ANALYSIS OF THE PREDICTORS OF FIVE ECO-SENSITIVE BEHAVIOURS

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Abstract

Purpose: The aim of this study is to examine five different types of eco-sensitive behaviours separately and understand if determinants of these behaviours vary depending on the type of action being performed.

Design/methodology/approach: The study investigates factors influencing five different eco-sensitive behaviours by empirically testing the effects of socio-economic status (SES), gender, age and environmental values. Theoretically guided hypotheses and models were formulated and tested with multiple linear regression models by employing a dataset from the National Opinion Research Center (NORC) 2010 General Social Survey.

Findings: Results conclude that different types of behaviour have different predictors. While age differences only explain recycling cans and bottles (RCB), gender difference explains buying pesticide-free fruits/vegetables and avoiding environmentally harmful products (AHP). Values, on the other hand, predict all five eco-behaviours. Driving less and saving water for environmental reasons were least explained by the examined predictors.

Originality/value: These results contribute to untangling the confusing research evidence on the effects of SES, age, gender and environmental values on different environmental behaviours and on the relationship between them by examining each behaviour separately.

Keywords: Environmentally Sensitive Behaviour, Socio-economic status, Age, Gender, Environmental values, Green Consumer Behaviour, Sustainable consumption

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INTRODUCTION

An increasing number of environmental problems and their detrimental impacts all around the world are signalling the urgency of finding immediate solutions. Application of the possible solutions to these widespread problems will need the full participation of individuals (Steg and Vlek, 2009). Gaining society's support to overcome these environmental problems will be possible only if we can understand the factors affecting individuals' behaviours towards acting in a more ecologically conscious manner (e.g. buying ecologically friendly products, recycling and driving less frequently) and the mechanisms between these factors.

While research on understanding factors influencing individual eco-sensitive behaviours has grown in recent years, there has been very little attempt at distinguishing between different types of eco-sensitive behaviour. Consumer motivations towards these different types of behaviour could vary significantly depending on their demographics and psychographics, as well as facilitators and inhibitors. Also, most research has tended to use small surveys or qualitative approaches to address these issues.

The purpose of this research is to construct a model and examine the relationships that link an individual's age, gender, SES and environmental values with five different pro-environmental behaviours. The study is based on measures and data obtained from the highly reliable large-sample secondary database of the General Social Survey (GSS). The main objectives of the study are to (1) determine predictor variables of five different environmentally sensitive behaviours (i.e. buying pesticide-free fruits/vegetables, RCB, AHP, driving less for environmental reasons and saving water) and (2) see if the predicting variables vary depending on the type of behaviour. The study develops and tests hypotheses by running causal models linking predictor variables to each behavioural outcome, and analyses the results. Gaining a detailed understanding of individuals' different environmentally sensitive behaviours will be important for policy makers as well as researchers who are in search of solutions to the ever-increasing environmental problems that will eventually require human behavioural changes.

LITERATURE REVIEW AND HYPOTHESES CONSTRUCTION

Environmentally sensitive behaviour, defined as efforts by individuals to limit damaging actions that can harm the physical and natural environment

(Albayrak *et al.*, 2011), has become a research interest of many scholars (e.g. Kollmuss and Agyeman, 2002; Barr, 2007; Young *et al.*, 2010). According to Kollmuss and Agyeman (2002), environmentally sensitive behaviours such as decreasing resource and energy usage, using non-toxic materials, or decreasing waste production can be influenced by many different factors.

By pointing out the importance of categorizing the potential factors, Kollmuss and Agyeman (2002) identify the various environmental behaviour determinants as: (1) demographic factors; (2) external factors such as institutional, economic, social and cultural factors; and (3) internal factors such as pro-environmental knowledge, awareness, values, attitudes, motivation, emotion, priorities, locus of control and perceived responsibilities. While Kollmuss and Agyeman's (2002) contribution is to conceptually identify a comprehensive set of determinants, our study provides empirical validity by testing the effects of four critical determinants that predict different environmentally sensitive behaviours. For demographic factors, we consider age and gender to have an effect on environmentally sensitive behaviours. For the second category, external factors, we capture the SES of the individuals. Finally, for the internal factors, we chose environmental values as another important and significant determinant of environmentally sensitive behaviours.

According to Stern (2000), environmentally sensitive behaviours depend on various causal factors (general or behaviour-specific) and different kinds of environmentally significant behaviours have different causes (e.g. for behaviours that are expensive or difficult, contextual factors and personal capabilities are likely to account for more of the variance). The author also points out that since the important causal factors vary across behaviours, each target behaviour should be theorized separately. Similarly, Steg and Vlek (2009) state that "promoting behaviour change is more effective when one (1) carefully selects the behaviours to be changed to improve environmental quality, (2) examines which factors cause those behaviours…" (p. 309). Following their suggestions, in this study we examine different environmentally sensitive behaviours (i.e. buying pesticide-free fruits/vegetables, RCB, AHP, driving less for environmental reasons and saving water) separately.

SES

One of the most widely used factors in research on the influences of environmental behaviour is SES (Pauw and Petegem, 2010). SES is a

construct that incorporates multiple variables; these include objective features such as material wealth and access to resources such as education and income, and also societal perceptions of SES (Piff *et al.*, 2010). There are different approaches and findings in terms of the effects of the socio-economic background of individuals and their environmental attitudes/behaviours. For instance, Torgler *et al.* (2011) investigated a cross-section of individuals from 38 countries using micro-data from the World Values Survey (1995-1997) and suggest that individuals' active participation in environmental issues, specifically participating in environmental organizations, is highly related to their SES (Torgler *et al.*, 2011). Similarly, Owens *et al.* (2000) asserted the importance of the socio-economic characteristics of individuals in relation to their environmental behaviours. Their study examined and reported a strong and positive correlation between individuals' environmental behaviour (recycling habits) and their educational level, household income and home ownership status.

As a component of SES, income has also been identified as a predictor of environmental attitudes and behaviour. According to Shen and Saijo (2008), higher levels of environmentalism in general are associated with higher income levels. This relationship between income and environmentalism can also be linked to higher educational levels that are typically associated with higher income. Higher levels of education are confirmed to be positively associated with environmentalism (Van Liere and Dunlap, 1980; Barr, 2007). The typical assertion is that education exposes people to a broad variety of beliefs and ideas and a more liberal outlook on life. In addition, according to Piff *et al.* (2010), lower social class (or SES) can be linked to higher possibility of exposure to threat, fewer economic resources, fewer educational opportunities and a reduced feeling of personal control. Furthermore, individuals with lower class backgrounds usually deal with higher levels of stress in their relationships and even domestic violence (Piff *et al.*, 2010).These life circumstances might suggest that individuals with lower SES engage in less pro-social behaviour, prioritizing self-interest over the welfare of others. Hence, we put forth our first set of hypotheses:

> *H1a: There is a positive relationship between individuals' SES and buying pesticide-free fruits/vegetables.*
> *H1b: There is a positive relationship between individuals' SES and recycling.*
> *H1c: There is a positive relationship between individuals' SES and AHP.*

H1d: There is a positive relationship between individuals' SES and driving less for environmental reasons.

H1e: There is a positive relationship between individuals' SES and saving water for environmental reasons.

Gender

Gender differences in environmental behaviours have also received much attention in this field of research. In general, academics seem to broadly agree that women tend to be more concerned about the environment than men (Pauw and Petegem, 2010). Regarding environmental attitudes, a number of studies have shown that women are more sympathetic than men to environmental concerns (e.g. Greenbaum, 1995; Tindall *et al.*, 2003; Dietz *et al.*, 2002; Xiao and Hong, 2010), whereas others have been inconclusive in this regard (e.g. Klineberg *et al.*, 1998, Evans *et al.*, 2007). Although some studies have found no differences between men and women, a larger majority of studies have found that in contrast to men, women have at least a modestly higher level of concern for the environment (e.g. Davidson and Freudenburg 1996; Zelezny *et al.*, 2000). According to Xiao and Hong (2010), a relatively higher level of concern might be expected to translate to more environmentally focused behaviours.

A typical theoretical approach to explain gender differences in attitudes towards the environment considers gender roles and socialization (Zelezny *et al.*, 2000). Socialization theory asserts that behaviour and attitudes can be predicted from the process of socialization and that individuals are shaped by the context of cultural norms and expectations for their gender. Women across cultures are socialized to be more expressive, to have a greater concern for caregiving, to be more interdependent, compassionate, nurturing, cooperative and helpful (Han *et al.*, 2011; Jain and Kaur, 2006; Shen and Saijo, 2008). Men, by contrast, are socialized to be independent and competitive (Eagly, 1987). As such, the differences in socialization could be reflected in attitudes toward the environment (Pauw and Petegem, 2010). This approach helps us to identify our next hypotheses:

H2a: Women buy pesticide-free fruits/vegetables more often than men.

H2b: Women recycle more often than men.

H2c: Women avoid environmentally harmful products more often than men.

H2d: Women reduce driving for environmental reasons more often than men.

H2e: Women save water for environmental reasons more than men.

Age

Researchers have also identified age as a determinant of pro-environmental behaviours. The research evidence on age and its impact on eco-sensitive behaviours is mixed. Olli *et al.* (2001) pointed out the complex relationship between age and environmental behaviour of individuals, such that it has not been possible to determine unerringly a consistent significant correlation. For example, some studies in the literature reported a non-significant or positive relationship between age and various environmental-conscious components (Chan, 1999; Shrum *et al.*, 1995). Luo and Deng (2008) sampled 438 visitors to a national forest in China and found that older respondents were more pro-environment. Similarly, Chen *et al.* (2011) found that older people were more likely to engage in pro-environmental behaviour than their younger counterparts. Also, a large-scale study by Schultz *et al.* (2013) on littering behaviour showed that age negatively predicted individual littering. However, some other studies in the literature showed that younger people have more environmentally positive attitudes than older segments of the population (e.g. Diamantopoulos *et al.*, 2003, Pauw and Petegem, 2010, Onel and Mukherjee, 2011). For instance, a study by Lee (2008) showed that younger people were more concerned about environmental quality degradation than their older counterparts. Consequently, this concern is expected to be reflected in their values and attitudes towards the environment. Therefore, we identify our third group of hypotheses as follows:

> *H3a: There is a positive relationship between individuals' age and buying pesticide-free fruits/vegetables.*
> *H3b: There is a positive relationship between individuals' age and recycling.*
> *H3c: There is a positive relationship between individuals' age and AHP.*
> *H3d: There is a positive relationship between individuals' age and driving less for environmental reasons.*
> *H3e: There is a positive relationship between individuals' age and saving water for environmental reasons.*
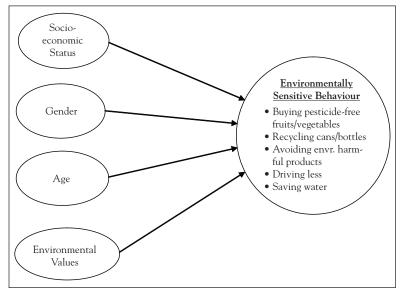
Environmental values

One of the most crucial predictors of behaviours towards the environment is considered to be environmental values (Davis *et al.*, 2011). Values are defined as the criteria that people use to select and justify actions and

assign worth to objects and the actions of others (Fraj and Martinaz, 2006). Each person has her/his own specific values that are shaped by experiences and learning processes (Kahle, 1996). People can express their values through their actions. For example, a person with higher environmental values might buy more ecologically friendly products, recycle and take part in environmental protection activities. In fact, some studies show that individuals who expressed that their personal values included respect toward the environment were more willing to purchase ecologically friendly products. There have been findings that those who most value ecological concerns are likely to have higher environmentally friendly behaviours (Fraj and Martinaz, 2006). Hence we put forth that:

> *H4a: There is a positive relationship between individuals' environmental values and buying pesticide-free fruits/vegetables.*
> *H4b: There is a positive relationship between individuals' environmental values and recycling.*
> *H4c: There is a positive relationship between individuals' environmental values and AHP.*
> *H4d: There is a positive relationship between individuals' environmental values and driving less.*
> *H4e: There is a positive relationship between individuals' environmental values and saving water.*

Based on these hypotheses, we aim to answer the following questions: (1) is there any difference between environmentally sensitive behaviours in terms of their predictors? and (2) is there a clear line of causality from SES, age, gender and environmental values to different environmentally sensitive behaviours? This study is designed to address these questions by exploring the relationships between SES, age, gender, environmental values and five environmentally sensitive behaviours.

METHODOLOGY

Based on the above hypotheses, we built a conceptual model for the study. The model is illustrated in Figure 1. According to the proposed model, individuals' SES, age, gender and environmental values have associations with their different personal behaviours towards the environment. In order to examine the casual relationships between identified variables and behavioural outcomes, we ran five multiple regression analyses, one for each of the eco-sensitive behaviours.

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Figure 1. Proposed
model showing the
influence of socio-
economic status,
gender, age and
environmental values
on environmentally
sensitive behaviour.

DATA

The dataset was compiled from the 2010 NORC GSS of the University
of Chicago, which includes a set of environmental items (GSS, 2010).
The GSS is a bi-annual nationally representative full-probability
weighted sample set of the U.S. adult population compiled by NORC.
It is designed to support social indicator research with modules touching
upon various current and emerging issues. The 1993 (N=1606), 2000
(N=1541) and 2010 (N=2044) GSS surveys include a module for the
environment consisting of 60 items addressing environmental attitudes
and behaviours (GSS, 2009).

SES was measured by a single index, called the socio-economic index,
which included education and income (GSS 2009). For environmental
values, the GSS's environmental value survey questions were used to
come up with an appropriate single measure. The survey items the GSS
uses for this variable are: concerned about the environment; almost
everything we do harms the environment; worrying too much about
progress harms the environment; economic growth is necessary to protect
the environment; and economic growth always harms the environment.
Scale items of negatively worded statements were reversed (almost
everything we do harms the environment; worrying too much about

progress harms the environment; and economic growth always harms the environment) to create consistency between items. Lastly, the data for the outcome variable capturing environmentally sensitive behaviours gathered from personal behaviours towards the environment were given as: recycle can bottles, buy pesticide-free fruits and vegetables, avoid purchasing environmentally harmful products, drive less and save water for environmental reasons. Missing data were replaced with the mean of the column in the dataset. The gender distribution of the sample of 2044 respondents was: 56.4% women and 43.6% men.

RESULTS

In order to explain each outcome variable by identified predictor variables, a series of multiple regression analyses was performed. A summary of results is displayed in Table 1.

The first regression equation including the four factors (i.e. SES, gender, age and values) affecting buying pesticide-free fruits/vegetables (BPF) is significant with an R Square (R^2) value of 0.027. Standardized beta coefficients for the GENDER $\rightarrow$ BPF link (0.071, $p=0.001$) and for the VALUE $\rightarrow$ BPF link (0.141, $p=0.000$) are both significant. However, the AGE $\rightarrow$ BPF (-0.024, $p=0.282$) and the SEI $\rightarrow$ BPF (-0.003, $p=0.880$) links are not significant. So, for the first analysed behaviour, buying pesticide-free fruits/vegetables, the direct effects of gender (*H2a*) and values (*H4a*) are significant and, as hypothesized, the analysis shows a positive relationship for both. The direct effects of SES (*H1a*) and age (*H3a*) are not significant. Thus, *H2a* and *H4a* are supported, whereas *H1a* and *H3a* are not.

The second regression analysis with the same four predictor variables and RCB as an outcome is significant ($p=0.000$), with an R^2 value of 0.096. Standardized beta coefficient for the GENDER $\rightarrow$ RCB link (0.002, $p=0.924$) is not significant. For the SEI $\rightarrow$ RCB link (0.087, $p=0.000$), AGE $\rightarrow$ RCB link (0.116, $p=0.000$) and VALUE $\rightarrow$ RCB link (0.266, $p=0.000$), beta coefficients are all significant. Since the direct effects of SES (*H1b*), age (*H3b*) and values (*H4b*) on recycling behaviour are significant, *H1b*, *H3b* and *H4b* are supported, whereas the hypothesis on gender (*H2b*) is not.

The results of the next regression analysis that considers AHP as an outcome show an R^2 value of 0.068. Standardized beta coefficients for

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Hypotheses		R²	(F-Sig.)	Std. Beta	p-Value	Results
H1a. SEI →	Buying pesticide-free fruits/vegetables	0.027	(0.000)	-0.003	0.880	Not supported
H1b. SEI →	Recycling cans and bottles	0.096	(0.000)	0.087	0.000	Supported
H1c. SEI →	Avoiding envr. harmful products	0.068	(0.000)	0.046	0.033	Supported
H1d. SEI →	Driving less for environmental reasons	0.015	(0.000)	0.004	0.850	Not supported
H1e. SEI →	Saving water for environmental reasons	0.010	(0.000)	-0.038	0.083	Not supported
H2a. Gender →	Buying pesticide-free fruits/vegetables	0.027	(0.000)	0.071	0.001	Supported
H2b. Gender →	Recycling cans and bottles	0.096	(0.000)	0.002	0.924	Not supported
H2c. Gender →	Avoiding envr. harmful products	0.068	(0.000)	0.042	0.050	Supported
H2d. Gender →	Driving less for environmental reasons	0.015	(0.000)	0.008	0.719	Not supported
H2e. Gender →	Saving water for environmental reasons	0.010	(0.000)	0.003	0.134	Not supported
H3a. Age →	Buying pesticide-free fruits/vegetables	0.027	(0.000)	-0.024	0.282	Not supported
H3b. Age →	Recycling cans and bottles	0.096	(0.000)	0.116	0.000	Supported
H3c. Age →	Avoiding envr. harmful products	0.068	(0.000)	0.021	0.328	Not supported
H3d. Age →	Driving less for environmental reasons	0.015	(0.000)	0.027	0.221	Not supported
H3e. Age →	Saving water for environmental reasons	0.010	(0.000)	0.000	0.987	Not supported
H4a. Values →	Buying pesticide-free fruits/vegetables	0.027	(0.000)	0.141	0.000	Supported
H4b. Values →	Recycling cans and bottles	0.096	(0.000)	0.266	0.000	Supported
H4c. Values →	Avoiding envr. harmful products	0.068	(0.000)	0.246	0.000	Supported
H4d. Values →	Driving less for environmental reasons	0.015	(0.000)	0.120	0.000	Supported
H4e. Values →	Saving water for environmental reasons	0.010	(0.000)	0.088	0.000	Supported

All hypotheses tested at $p<0.05$
Model: Regression results of the effects of Socio-economic Status, Gender, Age and Environmental Values on five Environmentally Sensitive Behaviours

Table 1. Summary
of results

the GENDER ➔ AHP link (0.042, $p=0.050$), SEI ➔ AHP link (0.046, $p=0.033$) and VALUE ➔ AHP link (0.042, $p=0.000$) are all significant. For this behaviour, only the AGE ➔ AHP link (0.021, $p=0.328$) is not significant. So, while gender difference, SES and values show a positive relationship with AHP behaviour, age difference does not explain any of the variance. Thus, *H1c*, *H2c* and *H4c* are supported, whereas *H3c* is not.

The next regression equation including the same four factors affecting driving less for environmental reasons (DL) is significant with an R^2 value of 0.015. The regression results show significant standardized beta coefficient just for the VALUE ➔ DL link (0.120, $p=0.000$). The AGE ➔ DL (0.027, $p=0.221$), GENDER ➔ DL (0.008, $p=0.719$) and SEI ➔ DL (0.004, $p=0.850$) links are not significant. Thus, *H4d* is supported but *H1d*, *H2d* and *H3d* are not.

Finally, the last regression of four factors affecting saving water for environmental reasons (SW) is significant ($p=0.000$) with an R^2 value of 0.010. Similar to the driving less behaviour, only the standardized beta coefficient for the VALUE ➔ SW link (0.088, $p=0.000$) is significant. However, the AGE ➔ SW (0.000, $p=0.987$), GENDER ➔ SW (0.033, $p=0.134$) and SEI ➔ SW (-0.038, $p=0.083$) links are not significant. Thus, *H4e* is supported but *H1e*, *H2e* and *H3e* are not.

DISCUSSION AND CONCLUSION

The results of the study show that values can predict the five examined environmentally sensitive behaviours of individuals. According to the results, environmental values significantly explain all five eco-sensitive behaviours in the study. No other predictor explains all five behaviours. This tells us that the environmentally sensitive behaviours of individuals are most affected by the environmental values they carry. The conclusion regarding values and sensitive behaviours towards the environment echoes the suggestion of Peattie (2010), who proposed that the emerging phenomenon of green consumption, which is complex and diverse in nature, is strongly influenced by consumer values and norms.

This study also reveals that SES is positively correlated with recycling and AHP. Similar to many of the prior research findings (e.g. Owens *et al.,* 2000; Shen and Saijo, 2008; Torgler *et al.*, 2011) that examine and

report a strong positive correlation between individuals' environmental behaviour and their SES, the results of this study also reveal that this association holds true for recycling and AHP.

In the literature, researchers have generally reported that women have higher, or modestly higher, levels of concern about the environment than men (Greenbaum, 1995; Tindall *et al.*, 2003; Dietz *et al.*, 2002; Xiao and Hong, 2010; Davidson and Freudenburg, 1996; Zelezny *et al.*, 2000; Pauw and Petegem, 2010). Interestingly, our study found a significant relationship between gender and pro-environmental actions only for the purchase behaviours (i.e. buying pesticide-free fruits/vegetables and avoiding purchase of environmentally harmful products). This result supports the findings of Zelezny *et al.* (2000) and Pauw and Petegem (2010), who used gender and socialization as bases to understand attitudes and behaviours toward the environment. For the recycling, driving less and saving water behaviours, our results parallel the findings of the study by Xiao and Hong (2010). In their comprehensive study examining 39 empirical studies focused on gender differences in environmental behaviours since 1995, Xiao and Hong (2010) found no gender differences in publicly oriented environmental behaviours. A similar study by Chen *et al.* (2011) on pro-environmental air travel behaviour revealed that there was no significant difference in environmental knowledge, environmental attitudes and pro-environmental behaviour. As a form of travel behaviour, this result echoes our findings for the less driving behaviour. Future studies should take these results into account and analyse gender issues by considering other environmentally sensitive behaviours, especially the ones related to consumption.

The study results also reveal that age differences can significantly explain recycling behaviour. This result is similar to the prior research findings from Luo and Deng (2008) and Chen *et al.* (2011), which found that older respondents were found to be more environmentally positive in their behaviours than younger respondents. Our findings, however, are contrary to the prior research findings of Diamantopoulos *et al.* (2003) and Lee (2008). Their studies reported a significant and negative relationship between age and environmental attitudes and environmental behaviour. It is possible that depending on the type of the environmental behaviour itself, the impact of age difference could vary. Furthermore, cultural differences might influence how older or younger individuals approach social issues, such as environmental deterioration, which can lead to a certain type of behaviour. Thus, it is also possible

that studies developed and conducted in different regions of the world can give different results for the same type of behaviour.

To sum up, the results of our study confirm that different pro-environmental behaviours have varying results in terms of gender, SES and age differences. Although all the behaviours we examined showed significant impact of values, this impact also varied depending on the type of the behaviour. These results tell us the importance of defining and examining each environmentally sensitive action separately rather than clustering them into one category.

Our study points to several interesting areas of future research. The results of the study show that the assessment of the relationship between different variables may need more explanatory items in the model. For instance, according to Nordlund and Garvill (2002), the decision to act in an environmentally friendly manner may involve clashing interests, such as the interests of the immediate individual versus those of the long-term collective. The individual benefits obtained from driving less or purchasing products that are pesticide-free are more significant than RCB. Furthermore, the model we developed did not consider externally imposed boundary conditions. For example, in the context of recycling under the category of environmentally sensitive behaviour, externally imposed boundaries can significantly affect the behaviour, such as convenience of the action and/or availability as suggested by Stern *et al.* (2000). Further analyses could better explain the outcomes related to the environmental behaviour if these conditions are included in the model. Research is also needed on longitudinal analysis of changes/trends in eco-sensitive behaviours and their determinants over time. These important suggestions from our study open new directions that need more attention in future studies.

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