Pro-environmental Behaviour, Environmental Attitude and Perceived Behavioural Control in a Sample of Young Irish Adults

Paula Ferrari

16101685

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Abstract

This study investigated the relationship between attitude, perceived behavioural control and pro-environmental behaviour in a sample of young Irish adults. Behaviour change is required to offset negative human impact on the environment in a time of great climatic change. Ireland is failing to meet deadlines to offset further negative impact and young adults of today will be those dealing with environmental issues in the future. It is important to understand factors related to their environmental behaviour and how to target interventions appealing to this cohort. There is a paucity of research into psychological factors affecting pro-environmental behaviour in Ireland. Using the Environmental Attitudes Inventory (EAI-24), the Perceived Behavioural Control Measure and the Pro-environmental Behaviour Scale, this study hypothesised that environmental attitude and perceived behavioural control would predict pro-environmental behaviour in a sample of young Irish adults. The findings show that environmental attitude was a significant predictor of pro-environmental behaviour (p = .003), while perceived behavioural control was not a significant predictor. This supports previous research which determined the complexity of predictors of pro-environmental behaviour and suggests that interventions to increase pro-environmental behaviour may rely on appealing to environmental attitude. Novel and more relevant measures may be required to capture the complex nature of predictors of pro-environmental behaviour in young Irish adults of today.

Keywords: Pro-environmental behaviour, perceived behavioural control, environmental attitude, young Irish adults, EAI-24, Perceived behavioural Control Measure, Pro-environmental Behaviour Scale

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Pro-environmental Behaviour, Environmental Attitude and Perceived Behavioural Control in a Sample of Young Irish Adults

In the last four years from 2015 to 2019, the earth has experienced the warmest temperatures on record, with worldwide hurricanes, droughts, wildfires, acidification of the oceans, rises in sea level and melting of the Arctic permafrost (United Nations NDC Global Outlook Report, 2019). These effects already negatively impact national economies and livelihoods (United Nations NDC Global Outlook Report, 2019). The government of Ireland has acknowledged climate change as a major and complex challenge which must be addressed in order to offset massive worldwide effects (Department of Communications, Climate Action and Environment, 2019). It is acknowledged that this challenge and the creation of sustainable development requires an integrated national and international approach (Department of Communications, Climate Action and Environment, 2019; United Nations NDC Global Outlook Report, 2019).

A recent national update on climate change by the Climate Change Advisory Council (2019) has revealed that although predictions in relation to reduction of greenhouse gases are favourable, Ireland has failed time and again to meet designated targets, and attributes this to low awareness and willingness levels. Considering that the sustainable energy plans of the Irish government include investment in areas such as upgrading energy efficiency, changes in agricultural practices and switching to more sustainable travel options (Department of Communications, Climate Action and Environment, 2019), changes in behaviour will be required for people to adapt to these sustainable practices, indeed, as far as the reorganization of daily life (Hargreaves, 2011). The Environmental Protection Agency (2019) suggests that context is of importance in

consumer decision-making in environmental matters and stresses the importance of understanding these contexts before implementation of regulations.

Environmental psychology investigates the complex behavioural relationships between humans and their environment, both built and natural (Kollmuss & Agyeman, 2002; Gifford & Nilsson, 2014). Young adults of today are those who will confront the environmental issues of the future and will be instrumental in environmental activism and change (McDougle, Greenspan & Handy, 2011). To this end, the current study aims to investigate the context in which these decisions are made in a sample of young Irish adults by examining the relationship between environmental attitudes, perceived behavioural control and pro-environmental behaviour.

Understanding variables that predict behaviour in a given population is important for effecting change (Sutherland, 1998). Dunlap & Van Liere (1978) acknowledged that ecological problems arise from issues relating to societal concerns, attitudes, and beliefs in relation to the environment. Stern (1992) identified the complex and problematic relationship between modern society and the environment. While reviews of initial research did not show a strong relationship between environmental attitude and positive behaviour towards the environment (Bamberg, 2003), further research established that the relationship was contextual and relied on perceived behavioural control (Bamberg, 2003).

Indeed, public understanding in relation to evaluation of behaviours in relation to climate change varies (Whitmarsh, 2009). The diversity in the presentation of issues, even whether we are facing “global warming” or “climate change” has qualitative and quantitative influence on peoples’ understanding of the issue (Whitmarsh, 2009). Other issues affecting pro-environmental attitude may relate to socio demographic factors. A

review by Gifford & Nilsson (2014) found that complex differences arise in how urban and rural dwellers perceive the environment and relate to it. Rural dwellers may rely more on their environment, but how they relate to it has been found to be ambiguous, with inhabitants of large Chinese cities displaying more pro-environmental behaviour than their smaller city counterparts. Students from rural areas in England report higher affinity with their environment than those raised in urban areas. A Canadian study reported similar levels of relatively high environmental concern in both urban and rural settings.

Diekmann and Preisendörfer (1998) found that women showed more environmental responsibility than men. Their research suggests that those with higher levels of education were less likely to engage in pro-environmental behaviours, shifting their focus of attention to areas where it was easy for them to display pro-environmental behaviour than those where they found difficulty (such as cutting down on their usage of hot water).

Background Theories

Behaviour.

According to Levitis, Lidicker & Freund (2009), behaviour is an internal response of an individual or group to stimuli which are either external or internal. Traditionally, it has been accepted to be predicted by attitudes, beliefs and values (Hargreaves, 2011). Ajzen's (1991) theory of planned behaviour suggests that behaviour is also dependent on intention, which in turn is influenced by subjective norm and perceived behavioural control. According to Bamberg (2003), changing behaviour results from changing static situational patterns of attitude, beliefs, values and norms. The fact that behaviour relies on contextual factors is therefore an important issue in its examination in different settings.

Attitude.

Attitude, according to Nosek (2007) is a cognitive response which is controllable and intentional. Attitudes are not directly observable and as such, must be measured either by self-report or implicit measures (Milfont & Duckitt, 2010). Attitude can be implicit (outside conscious control) or explicit (within conscious control) (Greenwald & Banaji, 1995; Rydell & McConnell, 2006). Since environmental attitude is not a sensitive issue, explicit measures such as direct self-reports (questionnaires and inventories) using Likert-like scales are employed (Milfont, 2009). Associations between self-reported EA and observed pro-environmental behaviour have been found to be weaker than is usually reported (Gifford & Sussman, 2012). This may arise either from over-reporting or from other variables (Chao & Lam, 2011).

Perceived behavioural control.

Ajzen and Fishbein (1980) originally discussed behaviour in terms of a theory of reasoned action (TRA), whereby the antecedent to any behaviour is the intention, and stronger intentions lead to more likelihood of a behaviour being carried out. According to the TRA, determination of intention relied on attitude towards a behaviour and subjective norm (the perception of social pressure to carry out a behaviour). Ajzen and Madden (1986) found that perceived behavioural control also played a role in intention and extended the TRA to include perceived behavioural control (PBC). perceived behavioural control relates to the individual's ability (ease or difficulty – self-efficacy) and resources (control) to carry out an intended behaviour (Sheeran, Trafimow & Armitage, 2003); Verplanken (2018). A review by Godin and Kok (1996) found that in 86% of studies in which the TRA was applied, perceived behavioural control predicted intention to action.

In order for perceived behavioural control to be relevant to intention, the planned behaviour must not be completely volitional; and confounding factors must be involved (Sheeran, Trafimow & Armitage, 2003). Furthermore, they suggest that perception of behavioural control must be similar to actual control in order for it to predict behaviour.

Ajzen & Madden (1986) found difficulty in the concept of measuring actual control, with similar individuals with similar resources having different perceptions of control over behaviour. Perceived control measures should therefore moderate the intention-behaviour relationship and measure past attempts at carrying out a behaviour (Sheeran, Trafimow & Armitage, 2003). Verplanken & Roy (2016) devised an instrument to measure perceived behavioural control over pro-environmental behaviour which assesses the ease or difficulty of the individual to carry out pro-environmental behaviour, and this instrument is employed in the current study.

Environmental Attitude and Perceived Behavioural Control as Predictors of Pro-environmental behaviour

According to Bundy (2004) behaviour results from the interaction between how we feel and what we believe and suggests that changing behaviour entails changing the associated beliefs and feelings. The part played by perception and attitude is important in relation to intention to carry out a behaviour (Ajzen, 1991). While it may be difficult to influence objective elements faced by consumers in pro-environmental decisions, it is possible to influence their perception and attitude (Ertz, Karakas & Sarigöllü, 2016).

Verplanken (2018) suggests that behaviour is driven by individual consideration of costs and benefits, which may not only have physical, but also psychological demands, such as resources, time or effort. Moreover, Verplanken (2018) points out that the costs

and benefits involved in pro-environmental behaviour are complex and subjective. Furthermore, this often involves a trade-off between immediate costs and future societal benefit, such as prioritising the wellbeing of others in an effort to promote a sustainable environment.

The relative levels of attitude and perceived behavioural control in predicting intention varies in relation to different situations and behaviours (Ajzen, 1991). Increased feelings of control increase the willingness to apply effort to carry out a behaviour according to Artmitage and Conner, (2001) who found in a meta-analysis that there are no absolutes in predicting social behaviour with TPB variances of between 12% and 55% in self-reported behaviour.

Self-report measures in environmental psychology have been accused of being influenced by social desirability responding (Costarelli & Colloca, 2004). Impression management, as suggested by Paulhus, 1984, would infer that people over-report attitude and behaviour in an effort to be seen better by others. Milfont (2008) however, found that this association is weak at least in the case of self-reporting of environmental attitudes and has no effect on ecological behaviour. Moreover, his research found that social desirability had no moderating effect on the relationship between the two variables.

Environmental attitude as a predictor of pro-environmental behaviour.

To effect change, unsustainable environmental patterns of behaviour must be replaced with pro-environmental behaviour, which is defined as behaviour that actively seeks to minimise the negative effects of one's relationship with the environment (Kollmuss & Agyeman, 2002). A contemporary definition of attitudes suggested by Eagly & Chaiken (2005, p.1), is one in which attitude is defined as "a psychological tendency

that is expressed by evaluating a particular entity with some degree of favour or disfavour". General attitude may not predict a specific behaviour well (such as pro-environmental behaviour) (Tanner & Kast, 2003), but specific attitudes have the ability to predict such behaviours (Mobley, Vagias & De Ward, 2010). Guagnano, Stern & Dietz (1995) established an interaction between behaviour and attitude which varies with context.

The importance of environmental attitude is that it can predispose one to behaviour that is advantageous or otherwise to the environment (Gifford & Sussman, 2012). Greenhill, Levinston, Leonard & Walker (2013) suggest that attitudes can be influenced by factors such as social norms, distance, fear/anxiety or by awareness and willingness (Armitage & Conner, 2001). Whitmarsh & O'Neill (2010) found that pro-environmental behaviour can be influenced by self-identity, Verkplanken and Roy (2015) found that habit and past behaviour influence pro-environmental behaviour. Milfont (2007) suggests that the limitation of pro-environmental attitude to certain societal groups may place constraint on pro-environmental behaviour. In addition, attitudes in relation to pro-environmental behaviour can be influenced by factors such as the wording/terminology used (Greenhill, Leviston, Leonard & Walker, 2013; Whitmarsh, 2009). There are numerous other variables which influence behaviour, but as more variables are added to the equation, the predictive power is reduced (Hargreaves, 2011).

Milfont (2007) suggested that environmental attitude is a psychological construct whereby perceptions or beliefs about the natural environment are evaluated qualitatively either favourably or unfavourably and are a crucial construct in environmental behaviour (Milfont & Duckitt, 2010). For the purpose of this study, environmental attitude relates to

attitude other than that related to self (Heberlein & Black, 1981) and refers only to the natural environment.

Perceived behavioural control as a predictor of pro-environmental behaviour.

According to the theory of planned behaviour (TPB) (Ajzen & Madden, 1986), the individual will carry out a behaviour when they feel they have perceived behavioural control, and the stronger the volitional control and confidence an individual perceives, the stronger will be the intention to carry out a behaviour (Litt, 1988). Perceived behavioural control relates to the resources and opportunities which determine behaviour. It can be directly influenced by attitude towards the behaviour and/or the subjective norm.

Ajzen (1991) suggests that perceived behavioural control can reflect both internal and external factors. Ertz, Karakas & Sarigöllü (2016) identified two aspects of influence on pro-environmental behaviour: intra- and extra-personal factors. Intra-personal factors are internal motivations of behaviour such as attitude, subjective norms and motivation; extra-personal factors are those that influence the perceived control of the individual. In the case of environmental behaviour, extra-personal factors or situational factors are those such as government/local policy, affordability of sustainable options, accessibility of transport alternatives and availability of recycling facilities (Guagnano, Stern & Dietz, 1995).

Contemporary Research and Rationale for Current Study

Gifford (2011) suggests the need for research and analysis of psychological barriers into inaction regarding pro-environmental behaviour. Moreover, it is recommended that values and barriers related to pro-environmental behaviour in different populations, cultures and contexts be investigated, as the responses of different groups to policies,

interventions and messages will vary (Gifford, 2011). Understanding the values and drivers of pro-environmental behaviour can enable the design of effective policy (Verplanken, 2018).

Desrochers, Albert, Milfont, Kelly & Arnocky (2019) found that women score significantly higher on both environmental attitude ($p = .02$) and pro-environmental behaviour ($p = .001$) than men. The habit discontinuity hypothesis (Bamberg, 2006) purports that successful interventions for behaviour change can occur when associated with life course changes. Relocation provides opportunity for behaviour change, as was substantiated by research conducted by Verplanken & Roy (2016). Contrary to this, van den Broek, Walker and Klöckner (2019) suggest that stable contexts create habit.

Methodological issues can arise when trying to compare studies with similar measures. For example, Capstick, Whitmarsh, Nash, Haggar & Lord (2019) used 20 questions from the PEBS along with others to assess belief types and consistency in pro-environmental behaviour. As their methodology and analysis related to a different construct it would not be possible to compare their findings with the current research.

Lorenzoni, Nicholson-Cole & Whitmarsh (2007) identified that few European or US studies have addressed peoples' willingness to change behaviour in order to alleviate climate change. The Environmental Protection Agency (2019) conducted a social research survey regarding consumer behaviour and health in relation to the environment in Ireland. The survey examined environmental influences on consumer behaviour, physical and mental health. A press release by iReach Insights (2019) suggests that 96% of the adult Irish population has concern for the environment and sustainability, 94% report recycling and 90% use energy efficient lighting. Notwithstanding this, there appears to be a paucity of peer-reviewed Irish studies which have addressed the subject of pro-environmental

behaviour from a psychological viewpoint or accounted for the variables that impact either action or inaction in this regard in Ireland.

The aim of the present study is to address the issue by investigating the psychological variables that mediate self-reported pro-environmental behaviour in Ireland such as attitude towards the environment and perceived behavioural control. The relationship between environmental attitude, perceived behavioural control and environmental attitude will be studied using analysis of data relating specifically to a sample of young adults in an Irish context. It is hoped that the findings can be used to inform policy as to how to address the factors currently influencing pro-environmental behaviour in Ireland.

Hypotheses

The first hypothesis to be investigated is that higher levels of self-reported pro-environmental behaviour will be predicted by holding more positive levels of environmental attitudes when age, gender, level of education and location of residence are controlled for in a sample of young Irish adults. The second hypothesis which will be investigated is that when controlling for age, gender, level of education, location of residence and environmental attitude, higher levels of perceived behavioural control will predict higher levels of self-reported pro-environmental behaviour in the same sample.

Methods

Ethics

Ethical approval was granted by the NCI Ethics Committee for the before the commencement of this study and as such the study conforms to the professional ethical guidelines of the Psychological Society of Ireland. Information, consent and debriefing information provided to participants in the survey are located in Appendices (Appendix E, F, & G). Understanding of the process and informed consent were obtained by means of a check box; progress was terminated in the case of participants not indicating understanding or consent.

Design and Participants

This study was cross-sectional in design, with the relationship between the predictor variables of environmental attitude, perceived behavioural control and demographic factors being investigated with regard to pro-environmental behaviour in a sample of young Irish adults between the ages of 18 and 25 through self-report measures.

Sample

A total of $N = 112$ surveys had been attempted online. Data collected from the survey was imported to SPSS 26 for analysis. Cases with missing data were coded 999 and SPSS was set to ignore these entries. Re-coding of negatively worded questions from the relative instruments was carried out as required. Analysis of descriptive statistics for the sample are shown in Table 2.

Measures

Environmental Attitudes Inventory-24. The Environmental Attitudes Inventory-24 (EAI-24; Milfont & Duckitt, 2010) (Appendix B) was used to measure self-reported environmental attitude. It is a brief version of the EAI (Milfont & Duckitt, 2010). The original 120-item scale is a multi-dimensional instrument designed to be a balanced and cultural-general tool, for measuring environmental attitude. The symbolic and instrumental functions of environmental attitude relate to preservation (nature should be preserved and protected) and utilisation (nature exists purely for benefit of human objectives). The EAI-24 uses two balanced items from each of the 12 original EAI scales (14 items from preservation and 10 items from utilisation). It has also been found to be free from the effects of social desirability.

In the original study, Cronbach's alpha for preservation was found to be .79 and for utilisation .78. In the current study, Cronbach's alpha was found to be .76 for preservation and .50 for utilisation, with the total environmental attitude scale having a reliability of .640. Attempts were made to increase these levels, but removal of items did not achieve a more satisfactory reliability level and it was decided to retain the full scale. This level, while below that recommended (.70) is acceptable when employing psychometric measures, owing to construct diversity and possible underlying multi-dimensionality (Kline, 1999); implications will be discussed in the Discussion.

The EAI-24 is a rating scale, scored using a seven-point Likert-like scale with anchors at 1 = strongly disagree and 7 = strongly agree. Twelve items are reverse scored. Totals for participants are summed and averaged to form a composite environmental attitude score. Higher scores on the environmental attitude score indicate a higher affinity

for preservation of the environment and therefore a more positive attitude towards the environment.

Pro-environmental Behaviour Scale. The Pro-environmental Behaviour Scale (PEBS; Whitmarsh & O'Neill, 2010), (Appendix C) was used to measure self-reported pro-environmental behaviour. It is a 24-item rating scale with self-reported pro-environmental behaviour scored across four domains on two Likert-like scales using the following anchors: (1) 0 = never, 1 = more than 3 years ago, 2 = in the last year to indicate past actions; and (2) 0 = never, 1 = often (3) always to indicate the frequency of the actions in question. The four domains relate to household energy and water use, waste behaviour, transport and eco-friendly shopping. Cronbach's alpha for the original scale was 0.92. For the current study Cronbach's alpha was .63. This level, while below that recommended, is acceptable when employing psychometric measures, owing to construct diversity and possible underlying multi-dimensionality (Kline, 1999). Possible reasons for this level are reported in the Discussion.

The PEBS comprises two subscales (seven items related to one-off behaviours and 17 frequent behaviours). A composite score was calculated for the results. The mean score for the original PEBS is 27.9 (*SD* = 9.7) out of a possible score of 72 (Whitmarsh & O'Neill, 2010). High scores on the PEBS indicate a high level of pro-environmental behaviour. The mean score on the PEBS in the current study was 30.5 (*SD* = 6.3).

Note: For the first sub-scale in the original instrument, one-off pro-environmental behaviour was measured on four anchors with the first response option "1 = 5 or more years ago". Since the second anchor measured "1 to 3 years ago", it was considered

prudent not to leave a temporal gap between response options and the time period was changed to “3 or more years ago”.

Perceived Behavioural Control Measure. The Perceived Behavioural Control Measure (PBCM; Verplanken & Roy, 2016), (Appendix D) is a 12-item indicator rating scale which measures the perception of an individuals’ ability to carry out pro-environmental behaviour. The instrument assesses perceptions across four domains of behaviour: water conservation, waste reduction and reduction of gas and electricity usage. The 5-point Likert-like scales use the following anchors 1 = strongly disagree to 5 = strongly agree. High scores indicate strong perception of control. The original study cites Cronbach’s alpha for the different domains to range from .63 to .77. Reliability of the total scale for the current study was found to be $\alpha = .74$.

Procedure

Pilot study. The survey was designed to study environmental attitude, perceived behavioural control and pro-environmental behaviour in a sample of young adults in Ireland and was accordingly piloted with six individuals of a relevant demographic. An error in the input of the anchor points of one question was noted and rectified. It was also noted that some of the seven questions on the PEBS (Whitmarsh & O'Neill, 2010), related to "one-off" energy use, may not have been relevant to participants in the target age group unless they owned their own home (for example "Please indicate the last time you took this action… "Installed insulation products in your home"; …. "Installed a renewable energy system in your home"). The decision was taken to retain this subscale, not only to ensure the reliability of the instrument, but also as it was felt that some participants may have either engaged in such behaviours or been instrumental in the undertaking of these one-off energy-related behaviours in their homes.

Sampling. Cross-sectional convenience sampling based on social media (Facebook), instant messaging (WhatsApp), e-mail and personal contact was employed for this correlational study. This elicited a snowball sample targeted at young adults between the ages of eighteen and twenty-five years, currently resident in Ireland. A poster was designed to request participation in an online survey related to pro-environmental behaviour among young adults in Ireland (Appendix A) and was included in e-mails, messages and posts. Recipients were invited to forward and share the link to the survey with prospective participants. Attempts were made to ensure that participants were spread over a geographically national area by contacting prospective participants across the country and a question on the survey required confirmation of residence in Ireland.

Data collection and ethics. This was carried out using a set of questionnaires in an online Google Forms survey. This outlined information related to the nature and purpose of the study. Participants were informed of the voluntary and anonymous nature of the process and advised that information collected would be averaged for analysis purposes. Although the survey process and measures were deemed to pose no threat to persons participating, screening questions in the process ensured that participation by persons with diminished capacity could not proceed. Eligible participants were requested to give informed consent if they wished to proceed with participation.

The survey consisted of three questionnaires regarding the following: pro-environmental behaviour, environmental attitude, and perceived behavioural control. Participants indicated their level of agreement with behavioural, attitudinal and perceived control statements on Likert-like scales. Demographic data related to gender, age, location of residence and highest level of education was also collected.

Initial Analyses

Scores were computed for each of the measures according to the original instructions of the instruments, yielding a composite pro-environmental behaviour, environmental attitude and pro-environmental behaviour. As highest level of education (with three levels) was not a dichotomous variable, a dummy variable was created to enable it to be included in regression analysis.

Results

Descriptive Statistics

Descriptive statistics for the frequencies of the current sample of young Irish adults in relation to gender, age, location of residence and highest level of education are presented in Table 1.

Table 1

Frequencies for current sample of young Irish adults on demographic variables (*n = 109*)

Variable	Frequency	Valid %
Gender		
Male	49	45
Female	60	65
Residence		
Urban/suburban	82	83.6
Rural	18	16.4
Education		
Second-level	8	8.9
Third-level	60	24.4
Post-graduate	22	66.7

Descriptive statistics for continuous variables for the current sample are displayed in Table 2.

Table 2

Descriptive statistics for continuous variables

	Mean (95% CI)	SE Mean	Median	SD	Range
Age	22.34 (21.93 – 22.76)	0.21	23	1.88	7
PEB	30.52 (29.29 – 31.75)	0.62	30	39.34	40
EA	89.72 (87.69 – 91.76)	1.03	92	10.74	51
PBC	3.66 (3.57 – 3.76)	0.05	3.67	0.51	2.58

Note. PEB = Pro-environmental behaviour. EA = Environmental Attitudes. PBC = Perceived Behavioural Control. CI = Confidence Interval. SE = Standard Error of Mean. *SD* = Standard Deviation.

Inferential Statistics

Correlations between the continuous predictor variables (age, environmental attitude, perceived behavioural control and pro-environmental behaviour) were analysed. None of the five predictor variables significantly correlated with pro-environmental behaviour (Table 3). Correlations between the all predictor variables were also assessed and ranged from $r =$ -.03 to $r =$ .54).

For regression analysis, Stevens (1996) suggests a sample size of fifteen times the number of predictor variables; with five predictor variables (gender, age, highest level of education, location of residence, environmental attitude and perceived behavioural control), this indicated that the sample size was appropriate for the proposed analysis. Hierarchical multiple regression was carried out to investigate the ability of environmental attitude and perceived behavioural control to predict levels of pro-environmental behaviour in a sample of young Irish adults over and above gender, age, highest level of education and location of residence. Preliminary analyses were performed to ensure there were no violations of the assumptions of normality, linearity and homoscedasticity (Appendices H, I, & J). Linearity was assessed by partial regression plots and a plot of standardised residuals against the predicted values. A Durbin-Watson statistic of 1.76 indicated independence of residuals against unstandardised predicted values. VIF levels < 10 indicated there was no multicollinearlity (Tabachnick & Fidell, 2013). There were no outliers as assessed by the presence of no standardised deleted residuals of > +/- 3 SD, there were no leverage values > 0.2 and all values for Cook's distance were < 1.

Mean scores for the EAI-24 in the current study are displayed in Appendix K. Mean scores for PEBS are displayed in Appendix L and for the PBCM in Appendix M.

A hierarchical multiple regression was carried out to determine how well pro-environmental behaviour scores could be explained firstly by environmental attitude and then perceived behavioural control when controlling for demographic variables. Step one of the hierarchical multiple regression involved entering gender, age, highest level of education, location of residence and environmental attitude. This step was not statistically significant, F (5,68) = 1.204; p = .317 and explained 8% of the variation in pro-environmental behaviour. When environmental attitude was added in step two it led to an increase in R^2 of .17 and the total variance explained by the model was 24.6%, a change which was statistically significant (R^2 Change = .165, F (6,67) = 3.648, p = .003). The addition of perceived behavioural control at step 3 contributed to the variance by 2.8% but was not statistically significant (p = .113). The model as a whole was statistically significant, F (7,66), p = .003. See Table 4 for full results.

Table 3

Correlations between continuous variables

Variables	1	2	3	4
1. Age	1			
2. EA	.28	1		
3. PBC	.16	.25	1	
4. PEB	.19	.43	.30	1

Note. EA = Environmental attitude. PBC = Perceived behavioural control. PEB = Pro-environmental behaviour. Statistical significance: *p < .05

Table 4

Hierarchical Multiple Regression Model Predicting Pro-Environmental Behaviour

	R	R^2	B	*B*	*SE*	CI 95% (B)
Model 1	.26	.08				
HLE			0.07	-0.08	5.14	-3.10 – 3.17
Gender			1.41	0.13	1.43	1.67 – 4.02
LOR			-0.77	-0.05	1.85	-0.40 – 1.26
Age			0.47	0.17	0.41	-4.75 – 2.65
Model 2	.50	.25*				
HLE			-1.22	-0.13	4.70	-2.73 – 3.06
Gender			0.18	0.16	1.30	-1.15 – 4.12
LOR			0.21	0.01	1.71	-3.63 – 3.28
Age			0.10	0.04	0.39	-0.72 – 0.87
EA			0.22	0.43	0.06	0.09 – 0.33
Model 3	.52	.28				
HLE			-0.95	-0.11	4.65	-2.77 – 2.94
Gender			1.72	0.16	1.29	-1.16 – 4.03
LOR			0.88	0.06	1.74	-0.75 – 0.82
Age			0.06	0.02	0.39	-2.91 – 4.12
EA			0.20	0.39	0.06	-0.07 – 0.31
PBC			1.86	0.18	1.17	-0.27 – 4.46

Note. R^2 = *R*-squared; β = standardized beta value; *B* = unstandardized beta value; *SE* = Standard errors of B; CI 95% (B) = 95% Confidence Interval for B; *n* = 96. HLE = Highest Level of Education. LOR = Location of Residence. EA = Environmental attitude. PBC = Perceived behavioural control. Statistical significance: *$p < .05$

An independent samples t-tests was conducted to compare levels of pro-environmental behaviour between males and females. Assumptions for the test were met with Shapiro-Wilk's test ($p > .05$) for normality between gender groups and Levene's test for equality of variances ($p = .093$). There was a non-significant difference in scores, with males ($M = 29.77$, $SD = 7.40$) scoring lower than females ($M = 30.91$, $SD = 5.22$), $t(99)$

= -9.13, p = .363, two-tailed. The magnitude of the differences in the means (mean difference = - 1.15, 95% CI = -3.64 to 1.34) was very small (Cohen's d = -.18).

An independent samples t-tests was conducted to compare levels of pro-environmental behaviour between urban/suburban and rural dwellers. Assumptions for the test were met, with Shapiro-Wilk's test (p > .05) for normality between gender groups and Levene's test for equality of variances (p = .286). There was a non-significant difference in scores, with urban/suburban dwellers (M = 31.05, SD = 5.66) scoring higher than rural dwellers (M = 27.82, SD = 8.44), t(100) = 1.97, p = .052, two-tailed. The magnitude of the differences in the means (mean difference = 3.24, 95% CI = -.025 to 6.50) was moderate (Cohen's d = .45).

A final independent samples t-tests was conducted to compare levels of perceived behavioural control between urban/suburban and rural dwellers. Assumptions for the test were analysed with Shapiro-Wilk's test (p > .05) for normality between gender groups. Levene's test for equality of variances was (p = .032). This suggested non-equality of variances between the groups, and reporting took this into consideration. There was a significant difference in scores, with urban/suburban dwellers (M = 3.72, SD = 0.47) scoring higher than rural dwellers (M = 3. 34, SD = 0.59), t(108) = 2.62, p = .016, two-tailed. The magnitude of the differences in the means (mean difference = 3.23, 95% CI = .078 to .688) was large (Cohen's d = .71).

A one-way ANOVA was performed to investigate if pro-environmental behaviour varied according to highest level of education. Tests for assumptions to determine suitability of data were carried out. Data was normally distributed for the groups as assessed by Shapiro-Wilk test (p > .05) and there was homogeneity of variances as found by Levene's test (p = .161). Pro-environmental behaviour scores of highest level of

education varied from secondary (n = 7, M = 32.43, SD = 4.20), to third-level (n = 57, M = 29.88, SD = 5.43) and post-graduate (n = 12, M = 32.83, SD = 5.70) (Appendix N). There was no statistically significant difference in pro-environmental behaviour scores between different levels of education ($F(2,73) = 1.95$, $p = .150$).

Discussion

The aim of this study was to investigate environmental attitude and perceived behavioural control as predictors of pro-environmental behaviour among a sample of young Irish adults. Investigation of predictors of pro-environmental behaviour is important because of the need for behaviour change in order to meet strict climate-action targets that are required to offset climate change (Department of Communications, Climate Action and Environment, 2019; United Nations NDC Global Outlook Report, 2019). Furthermore, little research has been carried out regarding the relationship between predictors of pro-environmental behaviour in the context of young Irish adults.

In relation to the first hypothesis proposed in this study, that higher levels of self-reported pro-environmental behaviour would be indicated by holding more positive levels of environmental attitude when age, gender, highest level of education and location of residence are controlled for in a sample of young Irish adults, the findings of the current study support this hypothesis, with a significant variance in pro-environmental behaviour being explained by environmental attitude. This is in keeping with the findings of Ertz, Karakas & Sarigöllü (2016) who found a significant attitude-behaviour relationship and Costarelli & Colocca (2014) who found that stronger ambivalent environmental attitude significantly predicted lower pro-environmental behaviour.

The second hypothesis proposed in this study was that when controlling for age, gender, highest level of education, location of residence and environmental attitude, higher levels of perceived behavioural control would predict higher levels of self-reported pro-environmental behaviour in a sample of young Irish adults. The findings of the current study do not support this hypothesis with a statistical but non-significant variance in pro-environmental behaviour being explained by perceived behavioural control. Verplanken

and Roy (2016) found perceived behavioural control to be a negative predictor of pro-environmental behaviour in a relocation study, while Carfora, Caso, Sparks & Conner (2017) found that perceived behavioural control significantly predicted pro-environmental behaviour.

Overall, while the models generated for this study explain that environmental attitude and perceived behavioural control are both predictors of pro-environmental behaviour in this sample of young Irish adults, the results found that environmental attitude has a statistically significant influence on pro-environmental behaviour relative to perceived behavioural control, so the second hypothesis proposed in this study (that when controlling for all other variables, higher levels of perceived behavioural control predicts pro-environmental behaviour) must be rejected. The findings of this study therefore suggest that implications for targeting engagement with pro-environmental behaviour in young Irish adults should appeal to the attitude they hold in relation to the environment (beliefs and values) and not to external factors, as was relevant to this sample of young adults. This is in contrast to the findings of Bamberg (2003) who found that attitudes were weakly associated with pro-environmental behaviour and that perceived behavioural control determined positive behaviour towards the environment.

Interestingly, when comparing gender groups, education levels and whether participants were from an urban/suburban or rural area with pro-environmental behaviour, these variables did not have a statistically significant effect on pro-environmental behaviour and effect sizes ranged from very small (gender) to moderate (urban/suburban or rural). This would seem to suggest the existence of a homogeneous demographic in this sample with regard to pro-environmental behaviour. This is in contrast to the findings of Desrochers, Albert, Milfont, Kelly & Arnocky (2019) who found females reporting

significantly more pro-environmental behaviour than males, as did Diekman and Preisendörfer (1998).

Young adults are not generally representative of a stable contextual population, and do not therefore have the opportunity for behaviour change (van den Broek, Walker and Klöckner , 2019). This may account for the lower level of pro-environmental behaviour *reported* by newly graduated young adults (those who have completed third-level) in this sample, who possibly live in rented accommodation. It is also consistent with the findings of Diekman and Preisendörfer (1998) who found that higher levels of education predicted lower levels of pro-environmental behaviour.

In relation to perceived behavioural control, urban/suburban dwellers displayed a significantly higher mean score, suggesting that location, perhaps linked with external factors such as transport and other pro-environmental facilities contributed to their perception of control over their behaviour.

Strengths and Limitations

This study set out to examine the relationship between environmental attitude, perceived behavioural control and pro-environmental behaviour in a sample of young Irish adults. The study attempted to test two hypotheses: if environmental attitude predicted pro-environmental behaviour; and when controlling for attitude and demographics, if perceived behavioural control predicted pro-environmental attitude. The results showed that environmental attitude significantly influences pro-environmental behaviour while perceived behavioural control does not.

A strength of this study was that it attempted to capture a nationally representative sample in an anonymous survey designed to yield a true indication of participants' self-

reported behaviour. The use of the EAI-24, designed to be free from social desirability bias should also have ensured unbiased reporting of attitudes.

There are several limitations to this study which may have influenced the results. The sample was a convenience snowball sample and although attempts were made to ensure a geographically national sample, it was self-selecting and may not be representative of the young adult population in Ireland. The study was correlational and relied on self-report; a randomised experimental study designed to capture actual or observed behaviour may yield different results. In the course of data analysis for this study it became apparent that current, contextual and relevant questions were not addressed and highlighted the need for the development of contemporary instruments tailored for use with a cohort of young adults.

Methodological flaws may have impacted on the results. An example of this is the wording of questions (PBCM) where reverse-coded questions could have had ambiguous meaning and were therefore not been scored accurately by the participant. For example, “I would find it easy to conserve water” may not have been interpreted as the opposite to “I would find it hard to reduce my water consumption” (where “consumption” of water may be understood as “drinking” rather than usage of water).

The reliability of the EAI-24 scale was another methodological issue. Although wording and re-coding was checked, the total scale failed to reach an appropriately acceptable alpha level, even with attempts to remove items, and should have been withdrawn (regardless that one subscale had adequate reliability). Given the constraints of an undergraduate study, however, it was not possible to re-run the survey. As such, this precludes the environmental attitude findings reported in this study from being validly compared with others. It is possible that the questions themselves may have contributed to

the low reliability. Participants may have experienced conflicting ethical issues regarding the factors of population growth and employment which would have influenced their scores. It was also possible that the questions related to government intervention into management of natural resources may have been ambiguously understood.

As stated in the methods section, it was found that some participants answered some of the one-off energy use questions (PEBS) when perhaps they could not have been in a position to do so; this may also be true of questions such as "driving economically" (PBCM), if participants did not have the use of a car. These are examples of closed-type questions with no possibility for clarification from the researcher. Contact information had been supplied, but participants were obviously reluctant to request clarification. A consequence of this was cases with missing data, lowering the sample size considerably. In order to counteract the issue of missing data, the questionnaires should have been set so that questions were mandatory to progress through the survey.

Implications for Future Research and Conclusion

The overall impression given by the results of this study supports previous research that pro-environmental behaviour is a complex and contextual issue which requires varying interventions for different strata of society in terms of demographics and factors which influence attitude and behaviour in diverse populations (Guagnano, Stern & Dietz, 1995). Given the multitude of possible predictors of pro-environmental behaviour, the importance of changing behaviour in relation to the environment, and the role of young adults in dealing with the future of climate change, the findings of the current study suggest that further research into alternative predictors of pro-environmental behaviour should be undertaken. Due to the paucity of research into the psychological factors influencing environmental behaviour in Ireland in general, the broader implications of this study

suggest it would be conducive to undertake a randomised and national survey to investigate why Ireland is failing to reach important goals in terms of behaviour change.

Future directions for research should investigate the complex relationship of other predictors of pro-environmental behaviour in stratified samples of varying cohorts to identify drivers and barriers to pro-environmental behaviour. This would enable informed policy to be implemented and to target successful interventions. Based on best practice and information obtained during the process of the current study, such studies might consider a large randomised stratified sampling method with an interview-type process and open questions preceding the questionnaires or an "if-then" questionnaire format using a custom-designed measure appropriate for the target population. Experimental design research could also identify differences between self-reported and actual behaviour.

In this study relating to young Irish adults, pro-environmental behaviour was predicted to a statistically significant degree by environmental attitude. Perceived behavioural control had an influence on pro-environmental attitude, but not to statistically significant degree. There appears to be no gender difference in relation to self-reported pro-environmental behaviour and little influence by level of education. There is a statistically significant difference between urban/suburban and rural dwellers in levels of pro-environmental behaviour.

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Appendix A

Poster for invitation to participate in the study

Appendix B

EAI-24

Milfont, T. L., & Duckitt, J. (2010)

Page 1 of 2: displaying the original 120-item EAI and instructions regarding the EAI-24

Appendix 2. Environmental attitude inventory (EAI).

Scale 01. *Enjoyment of nature*
01. I am NOT the kind of person who loves spending time in wild, untamed wilderness areas. (R)
02. I really like going on trips into the countryside, for example to forests or fields.*,†
03. I find it very boring being out in wilderness areas. (R)*
04. Sometimes when I am unhappy, I find comfort in nature.
05. Being out in nature is a great stress reducer for me.*
06. I would rather spend my weekend in the city than in wilderness areas. (R)
07. I enjoy spending time in natural settings just for the sake of being out in nature.
08. I have a sense of well-being in the silence of nature.*
09. I find it more interesting in a shopping mall than out in the forest looking at trees and birds. (R)*
10. I think spending time in nature is boring. (R)*,†

Scale 02. *Support for interventionist conservation policies*
01. Industry should be required to use recycled materials even when this costs more than making the same products from new raw materials.
02. Governments should control the rate at which raw materials are used to ensure that they last as long as possible.*,†
03. Controls should be placed on industry to protect the environment from pollution, even if it means things will cost more.*
04. People in developed societies are going to have to adopt a more conserving life-style in the future.*
05. The government should give generous financial support to research related to the development of alternative energy sources, such as solar energy.
06. I don't think people in developed societies are going to have to adopt a more conserving life-style in the future. (R)*
07. Industries should be able to use raw materials rather than recycled ones if this leads to lower prices and costs, even if it means the raw materials will eventually be used up. (R)*
08. It is wrong for governments to try and compel business and industry to put conservation before producing goods in the most efficient and cost effective manner. (R)
09. I am completely opposed to measures that would force industry to use recycled materials if this would make products more expensive. (R)
10. I am opposed to governments controlling and regulating the way raw materials are used in order to try and make them last longer. (R)*,†

Scale 03. *Environmental movement activism*
01. If I ever get extra income I will donate some money to an environmental organization.
02. I would like to join and actively participate in an environmentalist group.*,†
03. I don't think I would help to raise funds for environmental protection. (R)*
04. I would NOT get involved in an environmentalist organization. (R)*,†
05. Environmental protection costs a lot of money. I am prepared to help out in a fund-raising effort.*
06. I would not want to donate money to support an environmentalist cause. (R)*
07. I would NOT go out of my way to help recycling campaigns. (R)
08. I often try to persuade others that the environment is important.
09. I would like to support an environmental organization.*
10. I would never try to persuade others that environmental protection is important. (R)

Scale 04. *Conservation motivated by anthropocentric concern*
01. One of the best things about recycling is that it saves money.
02. The worst thing about the loss of the rain forest is that it will restrict the development of new medicines.
03. One of the most important reasons to keep lakes and rivers clean is so that people have a place to enjoy water sports.*,†
04. Nature is important because of what it can contribute to the pleasure and welfare of humans.*
05. The thing that concerns me most about deforestation is that there will not be enough lumber for future generations.*
06. We should protect the environment for the well being of plants and animals rather then for the welfare of humans. (R)
07. Human happiness and human reproduction are less important than a healthy planet. (R)
08. Conservation is important even if it lowers peoples' standard of living. (R)*
09. We need to keep rivers and lakes clean in order to protect the environment, and NOT as places for people to enjoy water sports. (R)*,†
10. We should protect the environment even if it means peoples' welfare will suffer.(R)*

Scale 05. *Confidence in science and technology*
01. Most environmental problems can be solved by applying more and better technology.
02. Science and technology will eventually solve our problems with pollution, overpopulation, and diminishing resources.*
03. Science and technology do as much environmental harm as good. (R)
04. Modern science will NOT be able to solve our environmental problems. (R)*,†
05. We cannot keep counting on science and technology to solve our environmental problems. (R)*
06. Humans will eventually learn how to solve all environmental problems.*
07. The belief that advances in science and technology can solve our environmental problems is completely wrong and misguided. (R)*
08. Humans will eventually learn enough about how nature works to be able to control it.
09. Science and technology cannot solve the grave threats to our environment. (R)
10. Modern science will solve our environmental problems.*,†

Scale 06. *Environmental threat*
01. If things continue on their present course, we will soon experience a major ecological catastrophe.*
02. The earth is like a spaceship with very limited room and resources.
03. The balance of nature is very delicate and easily upset.
04. When humans interfere with nature it often produces disastrous consequences.*
05. Humans are severely abusing the environment.*,†
06. The idea that we will experience a major ecological catastrophe if things continue on their present course is misguided nonsense. (R)
07. I cannot see any real environmental problems being created by rapid economic growth. It only creates benefits. (R)
08. The idea that the balance of nature is terribly delicate and easily upset is much too pessimistic. (R)*
09. I do not believe that the environment has been severely abused by humans. (R)*,†
10. People who say that the unrelenting exploitation of nature has driven us to the brink of ecological collapse are wrong. (R)*

Appendix 2 *(continued)*

Scale 07. *Altering nature*
01. Grass and weeds growing between paving stones may be untidy but are natural and should be left alone. (R)
02. The idea that natural areas should be maintained exactly as they are is silly, wasteful, and wrong.
03. I'd prefer a garden that is wild and natural to a well groomed and ordered one. (R)*,†
04. Human beings should not tamper with nature even when nature is uncomfortable and inconvenient for us. (R)*
05. Turning new unused land over to cultivation and agricultural development should be stopped. R)*
06. I'd much prefer a garden that is well groomed and ordered to a wild and natural one.*,†
07. When nature is uncomfortable and inconvenient for humans we have every right to change and remake it to suit ourselves.*
08. Turning new unused land over to cultivation and agricultural development is positive and should be supported.
09. Grass and weeds growing between pavement stones really looks untidy.*
10. I oppose any removal of wilderness areas no matter how economically beneficial their development may be. (R)

Scale 08. *Personal conservation behaviour*
01. I could not be bothered to save water or other natural resources.(R)*
02. I make sure that during the winter the heating system in my room is not switched on too high.
03. In my daily life I'm just not interested in trying to conserve water and/or power. (R)*
04. Whenever possible, I take a short shower in order to conserve water.
05. I always switch the light off when I don't need it on any more.*
06. I drive whenever it suits me, even if it does pollute the atmosphere. (R)
07. In my daily life I try to find ways to conserve water or power.*
08. I am NOT the kind of person who makes efforts to conserve natural resources. (R)*,†
09. Whenever possible, I try to save natural resources.*,†
10. Even if public transportation was more efficient than it is, I would prefer to drive my car. (R)

Scale 09. *Human dominance over nature*
01. Humans were meant to rule over the rest of nature.*
02. Human beings were created or evolved to dominate the rest of nature.*,†
03. Plants and animals have as much right as humans to exist. (R)*
04. Plants and animals exist primarily to be used by humans.*
05. Humans are as much a part of the ecosystem as other animals. (R)
06. Humans are no more important in nature than other living things. (R)
07. Nature exists primarily for human use.
08. Nature in all its forms and manifestations should be controlled by humans.
09. I DO NOT believe humans were created or evolved to dominate the rest of nature.(R)*,†
10. Humans are no more important than any other species. (R)*

Scale 10. *Human utilization of nature*
01. It is all right for humans to use nature as a resource for economic purposes.
02. Protecting peoples' jobs is more important than protecting the environment.*,†
03. Humans do NOT have the right to damage the environment just to get greater economic growth. (R)*
04. People have been giving far too little attention to how human progress has been damaging the environment. (R)
05. Protecting the environment is more important than protecting economic growth. (R)*
06. We should no longer use nature as a resource for economic purposes. (R)
07. Protecting the environment is more important than protecting peoples' jobs. (R)*,†
08. In order to protect the environment, we need economic growth.
09. The question of the environment is secondary to economic growth.*
10. The benefits of modern consumer products are more important than the pollution that results from their production and use.*

Scale 11. *Ecocentric concern*
01. The idea that nature is valuable for its own sake is naive and wrong. (R)*
02. It makes me sad to see natural environments destroyed.
03. Nature is valuable for its own sake.*
04. One of the worst things about overpopulation is that many natural areas are getting destroyed.
05. I do not believe protecting the environment is an important issue. (R)*
06. Despite our special abilities humans are still subject to the laws of nature.*
07. It makes me sad to see forests cleared for agriculture.*,†
08. It does NOT make me sad to see natural environments destroyed. (R)*,†
09. I do not believe nature is valuable for its own sake. (R)
10. I don't get upset at the idea of forests being cleared for agriculture. (R)

Scale 12. *Support for population growth policies*
01. We should strive for the goal of "zero population growth".
02. The idea that we should control the population growth is wrong. (R)
03. Families should be encouraged to limit themselves to two children or less.*,†
04. A married couple should have as many children as they wish, as long as they can adequately provide for them. (R)*,†
05. Our government should educate people concerning the importance of having two children or less.*
06. We should never put limits on the number of children a couple can have. (R)*
07. People who say overpopulation is a problem are completely incorrect. (R)
08. The world would be better off if the population stopped growing.
09. We would be better off if we dramatically reduced the number of people on the Earth.*
10. The government has no right to require married couples to limit the number of children they can have. (R)*

Note. R = reversed coded items. * The 72 balanced items selected for the short version of the EAI (i.e., EAI-S). † The 24 balanced items selected for the brief version of the EAI (i.e., EAI-24).

Appendix C

Pro-environmental Behaviour Scale

Whitmarsh, L., & O'Neill, S. (2016)

Table 2
Pro-environmental behaviour measures and scores.

	Mean	SD	Unrotated factor loading[c]
Please indicate the last time you took this action (if at all)[a]			
Installed insulation products in your home	1.15	.96	.37
Bought or built an energy-efficient home	.18	.57	.11
Installed a more efficient heating system	.80	.99	.30
Installed a renewable energy system (e.g., solar panels, wind turbine) in your home	.07	.39	.10
Changed to a 'green' energy tariff for your home	.25	.73	.12
Bought a low-emission vehicle (e.g., hybrid, electric, biofuel, less than 1.4 L engine)	.34	.80	.20
Bought a product to save water (e.g., water but, water 'hippo', low-flush toilet)	1.05	1.14	.51
Please indicate how often you take each action[b]			
Turn off lights you're not using	2.56	.71	.53
Drive economically (e.g., braking or accelerating gently)	1.75	1.12	.38
Walk, cycle or take public transport for short journeys (i.e., trips of less than 3 miles)	1.86	1.00	.40
Use an alternative to travelling (e.g., shopping online)	.90	.93	.36
Share a car journey with someone else	1.05	.90	.39
Cut down on the amount you fly	1.10	1.18	.45
Buy environmentally-friendly products	1.43	.79	.70
Eat food which is organic, locally-grown or in season	1.60	.85	.60
Avoid eating meat	.66	.94	.44
Buy products with less packaging	1.46	.86	.66
Recycle	2.52	.81	.66
Reuse or repair items instead of throwing them away	1.88	.94	.61
Compost your kitchen waste	1.36	1.32	.48
Save water by taking shorter showers	1.59	1.13	.59
Turn off the tap while you brush your teeth	2.15	1.07	.57
Write to your MP about an environmental issue	.11	.38	.30
Take part in a protest about an environmental issue	.11	.38	.36

[a] Response options: never (0), 5 or more years ago (1), 1–3 years ago (2), In the last year (3).
[b] Response options: never (0), occasionally (1), often (2), always (3).
[c] Unrotated PCA indicated one component solution, accounting for 21.7% of variance.

Appendix D

Perceived Behavioural Control Measure

Verplanken, B., & Roy, D., (2016)

APA Psyc Tests Database Record:

Perceived Behavioural Control Measure
Verplanken, B., & Roy, D. (2016). *Perceived Behavioural Control Measure* [Database record]. APA PsycTests.
https://doi.org/10.1037/t48987-000

Description
The Perceived Behavioural Control Measure (Verplanken & Roy, 2016) was developed within the context of a study of an intervention promoting sustainable behaviours. Twelve items are used to assess respondents' perceptions of their ability to perform environmentally friendly behaviours. The measure consists of 4 behavioural domains: Using Less Water (3 items; e.g., "I would find it easy to conserve water"), Producing Less Waste (3 items), Reducing the Car Less for Short Journeys (3 items), and Reducing Gas and Electricity Use (3 items). Responses are reported on 5-point scales with the following anchors: 1 (strongly disagree), 2 (disagree), 3 (undecided), 4 (agree), and 5 (strongly agree). The measure was administered to a sample of adult residents of Peterborough, England. Cronbach alpha scores for the 4 behavioural domains varied between 0.63 and 0.77. For each respondent the responses were averaged into an aggregated perceived control index. High scores indicated strong perceptions of control.

Permission was sought from the authors by e-mail to use this measure. I was provided with the following 12 questions and scoring instructions were provided.

I would find it easy to produce less waste.
Cutting back on the amount of waste I produce would not be hard to do.
I don't really know how I could reduce the amount of waste that I produce.

I would find it easy to conserve water.
Cutting back on my water consumption would not be hard to do.
I don't really know how I could reduce the amount of water that I use.

I would find it easy to use less electricity and gas.
Cutting back on my electricity and gas consumption would not be hard to do.
I don't really know how I could reduce my electricity and gas consumption.

I would find it easy to reduce the use of the car for short journeys.
Cutting back on using the car for short journeys would not be hard to do.
I don't really know how I could reduce the use of the car for short journeys.

Appendix E

Information Sheet as displayed on Google Forms Survey

INFORMATION SHEET

You are invited to take part in a research study. Before doing so, you need to understand why the research is being done and what your involvement means. Please take time to read the following information carefully before giving your consent to continue with the survey.

My name is Paula Ferrari, I am an undergraduate psychology student at the National College of Ireland (NCI). The aim of this study is to investigate attitudes about climate change, self-reported pro-environmental behaviour (PEB) and perceived control over PEB in young adults in Ireland. This survey forms part of the final year qualification for a degree course. The findings of this study will not be published for financial gain, and no benefit will accrue to me, other than the qualification for which I am currently studying. The results of this study will be available, on request (following assessment by the National College of Ireland and the Psychological Society of Ireland (PSI) by contacting my Supervisor or myself (details provided below).

Taking part in this study will initially involve reading and understanding this Information Sheet in relation to the nature and purpose of the study, then indicating that you have read and understand this information. This will be followed by a Consent Form and survey questionnaires. Demographics questions will be asked for statistical purposes but you will not be asked for name/address or any other personal information which may be identifiable. Your email or IP address will not be tracked or saved. The total time taken, including reading this Information and Debriefing at the end should take less than 15 minutes. The questions require only check box answers.

Data relating to this research will be completely anonymous and averaged for analysis. It will be retained for two years from the date of assessment for the academic qualification that is being sought. Due to the anonymous nature of the process, it will not be possible to revoke or access any data after it has been submitted.

Your participation is completely voluntary; you have the right to refuse participation, you have the right to refuse any question, and the right to withdraw from the process at any time without consequence. There is no benefit to you from taking part, other than assisting me with your much appreciated and valuable input of time and interest. The results of the study may reflect attitudes and behaviour in relation to climate change in Ireland that have not been highlighted to date and this may be of benefit for further research into pro-environmental behaviour and/or to inform policy targeting areas which can be influenced to improve pro-environmental behaviour in Ireland.

For further information, you may contact: Paula Ferrari, National College of Ireland, IFSC, Mayor Square, Dublin 1 (e-mail: paula.ferrari@student.ncirl.ie) and/or Dr. David Mothersill, Supervisor, National College of Ireland, IFSC, Mayor Square, Dublin 1 (e-mail: david.mothersill@ncirl.ie).

I am over 18 and under 26 years of age and have read and understand the information sheet regarding the nature and purpose of the survey

I declare that I am not suffering from any clinical condition or under the influence of medication that may interfere with my participation in this study

I am resident in Ireland: Yes/No (*Note.* Participation could not proceed without Yes answer)

Appendix F

Informed Consent Form as displayed on Google Forms Survey

PARTICIPANT INFORMED CONSENT FORM

I have read and understood the nature and purpose of this study as outlined in the Information Sheet. I understand that if I agree to participate, I may refuse to answer any question and withdraw at any time without consequence. I understand that my data will be completely anonymous. I understand that if I do not complete the survey my data will not be saved and therefore will not be included in the study. I understand that the study involves a questionnaire relating to pro-environmental behaviour and a brief demographic questionnaire. I understand that no personal or tracking information will be requested or retained. I understand that I will not benefit in any way from participating in this research.

I understand that all data relating to this research will be retained for two years from the date of assessment for the degree qualification that is being sought. I understand that due to the anonymous nature of my data, it will not be possible to revoke it or access it after the survey has been submitted.

I understand that I can contact the researcher: Paula Ferrari, National College of Ireland, IFSC, Mayor Square, Dublin 1 (e-mail: paula.ferrari@student.ncirl.ie) and/or Dr. David Mothersill, Supervisor, National College of Ireland, IFSC, Mayor Square, Dublin 1 (e-mail: david.mothersill@ncirl.ie).

I understand that if I make contact with these parties after completion of the questionnaire that my participation may be known, but my data will remain anonymous.

I hereby give my informed consent and agree to participate in this study: Yes/No

(*Note.* Participation could not proceed without Yes answer)

Appendix G

Debriefing Information as displayed on Google Forms Survey

DEBRIEFING INFORMATION

Thank you for participating in this study investigating attitudes about climate change, self-reported pro-environmental behaviour and perceived control over this behaviour in young adults in Ireland. Your time and participation is much appreciated. Once you click "Submit" your input will be saved and averaged for research purposes. No personal details will be saved.

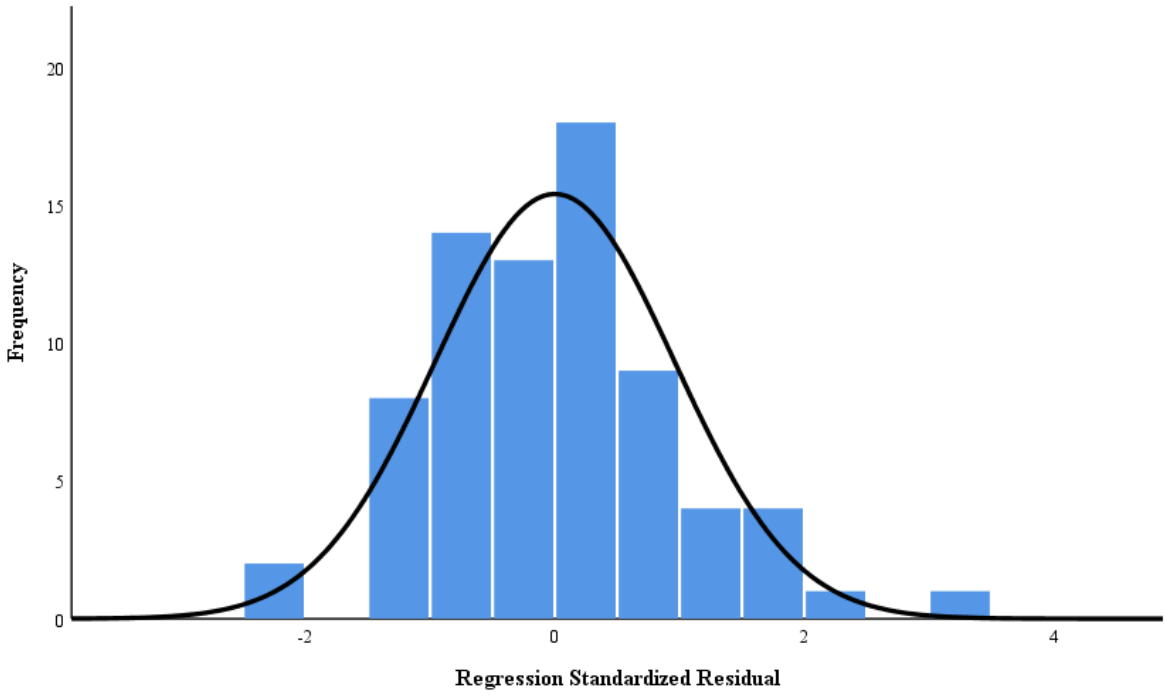
If you are aware of any family, friends or colleagues who would be happy to participate, please feel free to share the link you received in order for them to participate. You are requested to cooperate and not share the nature or content of this study with them until they have had the opportunity to participate; this is because advance knowledge of the process could undermine the results.

For further information regarding your participation in the survey or to obtain information regarding any qualification, reports, publications or presentations attaching to or based on the information obtained in the study, please contact Paula Ferrari, National College of Ireland, IFSC, Mayor Square, Dublin 1 (e-mail: paula.ferrari@student.ncirl.ie) and/or Dr. David Mothersill, Supervisor, National College of Ireland, IFSC, Mayor Square, Dublin 1 (e-mail: david.mothersill@ncirl.ie).

Thank you again for your time!

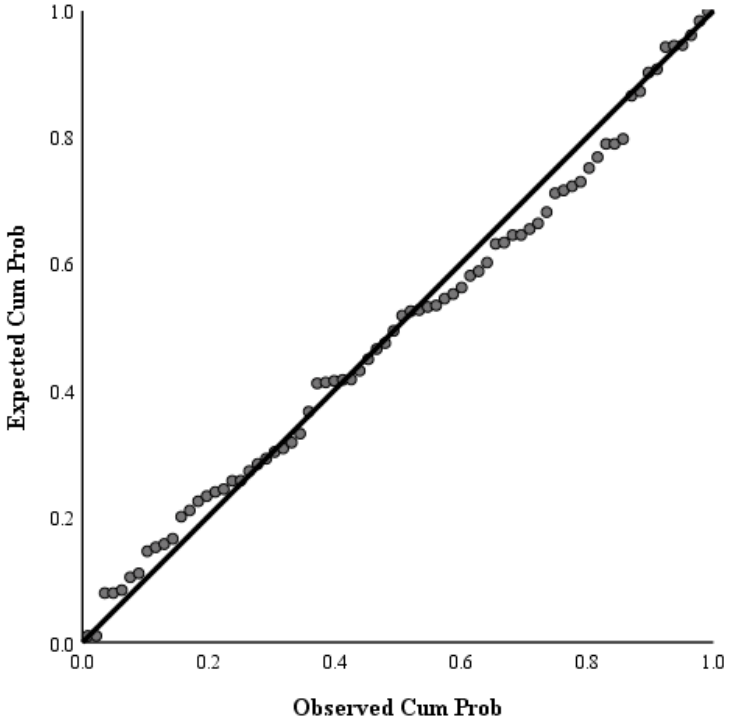
Appendix H

Assumption test for normality. Dependent variable: Pro-environmental Behaviour



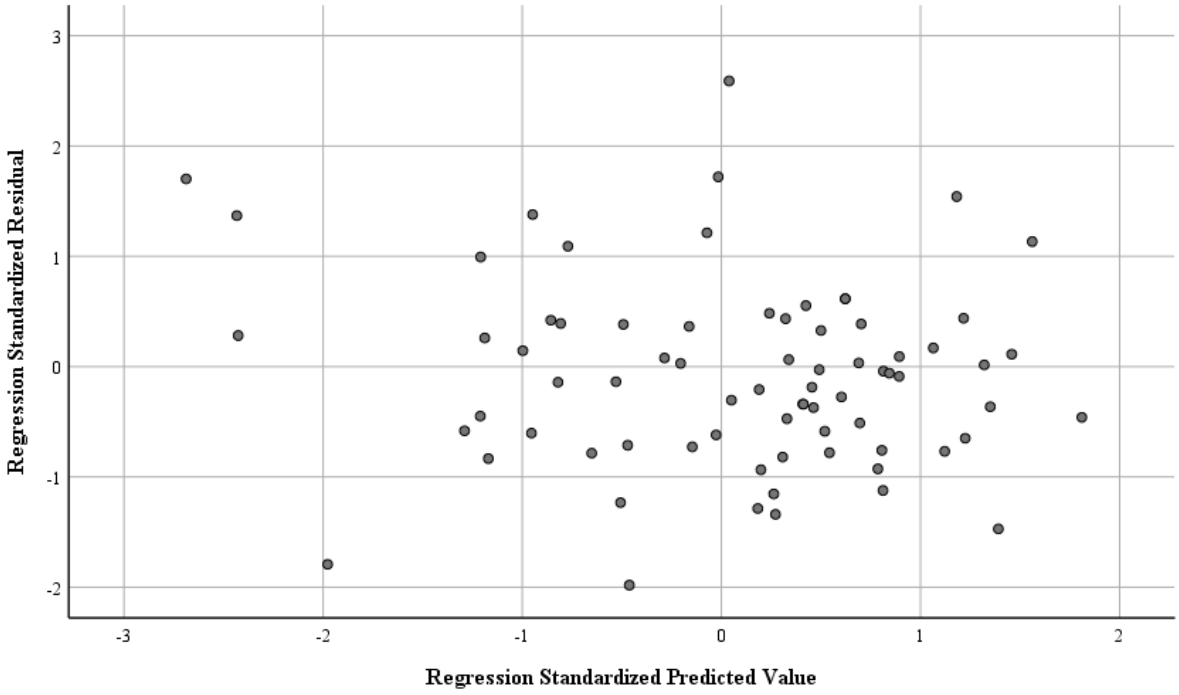
Appendix I

Assumption test for linearity. Normal P-P Plot of Regression Standardized Residual



Appendix J

Assumption test for homoscedasticity. Scatterplot of Regression Standardised Predicted Value of Pro-environmental Behaviour



Appendix K

Frequency of Mean scores for EAI-24 (24 Items)

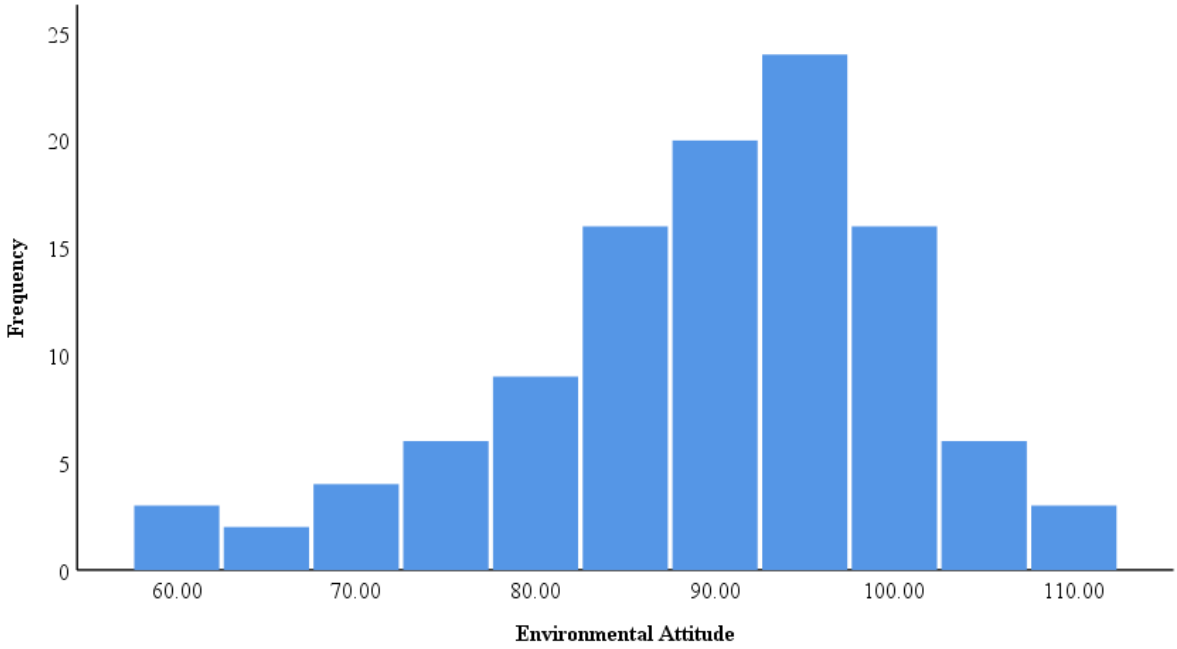


Figure 1

Frequency of Mean scores for Environmental Attitude (*n* = 109)

Appendix L

Mean scores for PEBS (24 items)

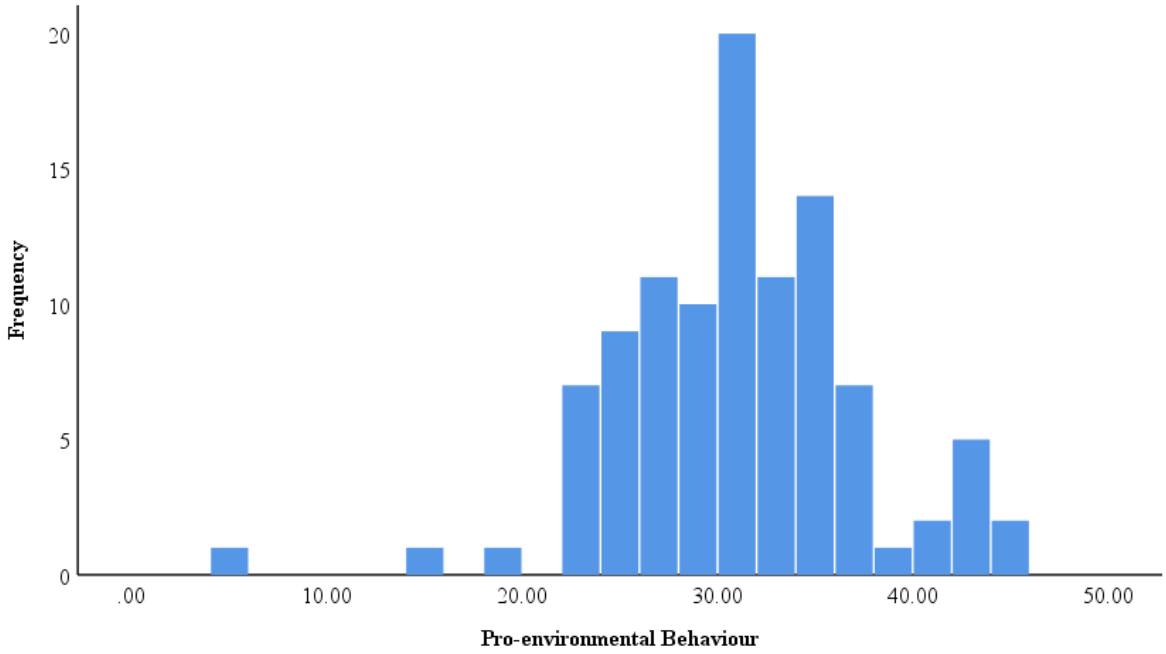


Figure 2

Frequency of mean scores for Pro-environmental Behaviour (n = 102)

Appendix M

Mean scores for PBCM (12 items)

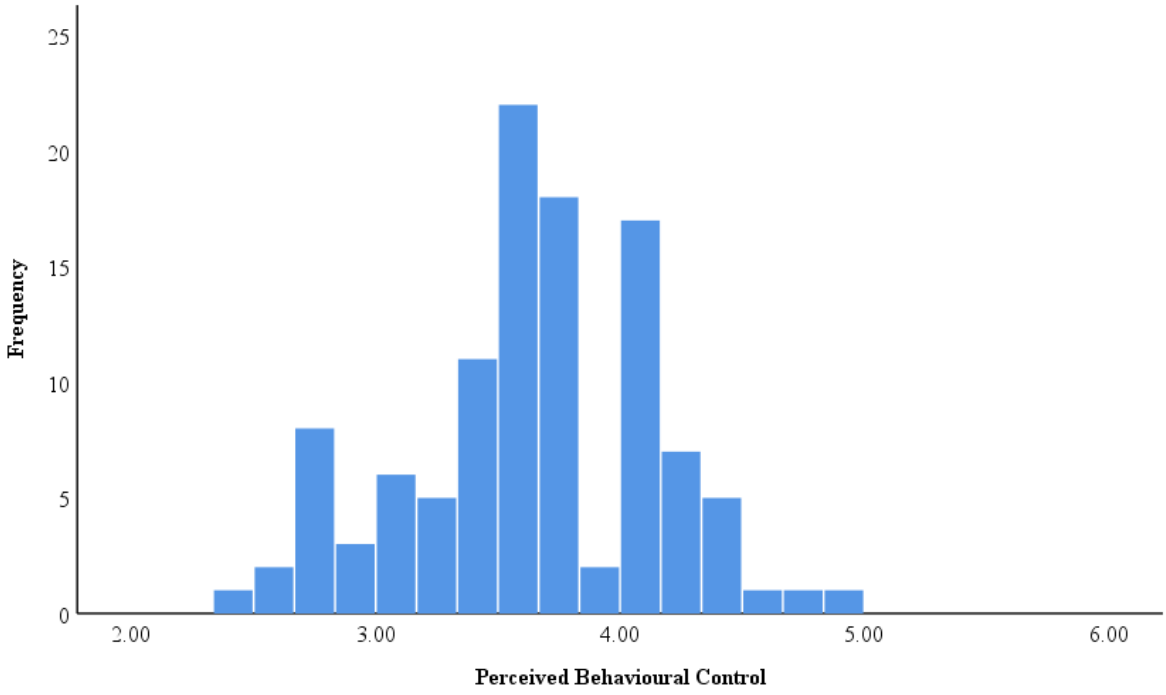
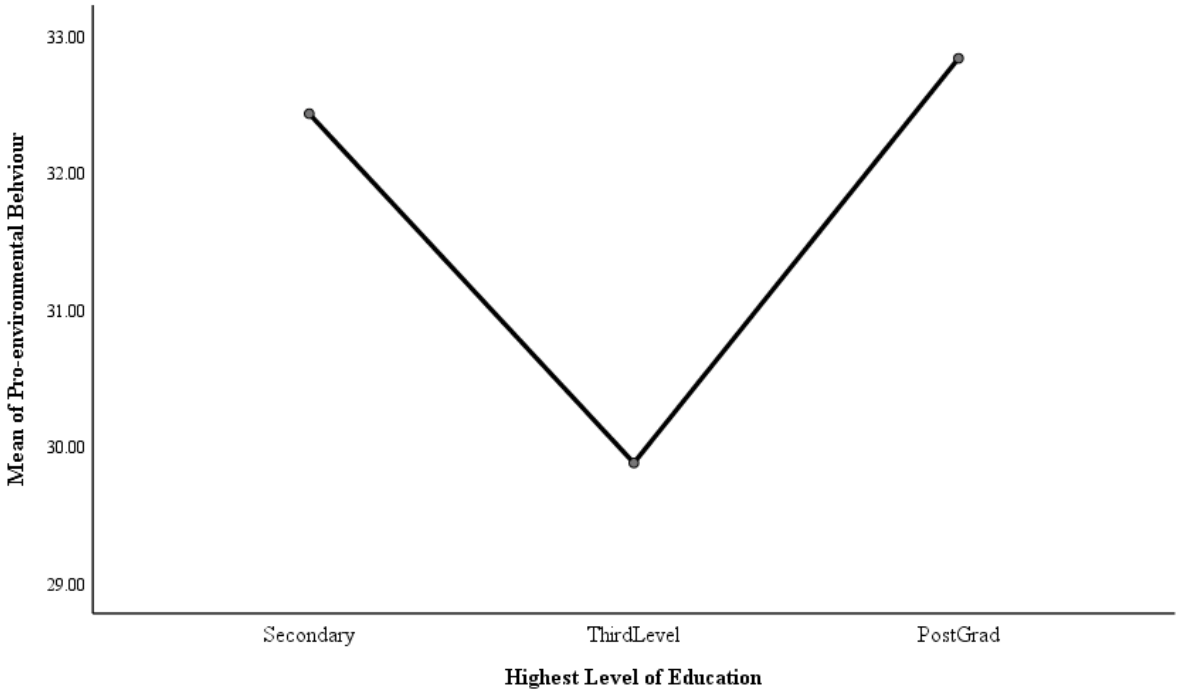


Figure 3

Frequency of mean scores for Perceived Behavioural Control (*n* = 110)

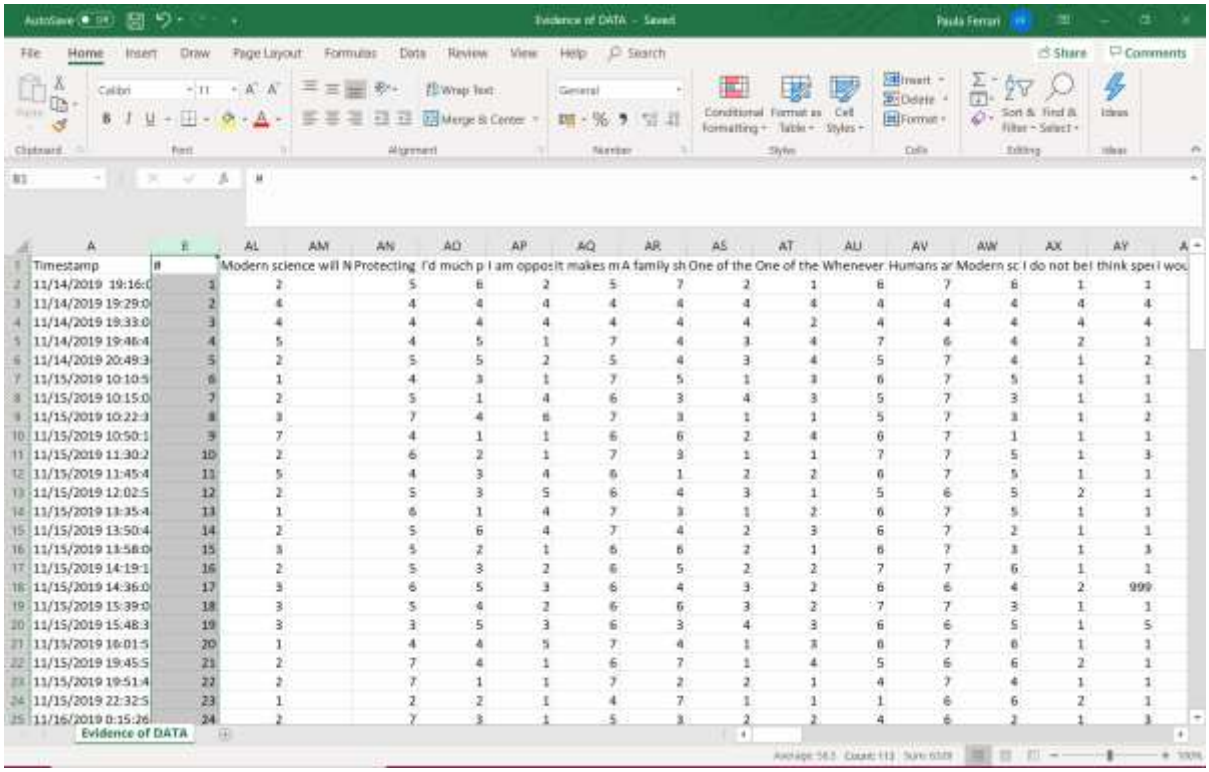
Appendix N

Non-significant difference between Highest Level of Education and mean score of Pro-environmental Behaviour



Appendix O

Evidence of Data Collection – screenshot of data imported from Google Forms



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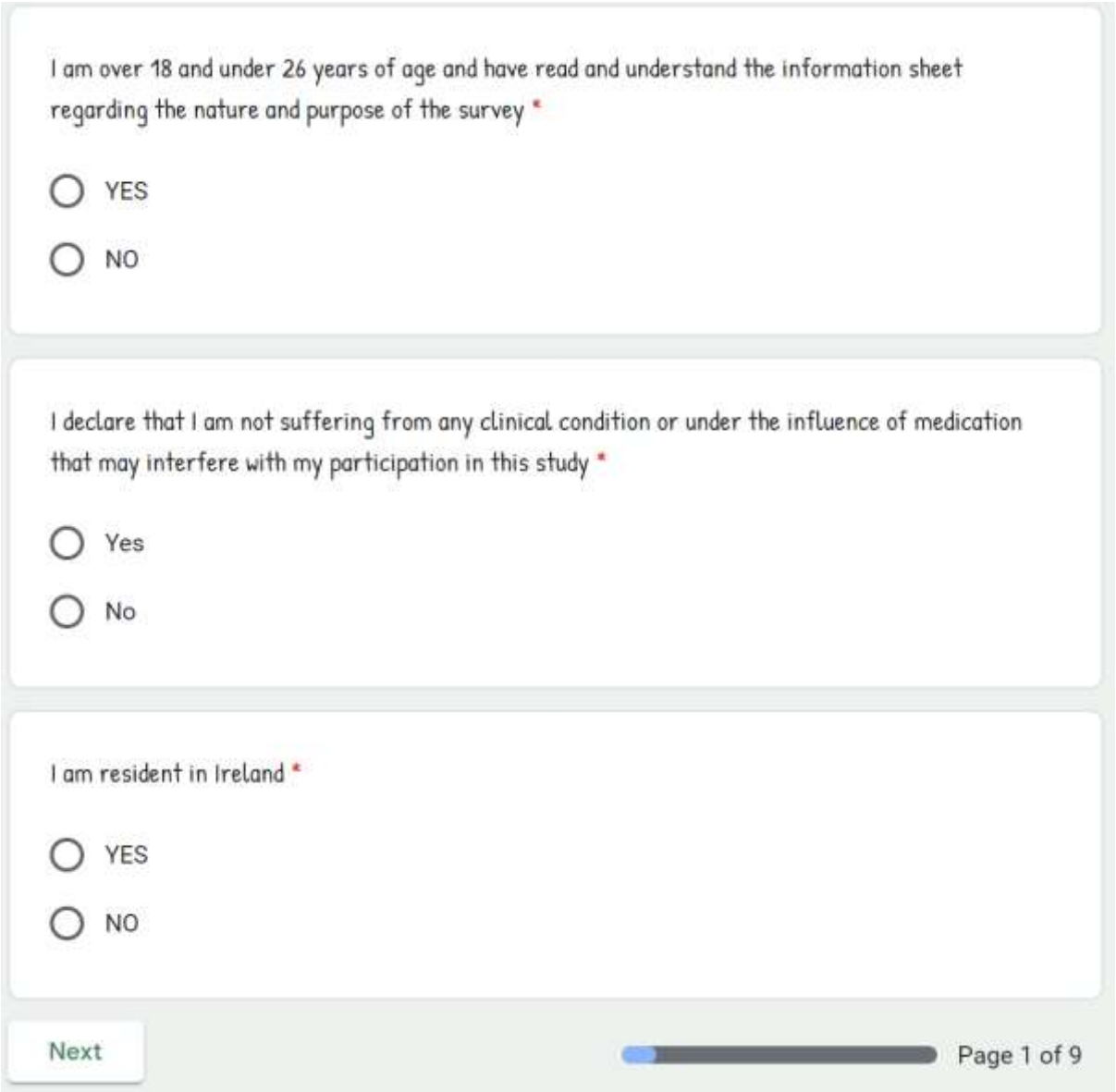
Appendix P

Screenshot Excerpt of Google Forms Survey

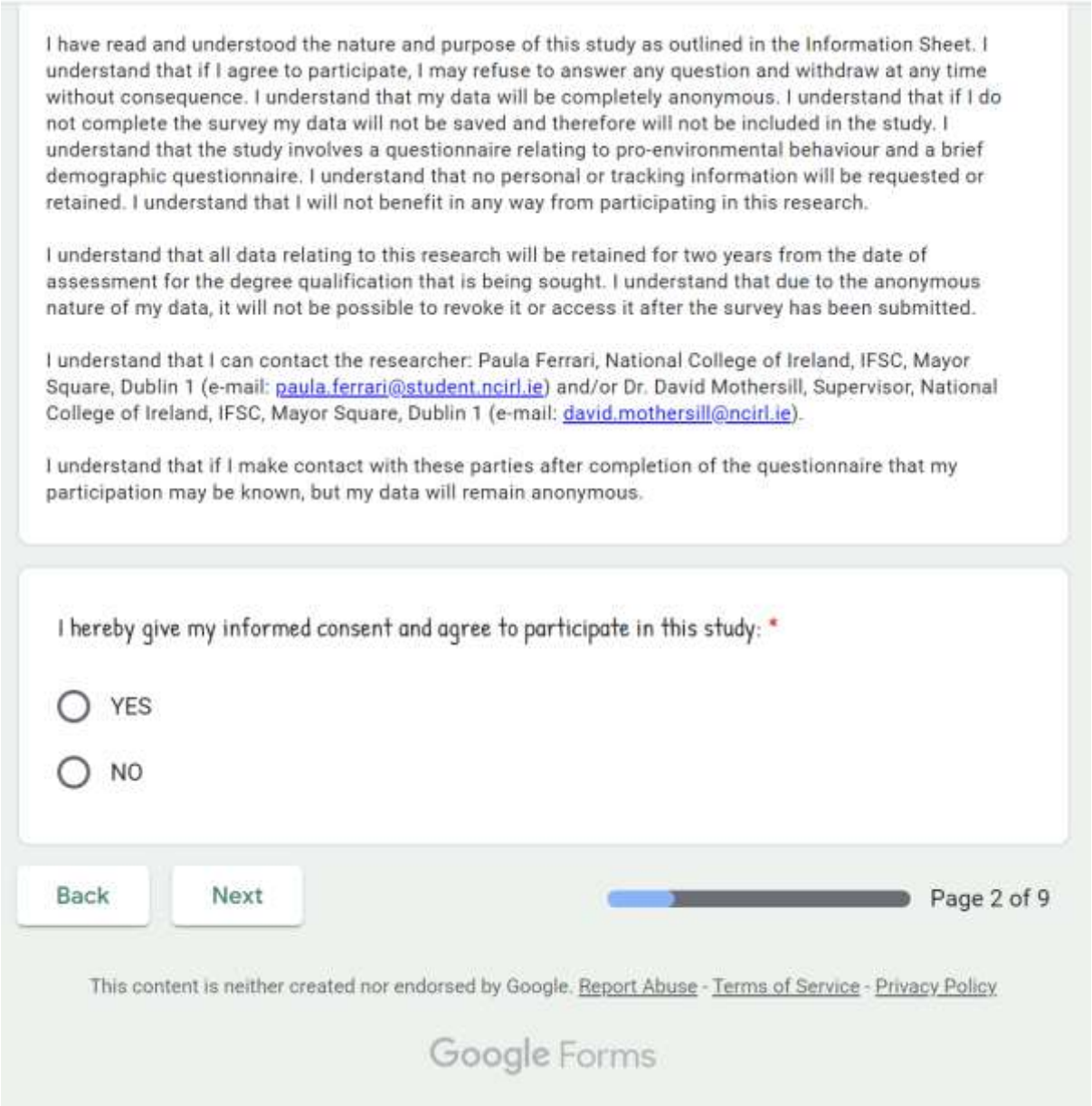
Indication of understanding of information and suitability to participate



Appendix Q

Screenshot Excerpt of Google Forms Survey

Indication of Informed Consent to participate



I have read and understood the nature and purpose of this study as outlined in the Information Sheet. I understand that if I agree to participate, I may refuse to answer any question and withdraw at any time without consequence. I understand that my data will be completely anonymous. I understand that if I do not complete the survey my data will not be saved and therefore will not be included in the study. I understand that the study involves a questionnaire relating to pro-environmental behaviour and a brief demographic questionnaire. I understand that no personal or tracking information will be requested or retained. I understand that I will not benefit in any way from participating in this research.

I understand that all data relating to this research will be retained for two years from the date of assessment for the degree qualification that is being sought. I understand that due to the anonymous nature of my data, it will not be possible to revoke it or access it after the survey has been submitted.

I understand that I can contact the researcher: Paula Ferrari, National College of Ireland, IFSC, Mayor Square, Dublin 1 (e-mail: paula.ferrari@student.ncirl.ie) and/or Dr. David Mothersill, Supervisor, National College of Ireland, IFSC, Mayor Square, Dublin 1 (e-mail: david.mothersill@ncirl.ie).

I understand that if I make contact with these parties after completion of the questionnaire that my participation may be known, but my data will remain anonymous.

I hereby give my informed consent and agree to participate in this study: *

YES

NO

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Google Forms

Appendix R

Screenshot Excerpt from Google Forms Survey

Questionnaire related to EAI-24