



Different shades of green? Unpacking habitual and occasional pro-environmental behavior



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ABSTRACT

This paper argues for a disaggregation of pro-environmental behavior into habitual and occasional behavior. The former captures routine everyday activities such as regularly buying organic food or habitually conserving water. The latter describes occasional or once-off activities such as installing insulation and purchasing energy-efficient household appliances. Drawing on a survey of 1500 households in the Republic of Ireland and Northern Ireland that developed both behavioral and attitudinal indices to investigate household consumption, we group respondents according to their scoring on each index. Results show that the socio-demographic and attitudinal profiles of households that report habitual pro-environmental behavior differ significantly from those that engage in once-off actions. This clearly impacts on environmental and sustainability policy, most notably the financial incentivization of sustainable consumption. Moreover, significant social sustainability issues arise, with rewards for once-off activities disproportionately benefiting better-off households while those who engage in routine pro-environmental behavior tend to face higher costs.

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1. Introduction

Existing research on pro-environmental behavior and those who engage in it rarely distinguishes between different types of activities. Habitual activities such as buying organic food and occasional acts such as the purchase of an energy-efficient household appliance are regularly treated as parts of the same phenomenon. This lack of attention to observable differences in the quality and frequency of activities classified as pro-environmental behavior seems all the more puzzling given that these types pose different challenges to those who seek to adopt them. Habitual, routine behavior tends to present considerable material and motivational hurdles regarding their persistent upkeep over time (Kurz et al., 2014), many of which arise from people's day-to-day exposure to a largely unsustainable system of production and consumption. At the same time, the true cost of habitual pro-environmental behavior may remain hidden due to it spreading across long periods of time. In contrast, occasional pro-environmental actions tend to require much less sustained behavioral

effort, though serious financial investments might be needed. As a result, the latter has been the target of government schemes in Ireland and elsewhere that try to reconcile the desire for economic growth with environmental protection goals. Car scrappage schemes, intended to boost sales while rejuvenating the car fleet, or the introduction of government-led financial incentives for home insulation and retrofitting to reduce household energy consumption exemplify this. In contrast, much less effort has been put into promoting changes in habitual behavior through sustained policy interventions. Existing evidence of governments engaging in behavioral change interventions reveal significant variations across different sectors, dominance of domain- and problem-specific approaches, at least until recently, and considerable fragmentation (Chatterton, 2014; McMeekin and Southerton, 2012). This said, there is international evidence of government-led policy programmes aimed at changing habitual behaviors such as recycling in the US (Vining and Ebreo, 1992) and energy conservation in the UK (DEFRA, 2008).

This paper examines quantitative evidence from the Republic of Ireland and Northern Ireland of habitual and occasional pro-environmental behavior. Following a review of the relevant literature, we draw on a large-scale survey of 1500 urban households to identify different household types that are more or less likely to engage in these two types of pro-environmental

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behavior. The paper discusses the use of two behavior-attitude indices to group respondents according to their scoring on each index. This will be followed by an in-depth discussion of the implications of our findings for both sustainability research and policy.

2. Literature review

Research into pro-environmental behavior has covered a wide range of issues. Firstly, there has been a substantial body of work looking at the (lack of) congruency between pro-environmental views and actual behavior. Publications abound on the so-called value-action-gap that arises from discrepancies between what people think they ought to do (e.g. behave in an environmentally friendly way), and what they actually do (Kollmuss and Agyeman, 2002; Barr, 2006; Whitmarsh et al., 2013; Mairesse et al., 2012). Many of these tend to focus more or less exclusively on individuals' values, intentions and actions. In contrast, there are studies that emphasize structural opportunities and constraints such as policy environments or infrastructural conditions that either help or hinder pro-environmental activities at the individual level. For example, Martinsson and Lundqvist (2010) show that the presence or otherwise of structural conditions that favor pro-environmental behavior are potentially much more significant than people holding pro-environmental values. Using quantitative evidence from Sweden, they argue that it is possible to 'come clean' without 'turning green' and that deep attitudinal shifts and green civic virtues may not always be necessary in order to achieve environmental gains through behavioral change. Similarly, Dauvergne's (2008) aptly-titled book 'The Shadows of Consumption: Consequences for the Global Environment' captures the political and structural context of unsustainable consumption in areas such as food and mobility. Responding to these identified gaps, in this paper we create a novel set of typologies that combine pro-environmental attitudes and behaviors. Acknowledging the richness and diversity of existing studies exploring casual relations between attitudes and behavior (see Karlin et al., 2012; Whitmarsh and O'Neill, 2010), this work distinguishes between different categories of behavior and subsequently reconnects them to different attitudinal positions thereby creating innovative classifications.

While there is a growing number of studies investigating different categories of pro-environmental behavior (see Karlin et al., 2012; Glatersleben et al., 2002; Whitmarsh and O'Neill, 2010) few contributions explicitly acknowledge that different categories of behavior may be particularly prone to structural influences such as the provision of infrastructure, government incentives or regulatory efforts, while others are more likely to be shaped by the often volatile nature of markets and economic processes, including the price of goods such as energy from renewable and non-renewable sources.

This lack of attention to different categories of behavior that vary in their regularity seems all the more puzzling given the growing emphasis in sustainable consumption research on temporal aspects of human actions (Shove et al., 2009; Rau, 2015). For example, different forms of time use produce different social, economic and environmental outcomes, including variations in people's propensity toward pro-environmental actions (Rau et al., 2014; Jalas and Juntunen, 2015; Rau, 2015). Moreover, time-use patterns frequently reflect prevailing social, cultural and economic conditions and their interactions (Jalas and Juntunen, 2015). According to Rau et al. (2014), future research on sustainable consumption must take seriously time-related aspects of consumption behavior. Similarly, Rau (2015) argues that how people use their time has diverse resource implications, some of which remain largely hidden from view and thus require new and

innovative modes of social scientific inquiry that make them visible. In this context, the distinction between habitual and occasional behavior seems particularly pertinent, given that these two types (a) reflect very different time use patterns, and (b) produce and depend on divergent social and material conditions. At the same time, habitual and occasional behaviors can be mutually influential. For example, for many people buying a house presents the biggest purchase in their lifetime. This tends to influence how people make purchasing decisions around property, with a range of social, cultural, financial and perhaps also environmental factors playing a role. However, the decision where to live and what type of dwelling to inhabit also has very significant implications for subsequent routine day-to-day behavior, including shopping, mobility and leisure pursuits, many of which persist for decades after the initial purchase of the home.

Much research argues for new and novel approaches to pro-environmental behavior. For example, some authors (see Barr et al., 2011a,b) propose the need for reframing practices around different sites of consumption. Other commentators posit that a focus on spillover effects is needed due to the potential of pro-environmental behavior interventions to affect other behaviors (see Truelove et al., 2014; Whitmarsh and O'Neill, 2010 for a critique of one-dimensional interpretation of spill over effects). Others critically examine the tensions between the apparent reflexivity of citizens in late modern societies and their deeply entrenched consumption habits (see Barr et al., 2011a,b). To date, few studies have focused explicitly on these and related issues, which leaves significant gaps in our understanding of pro-environmental behavior.

3. Theoretical framework

Social scientists are increasingly advocating for a more culturally and socially nuanced understanding of pro-environmental behaviors (see Barr, 2008; Shove, 2010). Guagnano et al. (1995) developed the ABC model of attitude, behavior, and structural conditions which found that the attitude-behavior relationship is strongest within a moderately supportive context that is neither too strong nor too weak. With highly supportive structural conditions, individuals with negative environmental attitudes tend to behave in an environmentally sound way. In contrast, highly restrictive conditions may prevent action among individuals with very positive environmental attitudes. Thus, external conditions shape the behavior of consumers with and without 'green' attitudes. This model has been successfully applied in empirical research (Ölander and Thøgersen, 2006; Martinsson and Lundqvist, 2010).

Some commentators criticize that these prevailing approaches create a narrow set of tools for understanding and influencing human behavior change that is poorly matched to what may be a highly varied and specialized challenge (Chatterton and Wilson, 2014, p.41). For example, promoting pro-environmental behavior change may not materialize through the use of 'nudges', that is, positive reinforcement or indirect suggestions (or other similar interventions) if these are applied in isolation (HMG, 2011). Nudge approaches also assume that different behaviors are equally 'nudgable', thereby ignoring wider contextual constraints and their varying impacts on different behavior categories, including regular and occasional activities. One proposed solution has been to adapt a multi-model framework approach to allow for the identification of salient characteristics of different behaviors. DEFRA (2008) in the UK originally initiated research exploring and identifying time dimensions of environmental behaviors as 'one-off, occasional, regular, every day or habitual'. Building on key aspects of DEFRA's report as well as related work by Chatterton's (2011), our framework pays particular attention to the temporal elements

of pro-environmental behavior, such as their degree of routinization, conscious planning (or lack thereof), and spontaneity. This is not to suggest that related factors such as cost or the persistence of established practices are less relevant. However, we argue that time constitutes a crucial element that has hitherto remained under-researched. These elements play a crucial role in the potential uptake of that behavior. In other words, we explicitly acknowledge the centrality of time in human behavior by distinguishing between occasional actions, and every day, habitual activities.

Regrettably, policy debates have largely ignored theoretical and empirical social-scientific insights into pro-environmental behavior, especially those that do not fit rationalist-economistic views of human action (Shove, 2011). As a consequence, behavioral change policy to date across the European Union has tended to adopt a rather narrow one-size-fits-all approach (Stockholm Environment Institute, 2009; Davies et al., 2014). Recognizing the diversity of actors and behaviors, this paper contributes to the growing body of alternative approaches to pro-environmental behavior that favor policy interventions tailored to the needs and capabilities of different social actors as well as the specificities of different behavior types, including their natural resource requirements.

3.1. Habitual and occasional behavior

Habitual actions, often described as ‘doing without thinking’, are recurring activities that require limited planning and cognitive effort (Barr et al., 2005: 1426). Although habits are initially under conscious control, once internalized by the individual they become routinized responses to specific situations (Aarts et al., 1998). Examples of habitual actions include heating and ventilation behaviors, or driving styles. Sequences of habitual actions, on the other hand, have been referred to as ‘habitual behavioral patterns’ (Verplanken et al., 1998), ‘semi-automatic response patterns’ (Ajzen, 2002; Bargh, 1989) or ‘behavioral scripts’ (Klöckner and Matthies, 2004) because they require a certain level of conscious control by the individual. Habitual behavior change requires sustained efforts toward transforming individual’s daily routines or lifestyles, as opposed to major (infra) structural changes and financial input often necessary for occasional behaviors (Abrahamse et al., 2005).

In contrast, occasional behavior is often referred to in the literature as ‘purchase-related behaviors’ (Van Raaij and Verhallen, 1983), ‘efficiency behaviors’ (Abrahamse et al., 2005; Gardner and Stern, 2002), ‘intended behaviors’ (CE Delft, 2012), ‘consumption-related behaviors’ (Barr, 2005) or ‘one-shot behaviors’ (Gardner and Stern, 2002). However, in this paper we define occasional behavior as infrequent, non-routine actions that involve conscious planning and decision-making by the individual in question. Examples of occasional pro-environmental behaviors include the purchase of energy-efficient technologies and appliances (e.g., hybrid car, heating systems), insulation of roofs or facades, or the replacement of old windows and doors, all of which require more or less wide-ranging structural changes to the individual’s environment as well as substantial extra financial resources. Many of these occasional behaviors are classified by Gatersleben et al. (2002) as resource-intensive activities with a high psychological and financial impact on people. Those without access to such resources (e.g., time, property, disposable income) are often precluded from engaging in these types of behaviors. In fact there is evidence to suggest that different social groups with divergent time use patterns vary in their propensity toward adopting both habitual and occasional pro-environmental behavior. For example a recent study by Jalas (2002) reveals that time-poor people tend to engage in more resource intensive day to day behavior (cf Rau, 2015 for a more general discussion on time use and resource

consumption). However, they might be more likely to engage in pro-environmental behavior, partly because they can access the financial resources to do so. Similarly it is possible to distinguish between time-use categories. For example, Druckman et al. (2012) draw on UK data to show that leisure pursuits and non-leisure activities vary in their carbon intensity as well as being unequally distributed across different social groups. This raises serious questions regarding the social implications of schemes that incentivize occasional pro-environmental behavior for those who can provide matching resources.

Segmentation can act as an important tool for identifying and subsequently influencing behavior across different social groups (Evans et al., 2006). This paper offers a novel approach to segmentation that captures both habitual and occasional behavior as well as the socio-demographic characteristics of the individuals who undertake them. By constructing two indices based on habitual behavior items and occasional behavior items, we build on, and further expand previous research (see Martinsson and Lundqvist, 2010; DEFRA, 2006a,b; Evans et al., 2006) that incorporates one behavioral scale only and that treat pro-environmental behavior as a homogeneous category. The following section details our methodological approach.

4. Methodology

This study employed a quantitative research design to investigate attitudes and environmental behaviors. A survey instrument—CONSENSUS *Lifestyle Survey*—was developed, piloted and implemented to collect large-scale data from 1500 people across three sample areas in Northern Ireland and the Republic of Ireland; County Galway, Derry/Londonderry and Dublin (Lavelle and Fahy, 2012). This research produced the largest dataset to date on attitudes and environmental behaviors in the areas of water, energy, food and transport in an all-island Irish context. For further information on methodology, please see Lavelle (2014). These consumption areas were identified as priority areas for the island of Ireland (OECD, 2008b).

Based on an extensive review of key international studies on sustainability and environmental consumption behaviors (e.g., Hobson, 2006; Tudor et al., 2011; DEFRA, 2007; Eurobarometer, 2009; National Geographic and GlobeScan, 2009; OECD, 2008a; European Social Survey, 2008), the CONSENSUS *Lifestyle Survey* generated information on a range of reported pro-environmental behaviors. Respondents were asked to indicate which habitual behaviors they had undertaken during the past month (specifically reducing energy consumption, conserving water, avoiding heavily packaged products, buying reusable products instead of disposable ones, and repairing items) as well as occasional actions undertaken in the five years prior to being surveyed (specifically purchasing an energy-efficient appliance or car, switching to a renewable energy supplier, and installing insulation).

For the purpose of this study, the total population was defined as all adults aged 18 years of age or over, residing in domestic households in both Northern Ireland and the Republic of Ireland. A multi-stage cluster sample was utilized. The primary clusters consisted of three counties: Derry/Londonderry, Dublin and Galway. Appendix Three provides a detailed rationale underpinning the selection of these three counties. These three counties (Galway, Derry/Londonderry and Dublin) were examined further based on their Electoral Districts composition. Thirty Electoral Districts (EDs) were selected for sampling based on varying social, economic and demographic characteristics, as well as their varying geographical locations. Electoral Divisions are defined as the smallest administrative area for which population statistics are published. In rural areas each Electoral Division consists of an aggregation of entire townlands. There are 3440 Electoral Divisions

in the State. Similarly, consideration involved housing characteristics (such as housing tenure, housing size and housing density in certain areas). These EDs formed the basis of the secondary clusters, with 10 EDs chosen from each of the three counties. Five EDs were rural areas and the other five EDs were urban locations respectively.

In line with previous European and international studies (Barr and Gilg, 2006; Csutora, 2012; Gröger et al., 2010; Evans et al., 2011; Martinsson et al., 2011), this research developed segmentation categories of respondents. However, in contrast with the majority of these studies which employed cluster analysis to analyse their large scale survey data, this study employed an innovative factor analysis approach method primarily in response to data collated and the scale of the data collected.

Based on the results of three sequential rounds of factor analysis (second layer in Fig. 1) and the application of cut-off criteria to produce two groups for each of the three scales (respondents with scores below threshold versus those with scores above and at the threshold), this study developed two innovative typologies of respondents. See Lavelle, 2014 for detailed description of method employed in the construction of these three scales. The first typology was based on their environmental attitudes and reported occasional pro-environmental behaviors, and the second typology linked attitudes and habitual pro-environmental behaviors. These two typologies were constructed using cut-off points along two scales respectively: (1) attitudes and occasional behaviors and (2) attitudes and habitual behaviors.

Initially, all survey items were factor-analyzed to generate a six-item attitudinal scale. Subsequently respondents whose score was equal to/above the subjectively selected threshold score of 3 (e.g., 3, 4, 5, 6) were classified as 'green' in terms of their attitudes. Respondents who scored less than the threshold score (i.e., 2, 1, 0) were labelled as 'brown'.

Following this first stage of factor analysis, two additional rounds of factor analysis produced two behavioral scales: habitual (6 items) and occasional (4 items). Cronbach's alpha scores for the two behavior scales (occasional and habitual) were low (see Lavelle, 2014). However, the use of both behavior scales – based on literature – was promising as they permitted a comparison of four lifestyle groups constructed from a habitual and occasional behavior perspective. In other words, from a conceptual point of view it was crucial to distinguish between the two types of behavior as each type encompasses different opportunities and challenges regarding behavior change.

To group respondents along the occasional behavior scale, those with 3 and 4 points were labelled as 'green'. Respondents who scored less than the threshold score of 3 (i.e., 2, 1, 0) were labelled as 'brown'. For the habitual behavioral scale respondents whose score was equal to/above the threshold score (i.e., 3, 4, 5, 6) were labelled as 'green'. Respondents who scored less than the threshold score (i.e., 2, 1, 0) were classified as 'brown'. These thresholds were informed by previous research on typology constructions which incorporated similar rationale to define cut-off points. Overall, our cut-off criteria were slightly skewed toward 'brown' attitudes and behavior. Given that our behavioral data was based on respondents' self-reports rather than observations of their actual behaviors, we felt that it was important to place high demands on respondents in order to pass as 'green', to avoid overestimating

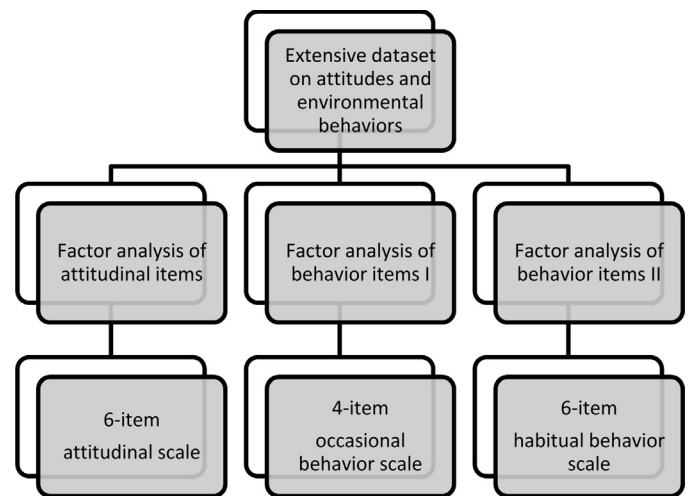


Fig. 1. Overview of method for typology development.

the share of people with strongly pro-environmental attitudes and behavior.

The label 'Dark-Green' describes a person who holds both pro-environmental attitudes and behaviors. In contrast, the label 'brown' is used to denote a person who neither holds pro-environmental attitudes nor reports pro-environmental behaviors. The labels 'Light-Green' and 'yellow' are used to describe groups that report pro-environmental behavior but do not hold pro-environmental attitudes (light green) and those respondents with pro-environmental attitudes but limited/no engagement in pro-environmental behavior (Yellow). Following on from this, eight different groups of consumers were constructed. The four groups in the occasional behavior typology (Typology I in Table 1) were labelled as: Dark-Greens, Browns, Light-Greens and Yellows. Regarding habitual behavior, four different labels were used: Ever-Greens, Aspiring-Greens, Accidental-Greens and Never-Greens (Typology II in Table 2). This approach contrasts with previous segmentation efforts (see DEFRA, 2006a,b; Evans et al., 2006) because it incorporates a temporal dimension of pro-environmental behavior.

All four theoretically possible combinations of attitudes (i.e., 'green' or 'brown') and behaviors ('green' or 'brown') for the two behavior types (occasional and habitual) existed in the sample of 1500 respondents. All eight groupings were subsequently profiled with respect to socio-economic and demographic variables, with a view to exploring their potential influence on the uptake of the two pro-environmental behavior types. Social groupings can be identified that share objective (e.g., socio-demographic) and subjective traits (e.g., interests, attitudes, opinions, activities), which in turn influence their propensity toward adopting environmentally friendly behaviors (Spaargaren and Van Vliet, 2000; DEFRA, 2008). Similarly, variables such as age, housing tenure, and employment status can indicate where environmental attitudes cluster in different populations (Ölofsson and Öhman, 2006). Acknowledging that segmentation is not without its limitations (see Section 6 below and Lavelle and Fahy, 2014 for in-depth discussion), we nevertheless believe that it facilitates a

Table 1
Typology I: respondents' expressed attitudes by occasional pro-environmental behaviors.

	Occasional behaviors +	Occasional behaviors –
Pro-environmental attitudes +	Dark-greens	Yellows
Pro-environmental attitudes –	Light-greens	Browns

Table 2
Typology II: respondents' expressed attitudes by reported habitual behaviors.

	Habitual behaviors +	Habitual behaviors –
Pro-environmental attitudes +	Ever-greens	Aspiring-greens
Pro-environmental attitudes –	Accidental-greens	Never-greens

more nuanced and detailed examination of various groups of respondents and their potential propensity toward behavior change in relation to habitual, everyday actions and occasional activities. A segmentation model could promote understanding of which groups of people might be more willing and/or able to undertake certain pro-environmental behaviors; which groups of individuals may be most opposed to certain behavior changes and what are the specific motivations and barriers for uptake of such behaviors. Such an understanding could then identify which behaviors have segment-specific potential, as well as provide guidance regarding the types of interventions that may be more or less effective for specific segments. Utilizing a segmentation approach in our research enabled an in-depth exploration of the nuances between the two types of behavior (i.e., habitual and occasional) as well as the variations and similarities between individuals who engage in each type of behavior. The following section presents key findings.

5. Results

5.1. Attitudes

To measure respondents' attitudes toward the environment, the CONSENSUS survey included six questions covering respondents' environmental concern, self-efficacy beliefs as well as their willingness to carry out certain actions to protect the environment (Table 3). Cronbach's alpha indicated relatively high levels of scale reliability ($\alpha = 0.658$).

Regarding the reported levels of environment concern, respondents were asked to answer this question using a four-point scale that ranged from 'very concerned' to 'not at all concerned' (see Item 6, Table 3). Results indicated that there were high levels of reported environmental concern across the entire sample, with 86% of respondents ($n = 1289$) stating that they were either 'very concerned' or 'somewhat concerned' about environmental issue. Self-efficacy, or a person's perceived behavioral control, was found to be high across the sample, with 82% of respondents ($n = 1129$) stating that their personal behavior could make a difference in the environment (see Item 5, Table 3). Overall, 43% of respondents said that they would be willing to pay higher prices for goods and services to protect the environment ($n = 640$). Almost two thirds of respondents (62%) disagreed with the

statement: 'I would be willing to support higher taxes in order to protect the environment', compared to 31% who agreed. The majority of respondents (70%, $n = 1,038$) agreed with the statement: 'I would be willing to sacrifice some personal comforts in the home in order to save energy', compared to 17% who disagreed ($n = 251$). 49% of this sample ($n = 730$) indicated that they would be willing to accept cuts in their standard of living, in order to protect the environment.

5.2. Occasional behaviors

All respondents in the survey were asked whether or not they had carried out four occasional behaviors in the past five years prior to being interviewed (Table 4). Respondents were most likely to have purchased an energy-efficient appliance, with 46% of the total sample ($n = 689$) stating that they had done so. However, approximately half of the respondents (46%) reported that they had actually purchased an energy-efficient appliance in the past five years.

Based on respondents' scores concerning their reported exhibition of occasional behaviors and their expressed attitudes, four categories of consumer were identified: Dark-greens, Browns, Light-greens and Yellows (Table 5; see Table 6 for detailed descriptions of each category). The largest category of respondents was the Yellow category, with 55.9% of the total sample classified under this label ($n = 839$). The second largest grouping identified was the Browns, which made up 38% of the total sample ($n = 562$). The remaining two categories captured less than 10% of the total sample, with the Dark-greens making up 4.5% and the Light-greens accounting for 2.1%.

Two groups, 'Light-Greens' and 'Yellows', both displayed some divergences regarding attitudes and actions. Individuals categorized as Light-Greens exhibited low levels of 'green' attitudes (mean = 1.47, SD = 0.72), whilst achieving a high score in terms of pro-environmental behavior (mean = 3.19, SD = 0.40). In contrast, individuals in the 'Yellows' category displayed high mean scores on the attitude scale (mean = 4.05, SD = 0.99), whilst simultaneously achieving low scores for occasional environmental behavior (mean = 0.84, SD = 0.78). In other words, the highest values (H) on both scales indicate the most environmentally friendly behavior or attitudes.

The other two groups, 'Dark-Greens' and 'Browns', displayed convergence concerning attitudes and behaviors. Individuals categorized as Dark-Greens exhibited high levels of 'green' attitudes (mean = 4.06, SD = 1.11) and high levels of pro-environmental behavior (mean = 3.06, SD = 0.24). Similarly, individuals in the 'Brown' category displayed low mean scores on the attitude scale (mean = 1.31, SD = 0.71), whilst simultaneously achieving low

Table 3
Six survey items that comprised the pro-environmental attitude scale.

Statements (%)	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Do not know
1 I would be willing to accept cuts in my standards of living, if it helped to protect the environment	2	46.7	11.8	36.4	2.5	0.5
2 I would be willing to pay higher prices for goods and services, if it helped to protect the environment	1.4	41.3	8.3	44	4.8	0.3
3 I would be willing to support higher taxes, if it helped to protect the environment	1.4	30	6.4	51.1	10.9	0.2
4 I would be willing to sacrifice some personal comforts, in order to save energy	1.7	67.7	13.7	15.9	0.9	0.2
5 I feel my own personal behaviour can bring about positive environmental change	21.1	60.8	7.1	10.3	0.4	0.3
6 Which one of the following statements best describes how you feel about environmental issues?	Very concerned 23.2	Somewhat concerned 62.7	No opinion 0.5	Not concerned 12.4	Not at all concerned 1.2	

Table 4
Prevalence of occasional behaviors undertaken by respondents.

Occasional activities	Percentage	Frequency
Purchased energy efficient appliance	46	689
Installed insulation	23	341
Switched to renewable energy supplier	21	315
Purchased an energy efficient car	6	88

scores for occasional environmental behavior (mean = 0.75, SD = 0.76).

Profiling of each of the four groupings in terms of their varying socio-demographic characteristics permits a more nuanced examination of environmental attitudes and actions. Table 6 illustrates the various socio-demographic characteristics of each of the four groupings. For the purposes of this study, educational attainment was measured by the highest degree achieved by respondent at time of survey. Note that renters in this study include respondents who pay rent to private landlords as well as those who pay rent to social/voluntary and municipal housing bodies. Income responses in this study were recoded into four groups that represented respondents' total net household income after tax and deductions. All income is reported in Euros; with Sterling cohorts converted to Euro. There were 1065 valid responses to this question (N = 1065); with respondents who stated that they 'did not know' or 'refused' to answer being treated as missing data (Missing = 435).

Descriptive information in Table 6 indicates differences across the four attitudes by occasional behavior groups. Differences were explored within the four segments using Chi-Square analysis. Due to differences in grouping sizes, a number of cells did not obtain the expected count in observations. Hence, to capture these differences in a more concise way and explore whether these differences were statistically significant, groups of respondents who were categorized as 'green' regarding their occasional behaviors (i.e., Dark-Greens and Light-Greens) were amalgamated. Similarly, the two groups with 'brown' behavior were merged to explore whether or not differences across the two recoded groups ('green' versus 'brown' behavior) were statistically significant. Recoding respondents into amalgamated groups meant that chi-square assumptions would not be violated. The decision to align groups based on behaviors, as opposed to 'green' attitudes, was a subjective decision that was in line with the aim of this paper—to dismantle the temporal dimensions of pro-environmental behavior. Equally, the groups could have been combined based on attitudinal considerations.

There was no statistically significant differences were found in relation to gender between the 'green' and 'brown' occasional behavior categories { $\chi^2(1, N = 1500) = 0.040, p = 0.841$ }. However, a statistically significant difference in educational attainment was found between individuals categorized as behaving in a 'green' or 'brown' manner { $\chi^2(2, N = 1492) = 7.328, p = 0.026$ }. A statistically significant difference was also found across the income cohorts; with respondents who were classified as 'brown' acting in terms of occasional behavior (40%) being more likely to fall into the lowest income category than their 'green' behavior counterparts (29%)

Table 5
Breakdown of participants' attitudes by occasional behaviors (Typology 1)

Category of consumers	Attitude	Behavior	Percentage (%)	Frequency
Dark-Greens	Green	Green	4.5	67
Browns	Brown	Brown	37.5	562
Yellows	Green	Brown	55.9	839
Light-Greens	Brown	Green	2.1	32
Total			100	1500

Table 6
Socio-economic and demographic characteristics of attitudes by occasional behavior groups.

Segments	Variables			
	Dark-Greens	Browns	Yellows	Light-Greens
% in each group	4.5 n = 67	37.5 n = 562	55.9 n = 839	2.1 n = 32
Gender				
Male	39	46	38	50
Female	61	54	62	50
Age in years				
Mean	45.6	43.3	45.7	47.2
SD	12.9	15.4	14.5	15.6
Age categories				
18–40 years	33.3	49.8	39	29
41–65 years	60.6	40.4	50.6	54.8
66+ years	6.1	9.8	10.4	16.1
Employment status				
Employed	59.7	57.8	59.7	53.1
Unemployed	7.5	9.4	6.2	15.6
Student	9.0	9.3	8.3	3.1
Retired	14.9	16.0	18.5	18.8
Other	9.0	7.1	7.3	9.4
Household size				
Mean	3.18	3.15	3.11	3.31
SD	1.24	1.26	1.32	1.12
Housing tenure (%)				
Homeowners	74.0	67.8	83.3	78.1
Renters	18.0	22.5	6.7	6.3
Rent-free	0.3	4.6	10.0	9.4
Other	4.5	5.1	0	0.0
Income (Euro)				
≤37,999	27.3	45.9	33.8	30.0
38,000–75,999	34.1	39.7	42.5	55.0
76,000–113,999	31.8	12.2	20.8	10.0
≥114,000	6.8	2.2	2.8	5.0

{ $\chi^2(2, N = 683) = 7.45, p = 0.024$ }. Regarding age, the differences were not statistically significant { $\chi^2(6, N = 1,478) = 6.503, p = 0.37$ }. Similarly, no statistically significant difference was found to exist between individuals categorized as behaving in a 'green' or 'brown' manner across the different employment categories.

5.3. Habitual pro-environmental behaviors

Respondents were asked whether they had engaged in six types of habitual pro-environmental behavior in the past month prior to surveying (Table 7). The most commonly undertaken habitual activity was to purchase reusable products instead of disposable ones. A total of 52% (n = 781) stated that they had carried out this activity. The next common activity was to reduce energy use, with 45% (n = 674) stating that they had done so in the past month.

Table 7
Prevalence of habitual behaviors undertaken by respondents.

Pro-environmental habitual activity	Percent	Frequency
Bought reusable products instead of disposable ones	52	781
Reduced energy use	45	674
Reduced water use	35	521
Shopped or paid a bill online	31	458
Avoided products with excess packaging	28	425
Repaired items instead of purchasing new ones	20	302

Table 8
Number of respondents in each attitude by habitual behavior category.

Category	Attitude	Behavior	Percentages	Frequency
Ever-Greens	Green	Green	13.9	209
Never-Greens	Brown	Brown	34.1	512
Aspiring-Greens	Green	Brown	46.5	697
Accidental-Green	Brown	Green	5.5	82
			100%	1500

Reducing water use was the third popular habitual activity (35%, $n = 521$).

Similar to Typology I, the four groupings in Typology II based on attitudes by habitual behavior were labelled to reflect their individual characteristics. The new labels are as follows: Ever-Greens; Never-Greens; Aspiring-Greens; Accidental-Greens (Table 8; see also Section 4 for details).

The largest category of respondents based on scores for habitual behavior and attitudes was Aspiring-Greens (46.5%). In other words, over half of respondents expressed 'green' attitudes but displayed 'brown' habitual behaviors. The second largest grouping consisted of respondents classified as 'Never-Greens' ($n = 512$, 34.1%). Respondents who were categorized as 'green' in terms of their self-reported habitual behaviors (e.g., Ever-Greens and Accidental-Greens) made up the two smallest groups (Table 8).

S- Table 9
i- Socio-economic and demographic characteristics of attitudes by habitual behavior groupings.

Variables	Ever-Greens	Never-Greens	Aspiring-Greens	Accidental-Greens
% in each group	13.9 $n = 209$	34.1 $n = 512$	46.5 $n = 697$	5.5 $n = 82$
Gender (%)				
Male	36.8	47.5	38.5	41.5
Female	63.2	52.5	61.5	58.5
Age in years				
Mean	45.51	43.49	45.71	43.75
SD	13.9	15.4	14.5	15.2
Age categories				
18–40 years	38.2	48.6	38.7	49.4
41–65 years	52.3	41.4	51	39.5
66+ years	9.5	10	10.3	11.1
Educational attainment				
No formal/primary level	4.8	4.7	3.7	7.5
Secondary level	30.3	48.1	39.3	40
Third level	64.9	47.1	57	52.5
Employment status				
Employed	59.1	59.2	59.9	48.8
Unemployed	8.7	9.2	5.6	13.4
Student	7.2	8.6	8.6	11
Retired	14.9	15.6	19.3	19.5
Other	10.1	7.4	6.6	7.3
Household size				
Mean	3.05	3.19	3.13	2.93
SD	1.24	1.27	1.34	1.14
Housing tenure (%)				
Homeowners	69.4	67.4	77.2	76.6
Renters	27.7	22.6	16.5	15.6
Rent-free	0.5	5	2	3.9
Other	2.4	5	4.3	3.9
Income (Euro)				
≤37,999	36.4	44.8	32.5	47.3
38,000–75,999	47	40.7	40.4	38.2
76,000–113,999	15.2	12.3	23.5	10.9
≥114,000	1.3	2.2	3.7	3.6

imilar to the previous typology, the following socio-demographic variables are examined: gender, age, educational status, housing tenure, and employment status. Table 9 outlines descriptive statistics for each of the four groups.

There were a number of differences across the four attitudes by habitual behavior groups. Similar to the process used in the construction of Typology I, groups of respondents were once again amalgamated depending on whether they displayed 'green' (i.e. Ever-Greens and Accidental-Greens) or 'brown' (i.e. Never-Greens and Aspiring-Greens) habitual behaviors. The purpose of recoding respondents into amalgamated groups meant that chi-square assumptions would not be violated. Descriptive analysis revealed some statistically significant differences across the two recoded groups. A statistically significant difference was noted between the 'green' and 'brown' groups with regard to their housing tenure status ($\chi^2 (3, N = 1476) = 7.770, p = 0.05$). Another statistically significant difference was noted between the 'green' and 'brown' groups with regard to their educational attainment ($\chi^2 (2, N = 1492) = 9.912, p = 0.007$). In terms of employment status, no statistically significant difference was noted between the two groups ($\chi^2 (5, N = 1497) = 5.651, p = 0.342$). Regarding income, no statistically significant difference was found. Similarly no statistically significant difference was noted between the 'green' and 'brown' acting groups with regard to age, the male/female ratio, employment status and average number of people per household

Table 10
Descriptive statistics within four behavioural groups.

Variables	Green across both behaviors	Only green habitual	Only green occasional	Not green for either
% in each group	2.3	17.1	4.3	76.3
N per group	n = 35	n = 256	n = 64	n = 1145
Gender (%)				
Male	42.9	37.5	42.2	42.3
Female	57.1	62.5	57.8	57.7
Age in years				
Mean	46.23	44.83	45.98	44.7
SD	15.58	14.09	12.69	15.07
Age categories				
18–40 years	37.1	42	29	43.7
41–65 years	51.4	48.2	62.9	46
66+ years	11.4	9.8	8.1	10.3
Educational attainment				
No formal/primary level	0	6.3	3.1	4.2
Secondary level	29.4	33.5	31.2	43.7
Third level	70.6	60.2	65.6	52.1
Employment status				
Employed	50	63.4	69.4	63.7
Unemployed	14.3	10.6	9.7	7.5
Student	14.3	8.5	4.8	9.5
Retired	21.4	17.4	16.1	19.2
Household size				
Mean	3.11	3	3.28	3.15
SD	1.05	1.23	1.28	1.31
Income (Euro)				
≤37,999	31.6	40.1	26.7	38.3
&38,000–75,999	47.4	44.4	37.8	40.7
76,000–113,999	15.8	13.9	28.9	18.2
≥114,000	5.3	1.6	6.7	2.8

in each group. A statistically significant difference was noted between the 'green' and 'brown' groups with regard to their housing tenure status ($\chi^2(3, N=1476)=7.770, p=0.05$). The 'brown' behavioral group had the highest percentage of respondents who were homeowners (73%) or who stated that their accommodation was provided rent-free (3%). The 'green' behavioral group had a slightly lower number of homeowners (71%) and those who lived in rent-free accommodation (2%). However, the 'green' group reported a higher percentage of renters (24%), compared to the 'brown' group (19%). Another statistically significant difference was noted between the 'green' and 'brown' groups with regard to their educational attainment ($\chi^2(2, N=1492)=9.912, p=0.007$). The greatest numbers of respondents with no formal education or primary level education were in the 'green' acting group (6%), compared to only 4% in the 'brown' acting group. At the same time, the 'brown' acting group also had a lower percentage of respondents who had attained third level education (53%), compared to the 'green' acting group (62%). A greater number of respondents in the 'brown' acting group had attained secondary level education only (43%), compared to 'green' acting group (33%).

5.3.1. The deepest shade of green

Given the differences in the composition of the 'green' acting and 'brown' acting groups across the two typologies (i.e. occasional and habitual behavior), the results would suggest that a distinction needs to be made between habitual and occasional pro-environmental behavior. An initial analysis of the prevalence of habitual and occasional behaviors reveals significant differences. Table 10 shows the number of individuals who engage in either habitual or

occasional behavior, a combination of the two, or neither of the two.

A number of differences were noted for key socio-demographic variables. The habitual 'green' group featured a greater proportion of women (62.5%, $n=160$). In terms of educational status, a greater percentage of respondents in the combined 'green' grouping (i.e. they carried out both types of green behaviors) had attained third level qualifications (70.6%) than those in the habitual 'green' grouping (60.2%), the occasional 'green' grouping (65.6%) and those individuals who undertaken neither of the green behavior types (52%). Although all groups comprised predominantly of homeowners – as opposed to other tenure categories (e.g., renters, rent free, other) – a higher percentage of respondents in the 'green' occasional group (77.8%) and the combination 'green' group (75.8%) owned their home, compared to 70.8% in the habitual 'green' group and 72.8% of the neither 'green' group. Likewise, more respondents in the habitual 'green' group reported being renters (25.2%), compared to their counterparts in the occasional 'green' group (12.7%). The habitual 'green' group comprised of a much lower percentage of individuals who reported earning more than 114,000 per annum in the year prior to the survey (1.4%), in contrast to respondents in the occasional 'green' grouping (7.5%) and the combination group (6.2%). In contrast, the occasional 'green' group (25%) had a lower percentage of respondents who stated they earned less than 37,000 (which was the smallest income category), in comparison to 40.4% in the habitual 'green' group and 40.1% of the neither 'green' group.

Based on thresholds deployed in this study, there were over three times as many only habitual 'green' group individuals ($n=256$ or 17.1%), when contrasted with the only occasional 'green' acting individuals ($n=64$ or 4.3%). These findings would appear to

make sense as occasional actions referred specifically to larger-scale activities (such as installing insulation, purchasing an energy-efficient car or appliance) and hence, may require substantial financial investment and time to undertake in comparison to habitual environmental behaviors such as reducing energy and water use in the home or purchasing reusable products. For example, when one considers how occasional actions – such as purchasing an energy-efficient appliance or installing insulation – can affect the structure of the dwelling and/or the internal infrastructure of a building, as well as require extra financial input to undertake, it makes sense that homeowners, as opposed to renters, would comprise a large proportion of the occasional ‘green’ behavior grouping. Homeowners would tend to have increased likelihood to undertake these larger occasional activities due to the nature of tenancy, especially on the island of Ireland where tenancy rights are not as established as other countries in Europe. Similarly, renters may be less likely to invest in property development and other occasional actions like retrofitting if they will only dwell at the premise for a limited period of time.

Having extensively profiled the ‘green’ acting respondents, we can conclude that relatively little overlap exists between those respondents categorized as ‘green’ based on their occasional one-shot behaviors (4.3%) and those individuals who are categorized as ‘green’ acting in relation to their habitual behaviors (17.1%). Individuals who reported undertaking neither green occasional or habitual behavior were the largest group; with over three quarters of the sample reporting this (76.3%, $n = 1145$). Surprisingly, only 35 respondents (2.3% of the total sample) who were classified as ‘green’ according to their occasional behaviors also engaged in ‘green’ habitual behaviors. In other words, only 9% ($n = 35$) of the 390 ‘green’ behaving individuals in the sample reported doing so with regard to both habitual and occasional behaviors. We termed this very small group of ‘green’ acting individuals as ‘True-Greens’. A thorough descriptive analysis of the ‘True-Greens’ found more women ($n = 20$, 57%) than men ($n = 15$, 43%) in the group. The majority of True-Greens attained third level education ($n = 24$ or 71%), with a further 29% ($n = 10$) stating that they had attained secondary level education. There were no respondents in this grouping who had attained no formal education or solely primary school education. Moreover, this group comprised predominantly of homeowners ($n = 25$ or 76%), then renters ($n = 6$, 18%) and finally those respondents who resided in their homes rent-free ($n = 2$, 6.1%). The majority of ‘True-Greens’ were employed ($n = 14$, 40%), with 20% comprising the category ‘other’ ($n = 7$), 17% retired ($n = 6$) and equal numbers of students and unemployed individuals ($n = 4$, 11%).

6. Discussion and conclusion

The findings presented in this paper clearly illustrate the heterogeneity and richness of pro-environmental behavior, thereby challenging much existing research that treats different types of ‘green’ behavior as part of the same phenomenon. In an attempt to unpack ‘pro-environmental behavior’ as a category, we examined two distinct types of actions – habitual behaviors and occasional actions – presenting evidence for their distinct characteristics and capturing variations between respondents who reported them. Building on from the emerging literature investigating different categories of pro-environmental behavior (see Karlin et al., 2012; Whitmarsh and O’Neill, 2010), this paper developed a novel set of typologies that combine pro-environmental attitudes and behaviors.

Using the CONSENSUS survey data, we identified and described in detail the different groups of people who undertake either of these types of behavior, or both. Here, we illustrated that survey respondents differ in their uptake of occasional and habitual pro-

environmental behaviors. Considerable differences exist between the two behavior groups with regard to key socio-demographic variables such as employment status, income, residential location and housing tenure. For example, respondents who are less well-off and less well educated are more likely to report everyday habitual activities such as buying reusable items, saving water and energy, and repairing faulty gadgets and appliances rather than discarding them. This suggests that some of this habitual behavior may be due to financial necessity rather than deliberate choice. In contrast, better-off respondents with a higher educational status were more likely to report engagement in occasional ‘green’ behavior such as retrofitting the house or purchasing an energy-efficient household appliance, all of which require a much higher financial commitment at a single point in time.

In line with recent research findings (see Martinsson et al., 2011); (infra) structural and cultural factors are also likely to play a significant role. Significantly, we recorded very little overlap between those who reported engaging in occasional pro-environmental behavior and those who claim to practice habitual, everyday ‘green’ activities, with only 35 people out of a sample of 1500 respondents (2%) being engaged in both habitual and occasional ‘green’ behavior.

The policy relevance of the findings presented in this paper cannot be over-estimated. There is clearly a need for all policy actors to recognize the complex, multi-layered nature of pro-environmental behavior. Using a segmentation approach that focuses on the identification of different behavior types and diverse groups of people, our research succeeds in demonstrating the characteristics of different groups of respondents who undertake either one of these behavior types, or both. This opens up new avenues for the development of sustainable consumption interventions that are tailored to particular population groups and that depart from ‘one-size-fits-all’ approaches that have hitherto dominated sustainable consumption policy in Ireland and Europe (Fahy et al., 2014). Given the urgency of many current sustainability challenges and the limited effectiveness of many policy initiatives to date (Pape et al., 2011), our efforts to promote a more nuanced understanding of ‘pro-environmental behavior’, especially in key consumption sectors such as energy, water and mobility, seem timely. Importantly, our research reveals the strong impact of socio-demographic factors on people’s ability to behave more sustainably, thereby highlighting the need to take seriously the close interconnections between social justice and environmental protection. Existing sustainable consumption policy that is largely insensitive to socio-demographic differences, including differences in income, educational status and housing tenure, is likely to miss its objectives and to leave unaddressed, or potentially exacerbate, social inequalities. For example, many energy retrofitting schemes such as the Greener Homes Scheme (2006–11) in Ireland have tended to benefit those who own property, thereby excluding those who rent public or private accommodation. Even schemes that are intended to assist vulnerable householders who receive fuel allowance or job seekers benefits such as the current Better Energy Homes scheme in the Republic of Ireland are only available to homeowners (SEAI, 2015). We recommend that future sustainable consumption policy incorporates social-scientific evidence such as the findings presented in this paper to ensure that social and environmental sustainability goals are given equal weight.

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