing less than cumbersome in a supermarket), and perhaps also reflects habitual behaviour (e.g. buying fresh produce loose is very common). It appears that the behaviours practiced less frequently are the ones that require to actively seek products that contribute less to waste (MIN1, 2, 4, 5, 7). Speculations as to why this is the case can be wide-ranging, and qualitative work is necessary as to establish a more complete picture. It will suffice to recognize that the differences may be down to issues of convenience, habit, lack of awareness of impacts behind certain consumer choices, product pricing (e.g. cheaper and convenient vs. dearer and durable), perceived relationship between quality and cost, the kind of goods offered in the market (e.g. over-packaged goods may be prevailing) and so forth.

The right side of the graph shows the scores for the same behavioural items, but with respect to the willingness to undertake each action. In sharp contrast with the frequency of the reported behaviours, the percentage of respondents that are 'willing' or 'very willing' to undertake action ranges from 70% (84 respondents, (MIN6): buy/use rechargeable batteries) to 91.7% (110 respondents, (MIN3): buy fruits and vegetables loose). Quite clearly, the vast majority of respondents, including those reported to carry out the behaviours on a more seldom basis, show a strong support towards the behaviours through their stated intentions. It is noticeable that the highest percentage of respondents stating that they were 'unwilling' or 'very unwilling' to carry out a behaviour is only 9% (MIN2).

[1] Waste Prevention at the Point of Purchase

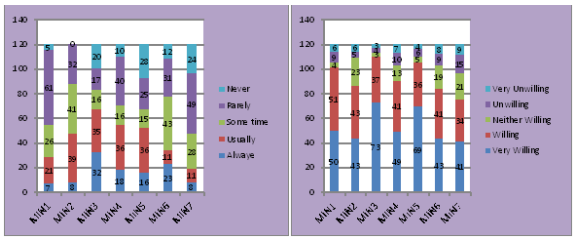


Fig. 2. Waste Prevention at the Point of Purchase: behaviours & behavioural intentions.

Household Waste Prevention Behaviours At the Point of Purchase

Reported Behaviour (RB) Reported Behavioural Intention (RBI)

	(RB)	(RBI)
MIN1: Buying goods with the least packaging possible	(2.70)	(4.08)
MIN2: Looking for packaging that can be easily reused or recycled	(3.19)	(3.97)
MIN3: Buying fruit and vegetables loose, not packaged	(3.35)	(4.44)
MIN4: Buying refills for some products	(3.10)	(3.95)
MIN5: Buying durable products and avoiding disposable ones	(2.89)	(4.40)
MIN6: Buying/useing rechargeable batteries	(3.01)	(3.58)
MIN7: Looking out for products made from recycled materials	(2.41)	(3.69)

NOTE: For each statement, the brackets contain the mean scores of the whole sample (Mean). Scored on a 5-point Likert scale (5= Always to 1= Never).

Furthermore, it is reasonable to assume that behaviours 1, 2, 5, 6, and 7 are the ones least likely to be influenced by, say, habit. In other words, it is reasonable to assume that they are not casual behaviours, but that, when they are carried out, they are carried out as a reflection of environmental concerns, values, and a sense of responsibility (also suggested by Tonglet *et al.*, 2004). However, the graph shows that the frequency with which these behaviours are carried out ranges from 'sometimes' to 'never' for the majority of the respondents, despite the findings demonstrate that the sample has a very high environmental concern and adheres largely with pro-environmental beliefs. In contrast, the stated intentions from the overwhelming majority of the sample are clearly strong.

These item-to-item comparisons show that there are wide disparities between intentions and actions. Furthermore, as certain behaviours are clearly pro-environmental behaviours enacted as an expression of environmental values and concern, the findings suggest that there is value-action gap.

Behaviours and behavioural intentions (WPTR)[2]

Similarly, (Fig. 3) summarises the findings related to WPTR behaviours and behavioural intentions.

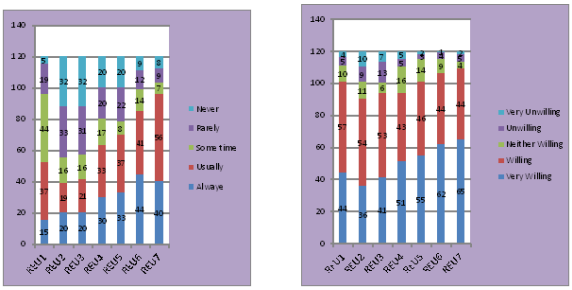


Fig. 3. Waste Prevention Through Reuse/Repair: behaviours & behavioural intentions.

Household Waste Prevention Behaviours Through Reuse/Repair

Reported Behaviour (RB)

Reported Behavioural Intention (RBI)

	(RB)	**(RBI)**
REU1 :Reusing plastic bags (or using durable ones) when going shopping	3.31	4.10
REU2 :Reusing wrapping paper from gifts or paper in general	2.68	3.80
REU3: Reusing glass bottles and jars, and/or plastic containers	2.71	3.90
REU4: Washing and reusing dish cloths (or similar cleaning items)	3.13	4.08
REU5: Trying to get things	3.34	4.24

[2] Waste Prevention through Reuse/Repair

repaired before deciding to buy new ones		
REU6: Save food, rather than throwing it away	3.82	4.35
REU7: Donate/sell items no longer needed, rather than throwing them away	3.92	4.37

NOTE: For each statement, the brackets contain the mean scores of the whole sample (Mean). Scored on a 5-point Likert scale (5= Always to 1= Never)

As expected, behaviours of reusing/repairing are more commonly practiced compared to WPPP behaviours. Not surprisingly, for example, washing and reusing dishcloths (REU 4), getting things repaired instead of replacing them (REU 5), saving food for later instead of throwing it away (REU 6), and donating unwanted items (REU 7) are either 'always' or 'usually' carried out by the majority of the sample. The results from the behaviours REU 1, 2, and 3 give a rather different picture. These behaviours are linked with personal actions that save resources and prevent waste in a more immediate manner. Reusing plastic bags is still a prominent behaviour for the majority who have stated that they 'always' or 'usually' undertake the behaviour (43.3%, 52 respondents), followed by 36.7% ('sometimes'), and 20% ('rarely' or 'never'). However, reusing packaging material, or reusing paper especially, are the least popular behaviours. Interestingly, the number of respondents that 'always' reuse both paper and packaging (bottles, jars etc.) is almost identical. Item-to-item comparisons with the corresponding behavioural intentions show a similar trend to what was observed for the WPPP behaviours. The majority of respondents support reuse/repair behaviours through expressing that they are either 'willing' or 'very willing' to undertake them (ranges from 75% for reusing paper, to 88% for saving food than discarding it). The fact that reusing paper or packaging are the least favourable is also noticeable in their corresponding behavioural intentions.

Applying the theory of planned behaviour: Multiple regression analysis

This is a method of correlation that assesses the effect of each independent variable (predictor) on the dependent variable. The results from the analyses for the WPPP and WPTR behaviours are presented separately in tabulated format, followed by corresponding path diagrams that become useful for visualising the various links within the TPB models.

Waste prevention at the point of purchase

Table (7) summarizes the results from the regression analysis undertaken for the dependent variables of WPPP. The relationships printed in bold are the ones that are statistically significant (significance level of < 0.05), thereby showing which variables are the underlying predictors.

In terms of the efficacy of the models, the results report that their explanatory power R2 adj. is relatively substantial with regards to 'intention', and moderate with regards to behaviour. This is reasonable and expected, as a questionnaire cannot account for all possible factors that might be influencing actual behaviour. Intention on the other hand is described more adequately, since its constituents ('attitude' especially) are comprised by numerous items. The findings can be investigated with more clarity using a path diagram (Fig. 4).

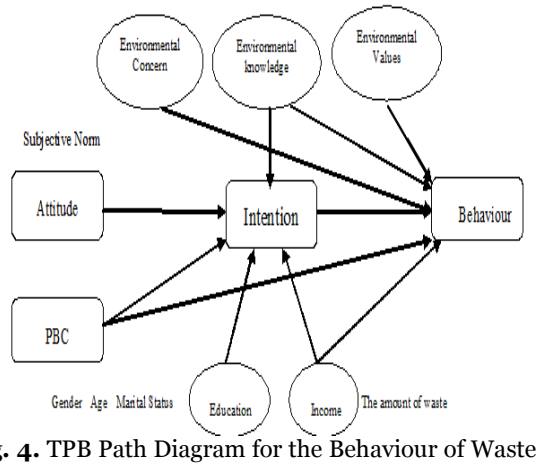


Fig. 4. TPB Path Diagram for the Behaviour of Waste Prevention at the Point of Purchase.

Table 7. Standardised regression coefficients (Beta weights) for the dependent variables of WPPP.

Independent Variable	*DEPENDENT VARIABLES (WPPP)*					
	INTENTION			BEHAVIOUR		
	Beta	***t***	***Sig. t***	**Beta**	***t***	***Sig. t***
Intention	-	-	-	.396	4.478	.003
Attitude	.421	2.151	.046	-	-	-
Subjective Norm	.023	.114	.911	-	-	-
Perceived Behavioural Control (PBC)	.124	1.396	.049	.112	1186	.005
Environmental Concern	.155	1.549	.140	.114	-.019	.005
Environmental knowledge	.296	2.365	.001	.189	-1.202	.049
Environmental Values	-.081	-1.927	.071	.267	2.327	.032
Gender	.158	1.301	.211	.064	4.032	.201
Age	-.020	-.590	.563	.012	2.983	.108
Marital Status	-.023	-1.297	.212	-.173	-2.291	.075
Education	.101	1.266	.009	.165	1.006	.329
Income	.106	- 1.516	.015	.171	1.322	.048
The amount of waste	-.144	-.417	.682	-.106	-2.301	.134
Model's Explanatory Power: R2 adj. (%)		0.61			0.54	
Model's Overall Significance (Fisher's Ratio)	F	5.163		F	4.886	
	Sig.	.005		Sig.	.002	

R2 adj. describes the explanatory power of the model by showing the proportion of the variance in the dependent variable that is explained by the independent variables. The higher the value of R2 adj. the more credible the model. Furthermore, to determine whether the explanatory power (R2 adj.) is greater than zero because of sampling error, Fisher's Ratio (F) and its significance level are used. Low significance values indicate that the R2 adj. is not an anomaly due to sampling error (De Vaus, 2002).

Waste prevention through reuse/repair

Table (8) summarizes the results from the regression analysis undertaken for the dependent variables of WPTR. In terms of the efficacy of the resultant models, both have moderate explanatory power. Similarly to WPPP, the variance explained by the independent variables is higher for 'intention' than it is for 'behaviour'. Although the explanatory power of the two models is not ideal (49% for intention, 43% for behaviour).

Figure (5) Similarly to WPPP, the 'subjective norm' construct is not a predictor. Based on the findings described previously with regards to WPTR, this can be interpreted as a indication that reusing involves activities that are well embedded in everyday life and, therefore, there aren't any perceived expectations or pressures that would encourage intentions.

On the other hand, the 'attitude' construct is the most significant predictor of intention with a Beta coefficient of 0.369. As shown in the descriptive analysis, this reflects a generally positive attitude towards waste prevention, combined with the high numbers of respondents that undertake several of the reuse/repair behaviours frequently.

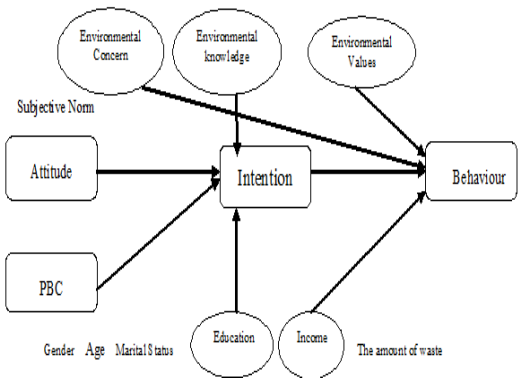


Fig. 5. TPB path diagram for the behaviour of Waste Prevention through Reuse/Repair

Table 8. Standardised regression coefficients (Beta weights) for the dependent variables of WPTR.

Independent Variable	*DEPENDENT VARIABLES (WPTR)*					
	INTENTION			**BEHAVIOUR**		
	Beta	***t***	***Sig. t***	**Beta**	***T***	***Sig. t***
Intention	-	-	-	.369	.495	.003
Attitude	.369	.395	.000	-	-	-
Subjective Norm	.068	.119	.653	-	-	-
Perceived Behavioural Control (PBC)	1.562	1.885	.023	-.144	-.417	.682
Environmental Concern	-.177	1.266	.523	.223	-2.297	.012
Environmental knowledge	1.313	1.988	.001	.023	.114	.911
Environmental Values	.086	1.256	.279	.101	2.342	.032
Gender	.101	1.630	.235	.155	1.549	.140
Age	-.077	1.260	.256	.059	1.886	.077
Marital Status	-.079	1.007	.251	-.081	-1.927	.071
Education	1.011	1.665	.000	.158	1.301	.211
Income	.263	.666	.235	-.220	-.590	.043
The amount of waste	-.273	.259	.256	.000	.002	.998
Model's Explanatory Power: R2 adj. (%)		0.49			0.43	
Model's Overall Significance (Fisher's Ratio)	F Sig.	3.062 .004		F Sig.	2.894 .023	

Recommendations and conclusions

In line with the aim set out at the beginning, the study has achieved its objectives towards exploring the sample's general environmental orientations and their HWP behaviours. The findings from the empirical work show that the vast majority of the studied population shared high environmental concerns, and generally appeared to endorse pro-environmental values. In contrast, however, evidence also show that there is a wide discrepancy between the numbers of respondents that stated high environmental orientations, and the numbers of respondents that appeared to undertake the pro-environmental activities systematically.Such discrepancies have been identified throughout the descriptive analysis, pointing towards a confirmation of the research hypothesis: that concerns for the environment do not translate into a coherent pro-environmental behaviours in the form of either WPPP or WPTR. Bearing in mind the complexity of these behaviours, and in order to explore this value-action gap in more depth, the conceptual framework offered by the Theory of Planned Behaviour (TPB) has been applied to both behaviours separately. The results arising from the applied model on WPPP behaviour confirm the underlying theory of the TPB. In other words, 'behaviour' is highly influenced by 'intention', which in turn is influenced by the 'attitude' and the 'perceived behavioural control'.

However, the insignificant influence of the 'subjective norm' factor reinforces the point that WPPP has not yet established itself as a widespread, pro-environmental practice. Furthermore, factors "environmental knowledge" and "concern for the community and the environment" and "Environmental Values" have a significant influence in behaviour. However, 'environmental knowledge' also has a significant influence on intention. In the case of WPTR, the results arising from the applied model deviate from what the underlying theory postulates in that the influence of PBC on behaviour is not statistically significant (though it significantly influences 'intention'). However, this might be attributed to the small sample size and not to an inconsistency of the theory. Nevertheless, the relationships between 'behaviour', 'intention', and 'attitude' are in line with the theory. Furthermore, the results show that, similarly to WPPP, intention is insignificantly influenced by the 'subjective norm' factor, indicating that reusing involves activities that are well embedded in everyday life. Finally, the additional factors of "environmental knowledge" and "concern for the community and the environment

"and" Environmental Values appear to exert significant influences on behaviour and intention respectively.

Planners can take advantage of the findings of this work in that they highlight certain factors which seem to influence waste prevention behaviours. For example, findings have shown that 'attitude' is a factor that shapes the willingness to undertake a behaviour. The construct of 'attitude' consists of items that largely reflect the benefits and outcomes of waste prevention at large. This means that to encourage positive attitudes, it might be advantageous to inform citizens about these benefits and about the real costs behind waste generation. For example, campaigns could explicitly make the links between everyday reusing practices and how they save resources and prevent waste. Inevitably, encouraging attitudes in favour of waste prevention involves some kind of awareness campaigns, and the infusion of some level of general environmental knowledge. The findings from this research provide concrete evidence that such general knowledges are significantly related to the behaviours studied. This becomes particularly important in the light of the recommendations by Barr *et al.* (2001) who strongly suggested that reducing, reusing, and recycling are treated as distinct behaviours. Therefore, separate campaigns might need to be considered in the future.

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