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EVALUATING HOUSEHOLD FOOD, ENERGY, AND WATER ENVIRONMENTALLY ORIENTED ANTI-CONSUMPTION IN THE US: TOWARD A COMPREHENSIVE THEORY SYNTHESIS

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By

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Abstract

Introduction – Everyday household activities using food, energy, and water (FEW) resources consumed in the US have perpetually contributed a large amount of carbon emissions into the atmosphere, amplifying the effects of climate change globally. These actions are embedded and routinized effectively at the individual level, resulting in habits inert to changes in household FEW behaviors more friendly to socio-environmental impacts. Public and voluntary policies could help shift perceptions of FEW household conservation, but a gap in environmental political and psychological research reveals a deficit in evidence examining the antecedents of the moral or personal norm concept.

Objective – The aim of this research is to examine the relationships interlinking individual features (i.e. cognitive and demographic) to the moral/personal normative beliefs that determine household FEW environmentally oriented anti-consumption (EOA). This report addresses this deficit in three thrusts. First, it constructs and evaluates five measurement models based on the personal norm from three complementary theories of environmentally friendly behavior – the Value-Belief-Norm (VBN) theory, the Value-Identity- Personal Norm (VIP) theory, and the Ecological Citizenship (EC) model. Second, each theory is analyzed to identity general demographic and theoretical antecedents of household FEW EOA. Third, this report compares the explanatory power of each model on the personal norm measure and FEW EOA to determine strengths, weakness, and directions of each in developing a model synthesis.

Methods – Data are collected using a multi-part survey instrument. Following multiple analysis of variance and exploratory factor analysis, confirmatory factor analysis and hierarchical linear modelling is conducted to identify influential demographic and socio-psychological features linked to significant differences across VBN, VIP and EC model antecedents and FEW household conservation measures.

Results – The VBN and VIP models fit the data best suggesting that biospheric values, environmental self-identity and general environmental beliefs play a significant role in shaping individual personal norms and predicting household FEW EOA. The EC model weakly fit the data, performing worse than VBN and VIP theory-based models, suggesting that although social justice beliefs are a strong determinant of the individual personal norm, social justice and ecological citizenship concepts like dismantling the distinction between the public-sphere and private-sphere consumption are distal predictors of FEW EOA. Age, race and gender demographics are also important factors that influence adopting practical household anti-consumption activities.

Conclusion – VBN, VIP and EC theories of pro-environmental behavior were constructed, assessed and validated as causal explanations of household FEW EOA. This report points to voluntary policies such as education, awareness, and goal-setting interventions to be developed that target specific consumers in the US, presenting a small but significant opportunity to immediately curb greenhouse gas emissions in the domestic sector.

Introduction

Social and psychological research is uniquely positioned to tackle climate change as it considers data sometimes overlooked by policy makers not always intuitive about the link between people and climate change. Seeing as there are distinctly different ways that people think about and express concerns, preferences and norms of behavior in response to climate change, many authors are beginning to employ different behavioral models capable of explaining detailed reasons why consumers are inert to pro-environmental behavior change and able to untangle it across several different domains (Clayton et al., 2015). A study by Shwom and Lorenzen (2012) is one such study; drawing from the fields of sociology, anthropology, psychology and economics, they developed a consumer typology suggesting different interventions for behavior change tailored to distinct consumer identities. Another study by Larson, Stedman, Cooper, and Decker (2015) examined the disproportionate levels of engagement and participation in various pro-environmental behaviors, suggesting that consumers vary significantly across geographic and social domains. While some robust theories of pro-environmental behavior are widely validated and tested to explain the adoption of environmentally friendly activities, the narrow range of explanatory factors – consequently the narrow range of explanatory power – presents a significant limitation to following exclusive pro-environmental theories. Calls for theory synthesis to develop a comprehensive model of pro-environmental behavior are inclusive to internal cognition, situational context, and other personal attributes distal and proximal to behavior and behavior intention (Stern, 2000).

The focus of this report is to interrogate demographic and behavior theory antecedents that predict conservation activities in the home. This report begins to shift this focus specifically on exploring and identifying general antecedents of anti-consumption or practicing conserving and curtailing food, energy and water in various household actions. Owing to an analytically eclectic research approach that posits and evaluates complex and overlooked latent variable relationships, a wide range of factors are selected to explore different connections and traffic in explanations from a wider range of theory and research traditions (Cooksey, 2001; Sil and Katzenstein, 2010). Based on the recommendations of other studies, this report develops a comprehensive theoretical framework to study and identify general behavior antecedents (Bamberg and Möser, 2007; van der Werff and Steg, 2016) of household FEW environmentally oriented anti-consumption (EOA). Three objectives emerge that drive the theoretical synthesis:

1. Construct and assess five measurement models that influences the individual moral or personal norm: (1) values, (2) beliefs, (3) value-belief-norm (VBN) theory, (4) Value-identity-personal norm (VIP) theory, (5) Ecological citizenship (EC) theory.
2. Identify general antecedents (i.e. demographics and theoretical motivators) of household FEW environmentally oriented anti-consumption: (1) dairy reduction, (2) meat reduction, (3) food waste reduction, (4) monitoring and reducing household heat and cool air loss, (5) monitoring and reducing exterior and interior light use, (6) reducing hot water use, (7) reducing shower use and frequency, (8) reducing loads of laundry.
3. Compare the predictive power of VBN, VIP and EC theory on the personal norm construct and household FEW EOA.

Theoretical framework

The value-belief-norm model

Value-belief-norm theory is a prevalent model useful for explaining a range of pro-environmental behaviors. It postulates a causal chain that links values to a world ecological view, or commonly known as general environmental beliefs based on the degree to which an individual recognizes that human activities pose substantial impacts to the environment. This world ecological view in turn influences the moral norm conceptualized as the predisposition to act out of morality or responsibility to take action. Finally, VBN theory posits that the individual moral norm directly influences pro-environmental behavior (Stern, 2000; Stern et al., 1999). Personal norms play a significant role in explaining and predicting pro-environmental behavior. Bicchieri (2016) and Schwartz (1977) demonstrate that the personal norm, the set of deeply held personal and moral beliefs assessing situations, guide positive and negative self-evaluations prevalent in everyday choices consumers face in everyday life. More specifically the moral norm is made up of three main systems of beliefs. The first includes moral considerations or obligations to behave a certain way based on internalized moral rules situated in decisions that test individuals to validate those rules or potentially bend or break those rules. This internal moral compass stems from studies on the norm activation model and the theory of reasoned action (Harland, Staats, & Wilke 1999, 2007). The second and third dimensions of the personal norm are based around studies that suggest behavior is driven by internalized feelings of pride and guilt (Antonetti & Maklan, 2014; Onwezen, Antonides, and Bartels, 2013; Schneider et al., 2017).

Recent studies have employed VBN theory to study policies to decrease car use in Japan such as implementing premiums for parking, transport, insurance and fuel (Hiratsuka, Perlaviciute, and Steg, 2018), motivators for last chance tourist destinations that feature vistas, land and seascapes and plants and animals that are threatened or endangered (Denley et al., 2020), and food service drones (Hwang, Kim, and Kim, 2020). Integrated models that have used the VBN model as the theoretical framework have been constructed to study public sphere behaviors such as environmental protests, issue campaigns, and environmental activism including making a donation to an environmental cause or organization (Liu, Zou, and Wu, 2018) and private sphere behavior (Chen, 2015). One study by Oreg and Katz-Gerro (2006) using a cross-national survey studied an extended VBN model of environmental attitudes focused on identifying factors that (dis)empower lifestyle changes. VBN theory was also linked with the advocacy coalition framework to empirically demonstrate that individual personal norms, beliefs and values can be distributed according to deep core, policy core and secondary aspects of the policy process, suggesting that belief continuum or "soup" in environmental policy systems (Henry and Dietz, 2012). The VBN model has proven to be applicable in a wide range of research objectives, not explicitly related to predicting specific types of behavior but rather uncovering theoretically gray antecedents directly or indirectly influencing environmentally friendly actions. Furthermore, it is a core model of interest to begin establishing and extending its usefulness in a general way with respect to domain specific anti-consumption behaviors. By extending this model to include other variables from emergent models of pro-environmental behavior, such as including environmental self-identity and ecological citizenship and social justice beliefs, this report may begin to take deliberate steps to developing a general model of environmentally oriented behavior.

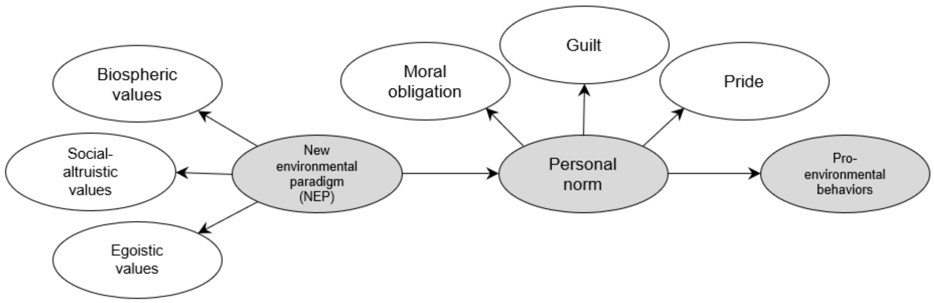


Figure 1
The value-belief-norm model (adapted from Liu et al. (2018))

Value-identity-personal norm theory

The second model of interest in this study examines how biospheric values and environmental self-identity influence the moral obligation to adopt household conservation practices in the value-identity-personal norm theory. The environmental psychological definition of a value or set of values, and its construction and measurements, are adapted to a multi-part survey instrument. Dietz, Fitzgerald, and Shwom (2005) presented Schwartz and Bilsky's (1987) definition, which consists of five core attributes: a) values are concepts or beliefs, b) they guide desirable states and behavior(s), c) are situational, d) determine behavior choice and individual evaluations of the events that follow, and e) are ranked according to importance on a relative basis. Since describing values as situational seems ambiguous, it is noted that values are inherently abstract, and therefore transcend situations (i.e. they are 'trans-situational') but are fundamentally guiding principles in one's life toward achieving a certain goal or end-state (De Groot and Steg citing Rokeach, 2008). As environmental scholars are interested in distinguishing groups of people, based on similar or different goal orientations, value orientations have been used extensively to denote distinctions in certain behavioral antecedents according to general life goals or pursuits (Fransson and Gärling, 1999; Fulton, Manfredo, and Lipscomb, 1996; Hitlin and Piliavin, 2004; Katz-Gerro et al., 2017; Nordlund and Garvill, 2003).

In the value-identity-personal norm theory shown in Figure 2, biospheric values are the antecedents that predict one's environmental self-identity, which in turn predicts one's personal norm or moral obligation to adopt pro-environmental behavior (van der Werff and Steg, 2016; van der Werff, Steg, and Keizer, 2013). Self-identity stems from the idea that internal processes individuals use to verify their identities and external social structural linkages that shape that identity influence the individual simultaneously (Stryker and Burke, 2000). By extension, an environmental self-identity is defined by both independent (self-verification) and interdependent (social-structural roles) self-construal, denoting how individuals think and feel about themselves autonomously and in relation to the natural world (Mancha and Yoder, 2015; Markus and Kitayama, 1991). Studies by Gatersleben, Murtagh, and Abrahamse (2014) and Whitmarsh and O'Neill (2010) extend these early constructions by operationalizing and testing the effects of environmental identity across a range of pro-environmental behaviors such as purchasing fair trade products, implementing energy efficient devices into the home, recycling, and reducing household waste. The personal or moral norm is the set of self-expectations and internal preferences established and changed through the natural course of individual experience (Schwartz, 1977). Furthermore, these moral obligations come with internal sanctions (Heberlein, 2012). That is, any deviant behaviors that one's personal norm would regularly disallow often generate negative emotions, diminished self-esteem or other unwelcome feelings that manifest in self-deprecation. This is why the personal norm concept is usually measured using metrics such as pride and guilt (Schwartz, 1977). These studies show that values dimensions and environmental self-identity linked to the personal norm are vital predictors of a range of pro-environmental behaviors that are capable of transcending different situations and contexts, though a fuller extent of pro-environmental behaviors is needed to bear out the strength of such a model. Today's complex web of consumer habits and choices are dynamic, but some patterns of consumption are embedded and difficult to change. Voluntary policies could be a fundamental solution to controlling and predicting the transition to sustainable behavior by unlocking environmental identity's influence on the personal norm denoted in the value-identity person norm model.

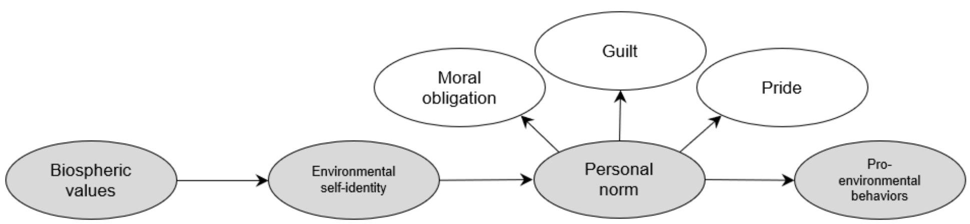


Figure 2
The value-identity-personal norm model (adapted from van der Werff and Steg (2016) and van der Werff et al. (2013))

Ecological citizenship

Appropriation of natural resources and the establishment of provisioning systems for human consumption of goods and services has contributed to a competitive and in some cases hostile marketplace environment, disproportionately affecting different segments of the US population, not to mention populations around the globe as well. An unwelcome reality underlying resource consumption in the US besides the expansion of pollution is the subsequent expanding oppression of marginalized places and community members. From an environmental justice perspective, the reason for marginalized places and underprivileged populations can mainly be traced back to neglectful maltreatment and ultimately the division of people and communities because of race, evidenced by the civil rights movements of the 1960s (Boone, 2010), and the unethical siting of high polluting industrial facilities, nuisance land-uses, and hazardous waste sites (Mohai and Saha, 2015). Today, divisions over age, gender identity, ethnicity, race, and wealth or socioeconomic status continue to complicate the picture. People of color, children, women, indigenous communities, and those who are poor or disabled experience a particularly higher level of environmental toxicity and vulnerable quality of life (Ryder, 2017), though local communities practicing grassroots activism have created a groundswell of mobile and informed community members helping each other recuperate from traumatic violence and exposure to toxics (Anguelovski, 2013), while empowering each other to pursue just sustainability. This idea encapsulates a stronger sense of place, community identity and attachment, and a future of climate justice that adequately deliberates over and delivers solutions to tackle risk and vulnerability to climate change by protecting the representation of underprivileged voices (Agyeman et al., 2016; Schlosberg and Collins, 2014). The point here is to illustrate that historically, consumers are disproportionately affected by the activities of others mainly over demographic traits and geographies, however, these systematic oppressions have also become inflection points bringing different community members together in times of need. Although these issues continue today, sustainability continues to be a perpetual goal shared by many optimistic of equal access and availability of goods and services, and just protections from environmental harm.

The motivations for prosocial or pro-environmental actions are difficult to unravel and even more difficult to justify with evidence. Findings identifying influential factors that support behavior change that aligns with the goals of resource conservation and sustainable livelihood are vital, but these findings require some caution, as the implications carry geographic limitations. The benevolence of some people to act in the name of adapting or mitigating climate change impacts – through civic engagement, supporting renewable energy projects or taking individual conservation actions – has been shown to be a function of psychological distance, where psychological concerns complement the distant risks posed by climate change and thus are a limiting factor of pro-environmental discourse or action (Schuldt, Rickard, and Yang, 2018; Spence and Pidgeon, 2010; Spence, Poortinga, and Pidgeon, 2012). In addition, other studies confirm different place attachments determine the level of resource conservation efforts, where more local attachments tend to determine negligible or modest levels of conservation and sustainability, and national or global attachments tend to influence heavier more meaningful actions relevant to a global identity (Devine-Wright and Batel, 2017; Scannell and Gifford, 2013). Learning from this research that global or even ‘glocal’ frames of environmental concern persuade individuals to act, perhaps interpersonal communication on climate change framed as a global call for action might reinvigorate consumers to adopt pro-environmental behaviors that are more than modest. More specifically, such efforts might be able to tap the personal or moral norm to conduct conservation behaviors on a non-contractual basis, where responsibility to act is viewed and performed out of a shared or collective interest as members of a global community and liberal state (Bell, 2005; Sáiz, 2005), and not on contractual terms usually controlled by the state. These are a few of the tenets emphasizing ecological citizenship. For example, actions such as sacrificing or reducing the use of a personal automobile, purchasing ecologically friendly products, divesting from fossil-fuel energy resources, or making a campaign donation to a climate change advocate might no longer be viewed as actions stemming from perceptions of climate change limited by political territories, but perceptions of climate change liberated by self-actualization, where pro-environmental actions have positive impacts that are felt and fulfilled globally.

A resurgence of interest in ecological citizenship has prompted a closer look at how social and environmental (in)justice could influence the intrinsic basis of the personal norm. The second model of interest in this study is the ecological citizenship model, which is a system of beliefs that motivate actions stemming from duties and civic virtues to restore environmental justice and reduce environmental degradation. These civic virtues are based on beliefs to extend the courtesy of sympathy, compassion, as well as an urgency to correct and compensate for unjust asymmetrical consequences affecting everyone (i.e. strangers) across territorial borders and intergenerational boundaries (Jagers citing Sagoff, 2009). Therefore, ecological citizenship is theorized as a responsibility-based motivation to be part of a global membership, whose global citizenry to restore and protect global resources as a means to an environmentally just end, is controlled by three core components (see Figure 3): recognition that private actions ought to have public consequences, responsibilities to act ought not to be constrained by political boundaries, and asymmetric levels of environmental degradation ought to influence asymmetric efforts to correct the impacts (Jagers, Martinsson, and Matti, 2014, 2016). In addition, the eco-citizenship model places social justice measures as the defining factor to determine the level of one's ecological citizenship motivation. This latent variable is defined by using the following three dimensions of the social justice latent construct: awareness of ecological footprints, sense of fairness, and other-regarding reasons for acting pro-environmentally (Dobson, 2003; Jagers et al., 2014, 2016). Eco-citizenship has grown from the constraints of unidimensional theory development and practical use (Melo-Escrihuela, 2008). Recently, eco-citizenship approaches are now used to understand how humans embedded in nature might cultivate these different virtues and influence a sociology of moral action that benefit both environment and the social conditions affecting each person's existence (Scoville citing Orwell, 2016). In another example, a critique by MacGregor (2014) motivates actors and agents of climate change to resist the neoliberal discourse that fails to internalize fair and just practices between men and women. Specifically, MacGregor urges people to reclaim a feminist commitment to not just creating a sustainable environmental future, but also one that is socially sustainable in the name of feminist ecological citizenship.

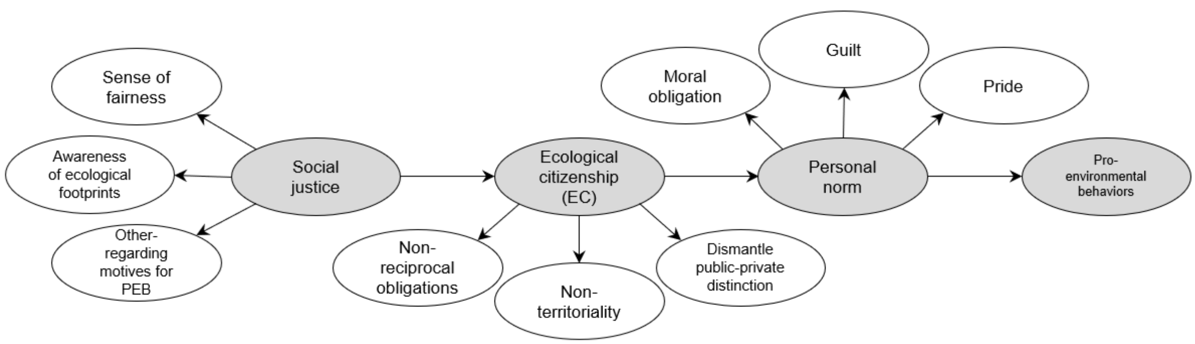


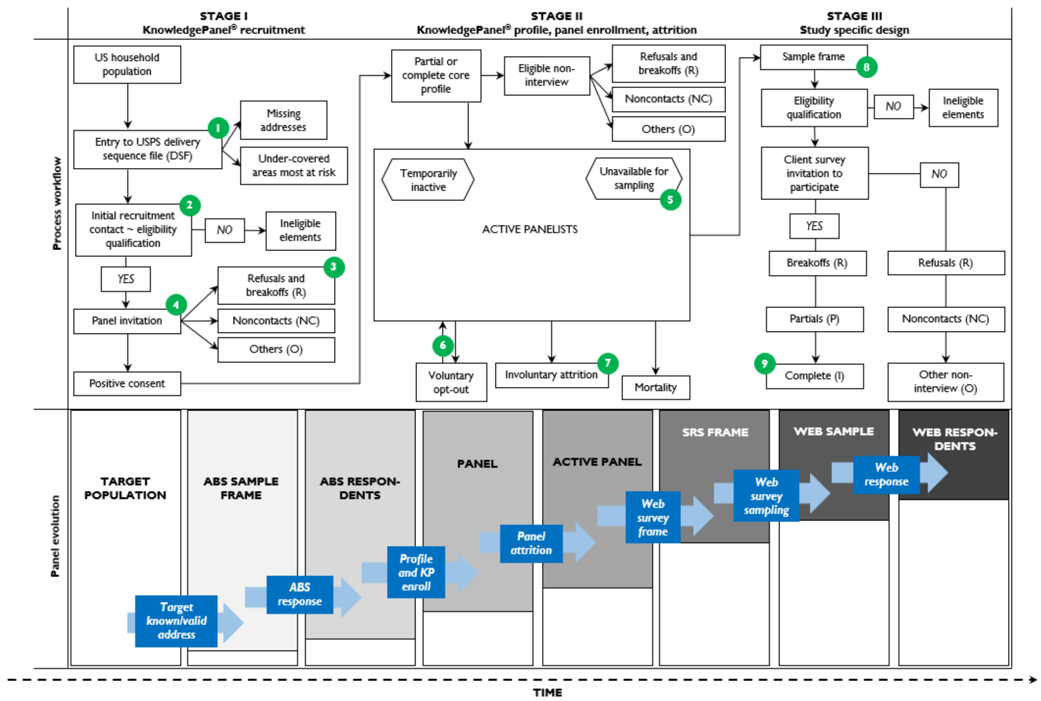
Figure 3
Dobson's (2003) ecological citizenship model (adapted from Jagers et al. (2014, 2016))

Toward an integrative model of household FEW EOA

The focus on incorporating more than one model or model component into a single integrative model stems from the idea that a greater amount of variation in behavior response can be captured by casting a wider net to other variables external to a single model. According to Stern (2000), a turn toward model synthesis incorporates less obvious contextual or personality factors that some environmentally significant behaviors are anchored in to adopt new behavior norms. A study by Wolske, Stern, and Dietz (2017) further clarifies that integrating more than one behavioral model helps target those most influential factors for intervention, and instead of assuming each model of behavior is competitive, it is more appropriate to say that each of them are complementary and are only partially explanatory. Several studies performing theory synthesis are optimistic of this motivation, integrating multiple theories to explain behavior change in landowner conservation (Pradhananga, Davenport, Fulton, Maruyama, and Current, 2017), transportation mode (Wall, Devine-Wright, and Mill, 2007), recycling (oom de Valle, Rebelo, Reis, and Menezes, 2005; Park and Ha, 2014), clothing consumption (Joanes, 2019), green lodging (Shin, Im, Jung, and Severt, 2018), organic menu item choice (Han, 2015), and habits which seek change in automatic and ritualized behaviors steeped in weak levels of consciousness and planning (Gkargkavouzi, Halkos, and Matsiori, 2019). Another reason motivating integrative models is to abolish paradigmatic compartmentalization. In situations where researchers offer decision-makers, managers or policy practitioners strong empirical evidence, arguments compartmentalized in one paradigm inculcate powerful assumptions that fail to conceptualize real world problems from diverse perspectives. This is showcased in Meissner's (2015) case study of urban wastewater infrastructure in South Africa, and also in Page and Page's (2014) survey testing a variety of individual perceptions that influence decision-making in the Framework for Internal Transformation, an eclectic model. The upshot of integration in these examples demonstrates that data offering multiple perspectives positions it for results that have practical implications and are better informed by different ways issues are problematized.

Methodology

The target population in this study included adults 18 years or older living in the United States. The data collection window began July 12th and ended July 27th, 2019. Two thousand active panelists were invited to complete the survey and 1,219 completed questionnaires resulting in a 61% response rate.



Keys to controlling data integrity, and generalizability:

1. Supplemental data is appended to each element in the DSF population frame targeting underrepresented strata (i.e. Hispanic families).
2. Multiple methods of recruitment modes (e.g. postal, email, face-to-face interview, telephone).
3. Refusal conversion calls made to non-responding households with a valid telephone number. Invitations can be completed via toll free hotline, postage paid form, or web enabled form.
4. Households without internet are provided free internet service and a web-enabled device. Panelists may also work out details to complete client surveys via non-web mode (i.e. telephone, mail, interactive voice recognition).
5. Active panelists are disallowed membership to multiple client surveys at a single time and are made unavailable to specific client surveys due to these commitments.
6. Loyalty incentives to re-recruit former panel members is cost effective, boosts cooperation, and saves time.
7. Panel maintenance, involuntary purging and omitting panelists with tenure limits.
8. Alongside a simple random sampling approach to selecting panelists, general population samples are weighted to most recent current population survey benchmarks to behave as EPSEM using a PPS approach.
9. Completion rate reported using Callegaro and DiSogra (2008); all response rate reporting guidelines follow American Association of Public Opinion Research (AAPOR) standards.

Figure 4
A process workflow of a pre-recruited probability web-panel (adapted from Biemer, (2010), Callegaro and DiSogra (2008), and Lee (2006))

The survey was administered by Ipsos and participants consisted of their pre-recruited probability-based web panel. Depicted in Figure 4, Ipsos constructs panels both from existing panelists and by recruiting and enrolling new panelists. Ipsos conducts ongoing recruitment to complement inactive panelist attrition (Callegaro and DiSogra, 2008; Callegaro et al., 2014a; DiSogra and Callegaro, 2016). Potential panelists are recruited to be representative of the US population (Callegaro and DiSogra, 2008). All panelists are compensated with modest financial incentives (e.g. cash prizes, entry to sweepstakes drawings and raffles) to take electronic surveys to respect their voluntary participation as well as promote loyalty (Ipsos, 2020). Ipsos contacts potential panelists using known mailing addresses, telephone numbers, email addresses or face-to-face interactions. Participants complete demographic indicators and are subsequently enrolled in the "active pool" of panelists (Callegaro and DiSogra, 2008) from which they can be sampled for specific studies. To reduce sampling error and ensure sample representativeness, a simple random sampling approach is used to draw the sample to meet Current Population Survey (CPS) benchmarks (Lee, 2006). The demographics for this panel are based on CPS 2018 measures, and include age, race, gender, education, income, and geography designators. Panelists are selected for client surveys using the equal probability of selection method: a probability proportionate to size approach where all active panel members are assigned the same likelihood of selection (Groves et al., 2009; Ipsos, 2020). A more complete narrative of the survey measures and assessment of total survey error can be found in Appendix A.

Following the workflow diagram this study employs shown in Figure 5, all latent variables are first constructed and evaluated from their respective latent indicators using an exploratory factor analysis (EFA). Next, the latent variable relationships postulated in

VBN, VIP and EC theories are assessed and validated using confirmatory factor analysis (CFA). Finally, a hierarchical linear modelling (HLM) approach is used to test the hierarchical or recursive attributes of the VBN, VIP and EC theories and to estimate the significant effects that that both independent and various interpersonal demographic variables have on each of the eight FEW household conservation measures. To construct and validate the measurement model(s), the results below provide estimates of several validity indices (see Appendix F). All EFA and CFA indices are depicted alongside each of the measurement models in the results.

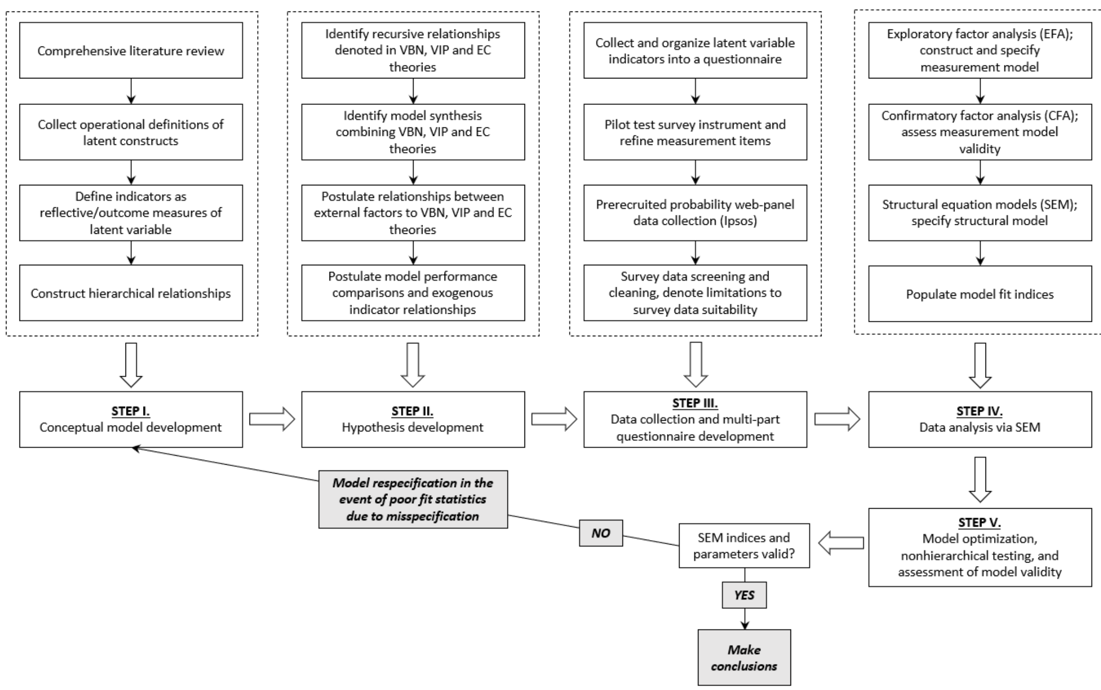


Figure 5
Workflow diagram of the research methodology (adapted from Dragan and Topolšek (2014) and Zhao, Pan, and Chen (2018))

Results

This section reports results of multivariate analysis of the multipart survey instrument. A description of demographic findings is provided in Appendix B. Multiple analysis of variance of demographic variables and latent variable construction (i.e. EFA results) are shown in Appendices D2 and G. These results are for reference only and inform the main course of analysis presented in two sections. First, CFA results of five measurement model specifications are evaluated based on: (1) values, (2) environmental and non-environmental beliefs, (3) value-belief-norm theory, (4) value-identity-personal norm theory, and (5) ecological citizenship theory. With respect to these latter model specifications, the VBN, VIP and EC a priori theories include covariances with the FEW household conservation measures, denoted by the pro-environmental behavior construct which each model predicts. The EFA and CFA approach is influenced by the two-step and four-step procedures recommended by Anderson and Gerbing (1988) and Mulaik and Millsap (2000). Second, three hierarchical linear models correspond to the VBN, VIP and EC theories with respect to the predictive power of each theories exogenous and endogenous latent constructs across each household FEW conservation measure. Hierarchical linear modelling is performed with three specific purposes in mind; to test the causal pathways between each of the model variables, to evaluate the predictive power of each theory for each household anti-consumption dependent variable by computing R^2, adjusted R^2 and 95% confidence intervals around each R^2 value similar to the theory comparison study on interest in smart energy systems by van der Werff and Steg (2016), and to identify those theory specific and demographic antecedents that significantly influence household FEW conservation behaviors generally. The hierarchical regression tables are presented in Appendix I and are the results are discussed below.

Assessment of measurement models

Based on the results of the EFA, several confirmatory factor models were assessed using maximum likelihood estimation (Byrne, 2010; Kline, 2015; Hair et al., 2019) and assessed for goodness of fit. In CFA, the goal is to specify and validate a measurement model which ultimately involves appraising how well each model is associated with the data prior to specifying structural equation models, the last step denoted in Figure 5 earlier. More specifically, this is achieved by computing and populating parameter estimates for each measurement model creating a predicted variance-covariance matrix to closely resemble the sample variance-covariance matrix based on the latent factors and latent factor indicators used to build the model (Hoyle, 2012). Since three similar but distinctly different theories of pro-environmental behavior are conceptualized in a single integrated theoretical framework, these CFA results are a critical step to establishing a complex model of household FEW conservation or anti-consumption behavior that unites concepts from each by first examining if causal relationships exist and to what degree they fit research data. Five measurement models are specified in the CFA here:

- *Model 1 (four-factor values model):* Values measures specified as four unidimensional first-order constructs: biospheric (BV, four correlated items), social-altruistic (SA, two correlated items), egoistic (EV, two correlated items) and hedonic values (HV, three correlated items).
- *Model 2 (four-factor beliefs model):* environmental and non-environmental beliefs specified as four unidimensional first-order constructs: environmental beliefs (New

Ecological Paradigm (NEP)), non-environmental beliefs (Quality of Life (QoL), awareness of consequences (AC) and behavior control (perceived behavior control (PBC)).

- *Model 3 (six-factor VBN model):* six latent factors are specified based on VBN model antecedents predicting FEW household EOA: biospheric values, altruistic values, egoistic values, environmental beliefs, personal norm, a second-order factor represented by three sub-constructs: moral obligation, guilt, and pride, and household conservation, depicted as a second order construct represented by three sub-constructs: diet (two correlated items "dairy" and "meat"), efficiency (three correlated items "waste", "hvac" and "lights"), and water conservation (three correlated items "hotwater", "laundry" and "showers").
- *Model 4 (four-factor VIP model):* four latent factors specified based on VIP model antecedents predicting FEW household EOA: biospheric values, environmental self-identity (3 correlated items), personal norm, and household conservation as specified earlier.
- *Model 5 (four-factor EC model):* four latent factors specified based on EC model antecedents predicting FEW household EOA: social justice (3 correlated items), ecological citizenship (dismantling public-private distinction (DPPD), 3 correlated items), personal norm, and household conservation as specified earlier.

Each of the CFA models below are evaluated based on convergent and discriminant validity and construct reliability indices shown in Table 3. Fit is assessed using absolute and incremental fit indices denoted in Table 4. A summary of all model fit indices is shown in Table 17. Each CFA model depicts standardized path coefficients. Taken together these criteria allow each of the models to be compared with one another over association to the national survey data (i.e. the population sample) and robust explanation of FEW household EOA measures.

Models 1 and 2 shown below specify values and beliefs models respectively. Reliability is assessed using the composite or construct reliability (CR) coefficient and the average variance extracted (AVE). The CR and AVE values reported for each of the values and beliefs constructs meet satisfactory convergent validity requirements ($CR_{model\ 1} > 0.70$, $CR_{model\ 2} > 0.70$; $AVE_{model\ 1} > 0.50$, $AVE_{model\ 2} > 0.50$), meaning each of the measures in models 1 and 2 below converge on one common phenomenon. Discriminant validity and construct reliability are assessed using maximum squared variance (MSV) and McDonald's H (MaxR(H)). Discriminant validity and construct reliability are established based on the estimates provided in both values and beliefs CFA models below ($MSV_{model\ 1}$ and $MSV_{model\ 2} < AVE$; $MaxR(H)_{model\ 1}$ and $MaxR(H)_{model\ 2} > 0.70$). These estimates provide evidence that each of the indicators specified in models 1 and 2 load on unique manifest/latent factors. Finally, goodness of fit criteria provided for model 1 (CMIN = 248.782, df = 38, CMIN/df = 6.547; NFI = 0.963; TLI = 0.944; CFI = 0.968; RMSEA = 0.067 [90% CI: 0.060, 0.076]), and model 2 (CMIN = 892.503, df = 113, CMIN/df = 7.898; NFI = 0.904; TLI = 0.884; CFI = 0.915; RMSEA = 0.075 [90% CI: 0.071, 0.080]) both indicate a modest fit.

Table 1
Validity measures of the values CFA model

	Convergent and discriminant validity indices				*Correlation matrix*			
Factors	CR	AVE	MSV	MaxR(H)	HV	BV	AV	EV
HV	0.804	0.578	0.203	0.815	**0.760**			
BV	0.910	0.717	0.612	0.914	0.451	**0.847**		
AV	0.760	0.614	0.612	0.768	0.414	0.782	**0.783**	
EV	0.727	0.590	0.341	0.906	0.406	0.418	0.584	**0.768**

Notes: Values in bold on the diagonal indicate the square-root of the AVE for the latent construct. Social altruistic values measures alt1 and al2, egoistic values measures ego1 and ego2, and hedonic values measure hed1 removed due to poor correlation with latent construct(s).

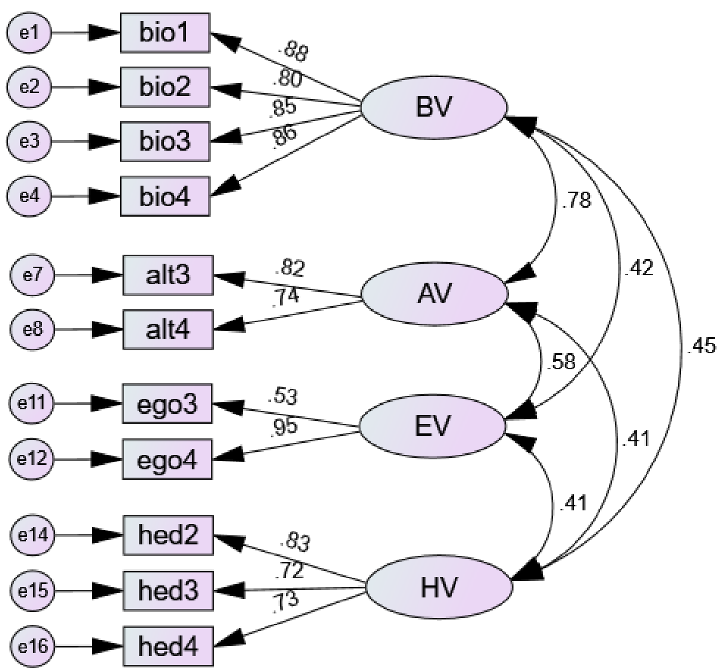


Figure 6
Confirmatory factor analysis of values
Notes: The latent factor labels represent the following: BV = biospheric values; AV = social-altruistic values; EV = egoistic values; HV = hedonic values. Social-altruistic values measures alt1 and alt2, egoistic values measures ego1 and ego2, and hedonic values measure hed1 removed due to poor loadings on latent construct.

Table 2
Validity measures of the beliefs CFA model

	Convergent and discriminant validity indices				*Correlation matrix*			
Factors	CR	AVE	MSV	MaxR(H)	NEP	QoL	PBC	AC
NEP	0.848	0.532	0.381	0.872	**0.729**			
QoL	0.865	0.522	0.292	0.891	0.531	**0.723**		
PBC	0.796	0.566	0.292	0.804	0.313	0.540	**0.752**	
AC	0.753	0.511	0.381	0.799	0.617	0.456	0.224	**0.715**

Notes: Values in bold on the diagonal indicate the square-root of the AVE for the latent construct.

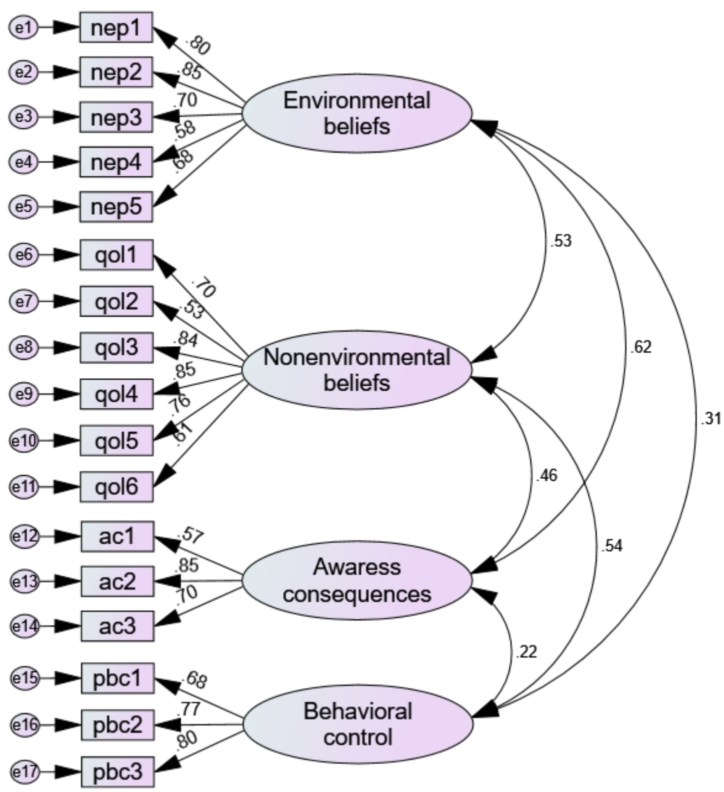


Figure 7
Confirmatory factor analysis of (non)environmental beliefs, control beliefs, and awareness of consequences

Factor solutions specified in in the VBN, VIP and EC models denoted in Figures 8, 9 and 10 depict confirmatory models with omitted indicators based on poor loadings from earlier EFA. Alternative models that contained full construct measures indicated poor construct reliability. Even with modification indices, violations to CR, AVE, MSV and MaxR(H) threshold values produced inadmissible models. Stable factor solutions from these models with omitted indicators were achieved by establishing convergent and discriminant validity. Composite reliability and average variance extracted scores met satisfactory levels in model 3 ($CR_{model\ 3} > 0.70$; $AVE_{model\ 3} > 0.50$), model 4 ($CR_{model\ 4} > 0.70$; $AVE_{model\ 4} > 0.50$) and model 5 ($CR_{model\ 5} > 0.70$; $AVE_{model\ 5} > 0.50$) indicating the presence of convergent constructs in VBN, VIP and EC theory-based models predicting FEW household EOA. The CFA models based on VBN, VIP and EC theory all specify unique latent constructs ($MSV_{model\ 3}$, $MSV_{model\ 4}$, $MSV_{model\ 5} < AVE$; $MaxR(H)_{model\ 3}$, $MaxR(H)_{model\ 4}$, $MaxR(H)_{model\ 5} > 0.80$), establishing construct reliability and discriminant validity. Each model provided a range of fit indices with respect to the national survey data. Shown in table 6, both VBN and VIP theories in model 3 (CMIN = 1227.347, df = 384 , CMIN/df = 3.196; NFI = 0.947; TLI = 0.955; CFI = 0.963; RMSEA = 0.042 [90% CI: 0.040, 0.045]) and model 4 (CMIN = 862.988, df = 240 , CMIN/df = 3.596; NFI = 0.959; TLI = 0.963; CFI = 0.970; RMSEA = 0.046 [90% CI: 0.043, 0.050]) produced close fit, but the EC model produced a weaker fit than the others (CMIN = 906.194, df = 218 , CMIN/df = 4.157; NFI = 0.945; TLI = 0.946; CFI = 0.958; RMSEA = 0.051 [90% CI: 0.047, 0.054]).

Table 3
Validity measures of the value-belief-norm CFA model

	Convergent and discriminant validity indices				*Correlation matrix*					
Factors	CR	AVE	MSV	MaxR(H)	PN	AV	BV	EV	hhEOC	NEP
PN	0.962	0.893	0.554	0.965	**0.945**					
AV	0.760	0.613	0.610	0.767	0.662	**0.783**				
BV	0.910	0.717	0.610	0.913	0.744	0.781	**0.847**			
EV	0.775	0.662	0.288	1.097	0.341	0.537	0.381	**0.813**		
hhEOC	0.823	0.619	0.415	0.885	0.644	0.466	0.546	0.256	**0.787**	
NEP	0.848	0.532	0.477	0.872	0.619	0.540	0.691	0.209	0.452	**0.730**

Notes: Values in bold on the diagonal indicate the square-root of the AVE for the latent construct. Social altruistic values measures alt1 and al2 and egoistic values measures ego1 and ego2 removed due to poor correlation with latent contruct(s).

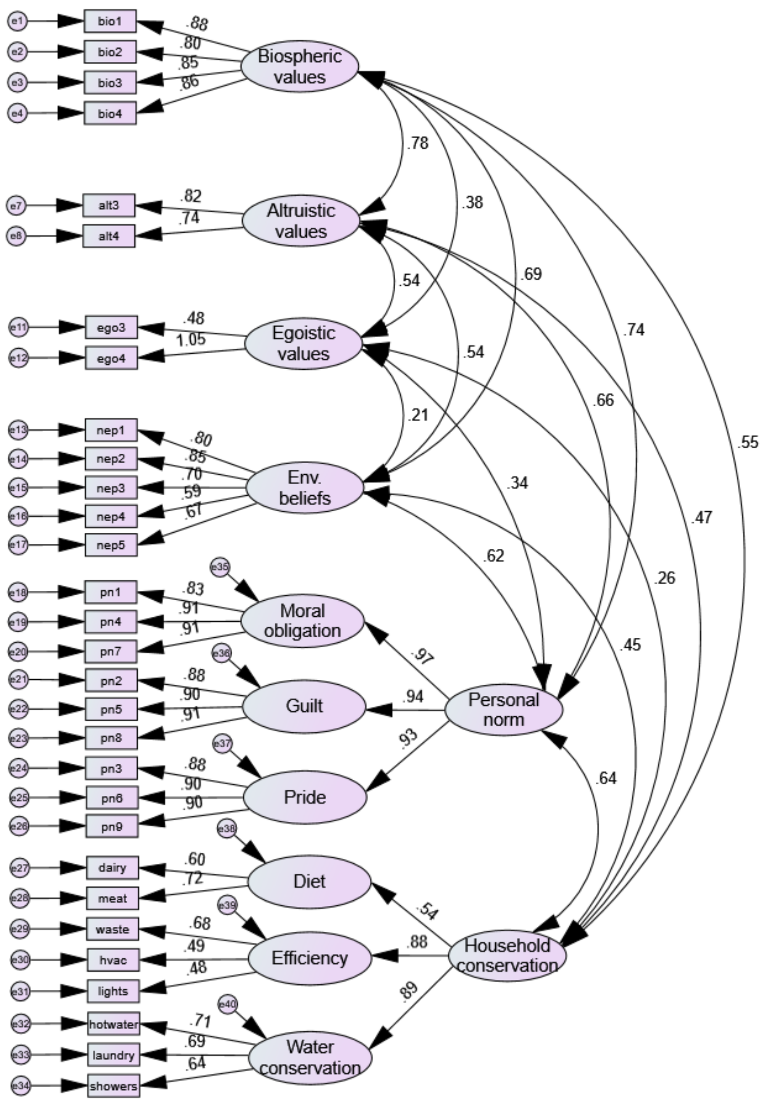


Figure 8
Confirmatory factor analysis (measurement model) of the value-belief-norm (VBN) model antecedents toward household environmentally oriented consumption

Table 4
Validity measures of the value-identity-personal norm CFA model

Factors	*Convergent and discriminant validity indices* CR	AVE	MSV	MaxR(H)	*Correlation matrix* ESI	BV	PN	hhEOC
ESI	0.944	0.849	0.567	0.947	**0.922**			
BV	0.910	0.716	0.567	0.913	0.753	**0.846**		
PN	0.962	0.893	0.554	0.966	0.684	0.744	**0.945**	
hhEOC	0.865	0.686	0.183	0.918	0.404	0.398	0.428	**0.828**

Notes: Values in bold on the diagonal indicate the square-root of the AVE for the latent construct.

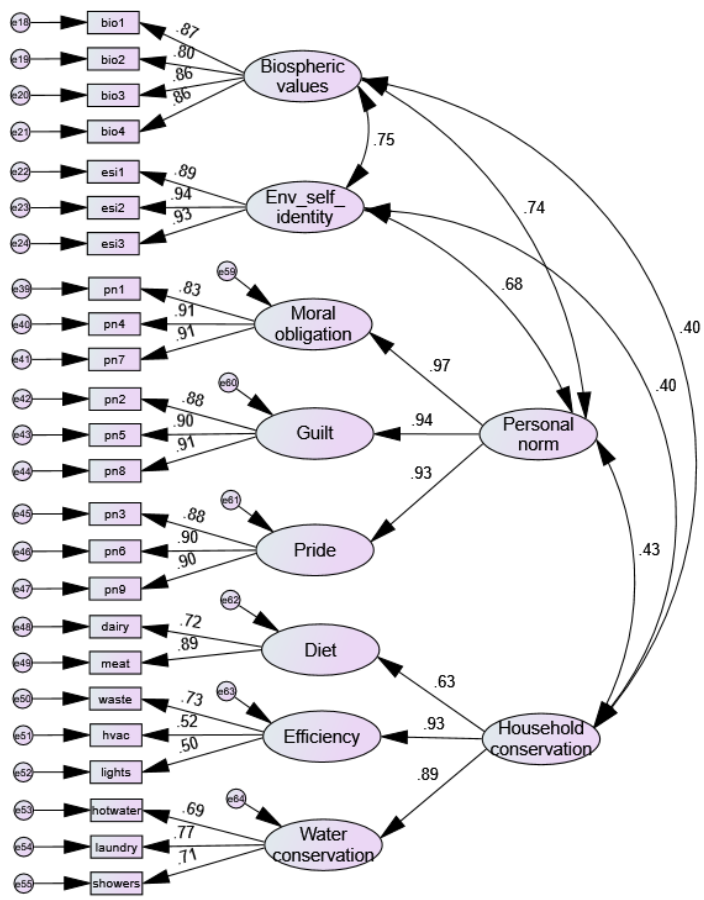


Figure 9
Confirmatory factor analysis (measurement model) on value-identity-personal norm measures toward household environmentally oriented consumption

Table 5
Validity measures of the ecological citizenship CFA model

	Convergent and discriminant validity indices				*Correlation matrix*			
Factors	CR	AVE	MSV	MaxR(H)	SJ	PN	hhEOC	DPPD
SJ	0.773	0.536	0.289	0.801	**0.732**			
PN	0.962	0.893	0.413	0.969	0.538	**0.945**		
hhEOC	0.822	0.618	0.413	0.887	0.354	0.643	**0.786**	
DPPD	0.773	0.546	0.052	0.851	0.229	0.124	0.077	**0.739**

Notes: Values in bold on the diagonal indicate the square-root of the AVE for the latent construct. Ecological citizenship measures dppd1 and dppd2 omitted because of poor correlations with latent factor. Only "awareness of ecological footprints" indicators retained in the social justice latent construct.

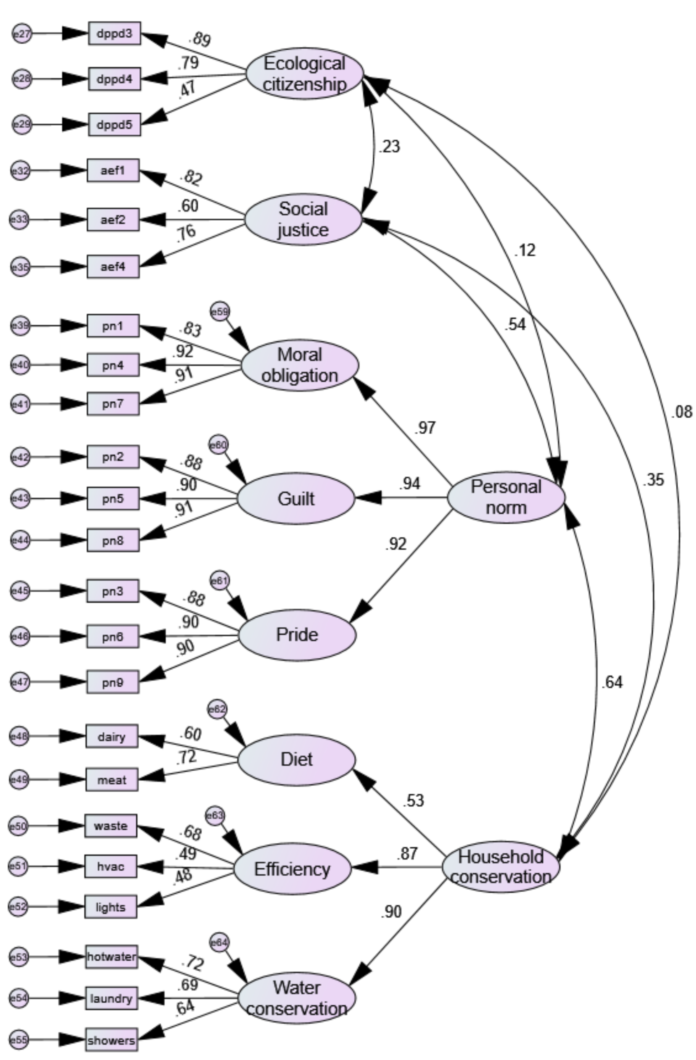


Figure 10
Confirmatory factor analysis (measurement model) on ecological citizenship measures toward household environmentally oriented consumption

Table 6

SPSS AMOS output: confirmatory factor analysis comparisons for goodness of fit

Minimum discrepancies	*Indices*			
Models	NPAR	CMIN (df)	P	CMIN/df
1) Values	39	248.782 (38)	0.000	6.547
→ Saturated model	(77)	(0.000 (0))	---	---
→ Independence model	(11)	(6648.218 (66))	(0.000)	(100.731)
2) Beliefs	57	892.503 (113)	0.000	7.898
→ Saturated model	(170)	(0.000 (0))	---	---
→ Independence model	(17)	(9270.852 (153))	(0.000)	(60.594)
3) Value-belief-norm	111	1227.347 (384)	0.000	3.196
→ Saturated model	(495)	(0.000 (0))	---	---
→ Independence model	(30)	(23324 (465))	(0.000)	(50.160)
4) Value-identity-personal norm	84	862.988 (240)	0.000	3.596
→ Saturated model	(324)	(0.000 (0))	---	---
→ Independence model	(24)	(21181.806 (300))	(0.000)	(70.606)
5) Ecological citizenship	81	906.194 (218)	0.000	4.157
→ Saturated model	(299)	(0.000 (0))	---	---
→ Independence model	(23)	(16497.435 (276))	0.000	(59.773)
Baseline comparisons	*Indices*			
Models	NFI	IFI	TLI	CFI
1) Values	0.963	0.968	0.944	0.968
→ Saturated model	(1.000)	(1.000)	---	(1.000)
→ Independence model	(0.000)	(0.000)	(0.000)	(0.000)
2) Beliefs	0.904	0.915	0.884	0.915
→ Saturated model	(1.000)	(1.000)	---	(1.000)
→ Independence model	(0.000)	(0.000)	(0.000)	(0.000)
3) Value-belief-norm	0.947	0.963	0.955	0.963
→ Saturated model	(1.000)	(1.000)	---	(1.000)
→ Independence model	(0.000)	(0.000)	(0.000)	(0.000)
4) Value-identity-personal norm	0.959	0.970	0.963	0.970
→ Saturated model	(1.000)	(1.000)	---	(1.000)
→ Independence model	(0.000)	(0.000)	(0.000)	(0.000)
5) Ecological citizenship	0.945	0.958	0.946	0.958
→ Saturated model	(1.000)	(1.000)	---	(1.000)
→ Independence model	(0.000)	(0.000)	(0.000)	(0.000)
RMSEA	*Indices*			
Models	RMSEA	LO 90	HI 90	PCLOSE
1) Values	0.067	0.060	0.076	0.000
→ Independence model	(0.286)	(0.280)	(0.292)	(0.000)
2) Beliefs	0.075	0.071	0.080	0.000
→ Independence model	(0.221)	(0.217)	(0.225)	(0.000)
3) Value-belief-norm	0.042	0.040	0.045	1.000
→ Independence model	(0.201)	(0.199)	(0.203)	(0.000)
4) Value-identity-personal norm	0.046	0.043	0.050	0.971
→ Independence model	(0.239)	(0.236)	(0.242)	(0.000)
5) Ecological citizenship	0.051	0.047	0.054	0.326
→ Independence model	(0.220)	(0.217)	(0.223)	(0.000)

Notes: NPAR = number of parameters. Model fit interpretations: 1) Values (modest); 2) Beliefs (modest); 3) Value-belief-norm (close); 4) Value-identity-personal norm (close); 5) Ecological citizenship (modestly close).

Multilevel analysis

Several studies investigate demographic predictors of pro-environmental behavior (Botetzagias, Dima, and Malesios, 2015; Frederiks, Stenner, and Hobman, 2015; Li et al., 2019; Seacat and Boileau, 2018; Thøgersen and Ölander, 2006). Following the multilevel analyses employed in similar studies of pro-environmental behavior theory (Carfora et al., 2017; Nigbur, Lyons, and Uzzell, 2010; Poortinga, Steg, and Vlek, 2004; van der Werff and Steg, 2016) hierarchical linear modelling (HLM) was used to predict the personal/moral norm to conserve household FEW resources, and by extension predict household FEW EOA behaviors. The results below denote stepwise blocks of the theory antecedents that build toward the moral obligation, guilt and pride subconstructs of the personal norm. Then the results regress each of the eight household FEW EOA behaviors on antecedent parameters and select demographic predictors based on earlier MANOVA results. These demographics include age, sex, head of household status, household size, number of children, race and marital status (dummy variables). Appendix H shows the hierarchical linear modelling results based on VBN, VIP and EC theoretical frameworks.

Table 1 shows the results of the multilevel analysis of the VBN theory. The first block features biospheric, egoistic and social-altruistic values as predictors of the dependent variable environmental beliefs, measured using the New Ecological Paradigm. These values constructs explained 38% of the variance in environmental beliefs (R^2 = 0.38, *adjusted* R^2 = 0.38 [95% CI: 0.34, 0.42], $F(3, 1190) = 245.39$, $p < 0.001$). The second block of parameters predict each of the three personal sub-constructs: moral obligation to conserve, appeal to guilt and appeal to pride with respect to conserving food, energy and water in the home. The predictive power of the second block of variables improved on the predictive power of the first block. Environmental beliefs alongside biospheric, altruistic and egoistic values predicted 48% of the variance in the personal norm appeal to individual pride ($R^2 = 0.48$, *adjusted* $R^2 = 0.48$ [95% CI: 0.44, 0.51], $F(4, 1188) = 276.52$, $p < 0.001$), 42% of variance in moral obligation ($R^2 = 0.42$, *adjusted* $R^2 = 0.42$ [95% CI: 0.38, 0.46], $F(4, 1188) = 216.70$, $p < 0.001$) and 43% of variance in guilt ($R^2 = 0.44$, *adjusted* $R^2 = 0.43$ [95% CI: 0.40, 0.47], $F(4, 1189) = 234.06$, $p < 0.001$). Based on theory antecedents specified in the VBN model from Figure 1, biospheric values have a similar effect on moral obligation ($\beta = 0.40$, $t = 11.50$, $p < 0.001$), guilt ($\beta = 0.39$, $t = 11.55$, $p < 0.001$), and guilt ($\beta = 0.38$, $t = 11.62$, $p < 0.001$). The last block of hierarchical regression coefficients shows the results of both model antecedents including the personal norm and demographic predictors of FEW anti-consumption. Some common indicators can be identified within and across resource domains, but no predictors can be identified. Table 18 shows that moral obligation to be a significant predictor of food waste reduction, lights, hot water, laundry and shower use conservation in the home, while guilt was a significant predictor of dairy and meat curtailment. Monitoring and reducing the use of exterior and interior lights was the only behavior item with all three personal sub-constructs as significant predictors, showing that individual sense of moral obligation and an individual sense of pride and guilt to conserve FEW resources significantly predicts reducing the use lights. Monitoring heat and cool air loss and otherwise correcting defects to household ventilation was not explained by the personal norm. Dummy variables controlling for Black ($\beta = 0.11$, $t = 2.72$, $p < 0.01$), Hispanic ($\beta = 0.10$, $t = 2.49$, $p < 0.05$) and White races ($\beta = 0.11$, $t = 2.15$, $p < 0.05$) were significant predictors, however age was the strongest predictor ($\beta = 0.20$, $t = 5.42$, $p < 0.001$) of heat and cool air loss conservation in the home.

Table 2 shows the results of a multilevel analysis of VIP theory. Biospheric values was a significant predictor of environmental self-identity, predicting 49% of the variance in environmental self-identity (R^2 = 0.49, *adjusted* R^2 = 0.49 [95% CI: 0.45, 0.52], $F(1, 1197) = 1149.61$, $p < 0.001$). The second block of predictors looks at how both biospheric values and environmental self-identity affect moral obligation, guilt and pride bases of the personal/moral norm. These model R-squared values decreased but not significantly. Biospheric values and environmental self-identity had similar influences, explaining 44% of the variance on moral obligation to conserve (R^2 = 0.44, *adjusted* R^2 = 0.44 [95% CI: 0.40, 0.47], $F(2, 1195) = 467.22$, $p < 0.001$), and 46% of variance on guilt (R^2 = 0.46, *adjusted* R^2 = 0.46 [95% CI: 0.43, 0.50], $F(2, 1196) = 513.04$, $p < 0.001$) and pride (R^2 = 0.47, *adjusted* R^2 = 0.46 [95% CI: 0.43, 0.49], $F(2, 1196) = 519.58$, $p < 0.001$). The next block of regression results that regress each of the household FEW behaviors against VIP antecedents (i.e. biospheric values and environmental self-identity) and demographics show some interesting relationships. First, biospheric values were suppressed, and no longer has any influential effect on household FEW EOA. However environmental self-identity had a significant effect on at least one behavior across each of the three resource domains: food waste reduction ($\beta = 0.20$, $t = 4.89$, $p < 0.001$), household heat and cool air loss conservation ($\beta = 0.17$, $t = 4.01$, $p < 0.001$), light use reduction ($\beta = 0.08$, $t = 2.02$, $p < 0.05$), and hot water reduction ($\beta = 0.10$, $t = 2.62$, $p < 0.01$). The results also complement the VBN model findings since the individual sense of guilt was a significant predictor of dairy and meat reduction in the food domain, while moral obligation was a significant predictor of food waste reduction, light use reduction and all of the water related anti-consumption behaviors. The demographic findings also confirm the MANOVA results. In particular, age negatively influenced dairy reduction (β = -0.08, t = -2.22, $p < 0.05$) and positively influences food waste reduction (β = 0.09, t = 2.52, $p < 0.05$), hvac (β = 0.17, t = 4.88, $p < 0.001$) and household hot water reduction (β = 0.008, t = 2.41, $p < 0.001$). This shows that increases in age result in a weaker likelihood to conserve dairy in the home, but a greater likelihood to reduce food waste, hot water, and heat and cool air loss being the strongest influential predictor.

Table 3 shows the results of the multilevel analysis of EC theory. These results show poorer predictive power than both VBN and VIP theory, indicating the personal or moral norm is weakly associated with social justice beliefs and individual beliefs and implications with respect to private consumption behaviors affecting social/public or environmental well-being (denoted in the ecological citizenship construct dismantling public-private distinction). In the first block, the singular social justice antecedent explained 25% of variance in ecological citizenship (R^2 = 0.25, *adjusted* R^2 = 0.25 [95% CI: 0.21, 0.28], F(1, 1197) = 388.94, $p < 0.001$). Ecological citizenship and social justice antecedents improve in their predictive capacities toward moral obligation, guilt and pride sub-constructs of the personal/moral norm, explaining a modest 29% of variance in moral obligation (R^2 = 0.29, *adjusted* R^2 = 0.29 [95% CI: 0.25, 0.33], F(2, 1195) = 245.06, $p < 0.001$), 38% of variance in guilt (R^2 = 0.38, *adjusted* R^2 = 0.38 [95% CI: 0.34, 0.41], F(2, 1196) = 363.14, $p < 0.001$) and 32% of variance in pride (R^2 = 0.33, *adjusted* R^2 = 0.32 [95% CI: 0.28, 0.36], F(2, 1195) = 287.59, $p < 0.001$). These regression results also complement the VBN and VIP results above with regard to the moral obligation and guilt effects on household FEW EOA. All marital status variables had insignificant influences on each of the eight behavior items except for controlling for marital status based on respondents who are married. Reduction in household shower use and frequency was negatively affected by the married marital status (β = -0.14, t = -2.13, p < 0.01), indicating that respondents who are married are less likely to practice reducing water (or hot water) through shower frequency and use. Only ecological citizenship significantly predicted meat reduction (β = 0.16, t = 5.00, p < 0.001) but had no significant effect on other food domain activities, nor energy nor water anti-consumption. This shows that dismantling the public-private distinction has a unique and narrow impact on a small number of behaviors but does not have a general impact on multiple FEW household conservation activities.

Discussion and concluding remarks

The aim of this report was to first construct and assess several measurement models based around the personal or moral norm, a significant predictor of pro-environmental behavior. The second objective was to then identify general antecedents of eight household FEW EOA behaviors to narrow down which factor solutions are behavior specific and which are more general in nature. This antecedents fall into VBN, VIP and EC theory antecedents as well as demographic factors. Finally, the third objective of this report was to compare the predictive power VBN, VIP and EC have on the personal/moral norm as well as household FEW EOA.

Five models based on values, beliefs, the VBN, VIP and EC theories were constructed and generated stable factor solutions. Both VIP and VBN theories produced close fit to the national survey data based on established threshold values of both absolute and incremental fit indices. EC model produced a modestly close fit compared with the other measurement models, suggesting the social justice and ecological citizenship concepts are measured with indicators that are not strongly unidimensional, potentially converging and more than one concept.

MANOVA and HLM results show that personal normative sub-constructs moral obligation and appeal to guilt are a strong positive general motivator for performing FEW EOA. Environmental self-identity was also shown to be a strong positive predictor of FEW EOA across each of the three domains, suggesting that identifying as an environmentally friendly person – being an engaged and practicing member of a community of environmentally friendly stewards – is an important part of adopting FEW EOA. While marital status, children, occupancy, and head of household status were not significant demographic predictors of FEW EOA, these results show that age, gender and race – and in some sparse cases political ideology and party identification – had significant influences on predicting household FEW EOA. Between these three complementary theories of pro-environmental behavior, food waste reduction and household hot water reduction had the highest levels of variance explained (Model R^2: 0.19-0.20), while dairy reduction and heat and cool air loss control were among the worst. Each model's explained variance estimates on each of the eight household FEW EOA measures were weakly modest, meaning other contextual, personal, and socio-psychological or demographic factors significantly impact FEW anti-consumption efforts in the home.

The results of this can prove useful for developing policy interventions pertinent to wider range of anti-consumption behavior. Targeting such general factors are useful for developing policies based on different dimensions of the personal/moral norm and identifying specific target audience attributes to tailor such interventions (Klöckner, 2013). Similar to studies emphasizing education, awareness, information or other community-based programs that promote goal setting (Beal, Stewart, and Fielding, 2013; Devaney and Davies, 2017; Schanes, Dobernig, and Gözet, 2018; Schmidt, 2018), this study is helpful to promote community-based interventions to change household FEW EOA based on differences in the personal norm and demographics such as age, race, and gender. These types of voluntary policy interventions are helpful for decision-makers that wish to develop community-based programs or policy instruments to encourage householders to increase self-awareness and introspection. This could activate pro-environmental behavior change on a voluntary basis, leading to marginal but immediate reductions in greenhouse gas emissions in US households.

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APPENDIX A
Survey design

Section 1
National survey instrument

Base: All respondents

DISP1 [DISP]

The purpose of this research is to study usage of food, energy, and water.

Your participation in this survey is voluntary. Your answers will be kept anonymous, and no individual identifiers will be collected; data from this survey will be used for statistical purposes only and kept confidential. While some questions require a little self-reflection and elaboration, it should take about 12 minutes.

Please contact Ipsos research at 1-800-782-6899 if you have concerns or questions regarding your participation. The Michigan Tech Institutional Review Board has reviewed our request to conduct this project. If you have any concerns about your rights in this study, please contact the Institutional Review Board (Michigan Tech-IRB) at 1-906-487-2902 or email IRB@mtu.edu.

SCRIPT NOTE: RANDOMIZE OREDER OF SECTIONS 1-7, RECORD ORDER

ALWAYS DISPLAY SECTION 7(DISPL2) BEFORE SECTIONS 3-6, DEPENDING ON WHICH SECTION SHOWS FIRST. FOR EXAMPLE: IF SECTION 3 IS FIRST OF 3-6, THEN SHOW BEFORE SECTION 3.

Base: All respondents
RANDOMIZE AND RECORD

VALUES [Grid; prompt once]

How important are each of the following items to your general goals in life:

Statements in row:

1. Respecting the earth: harmony with other species.
2. Unity with nature: fitting into nature.
3. Protecting the environment: preserving nature.
4. Preventing pollution: protecting natural resources.
5. Equality: equal opportunity for all.
6. A world at peace: free of war and conflict.
7. Social justice: correcting injustice, care for the weak.
8. Helpful: working for the welfare of others.
9. Social power: control over others, dominance.
10. Wealth: material possessions, money.
11. Authority: the right to lead or command.
12. Influential: having an impact on people and events.

13. Ambitious: hardworking, aspiring.
14. Pleasure: joy, gratification of desires.
15. Enjoying life: enjoying food, sex, leisure, etc.
16. Self-indulgent: doing pleasant things.

<u>Answers in column:</u>

1. Opposed to my values
2. Not at all important 1
3. 2
4. 3
5. 4
6. 5
7. 6
8. Extremely important 7

Base: All respondents
RANDOMIZE AND RECORD

ESI [Grid; prompt once]

How closely do you agree with the statements below:

<u>Statements in row:</u>

1. Acting environmentally friendly is an important part of who I am.
2. I am the type of person who acts environmentally friendly.
3. I see myself as an environmentally friendly person.

<u>Answers in column:</u>

1. Strongly disagree 1
2. 2
3. 3
4. 4
5. 5
6. 6
7. Strongly agree 7

Base: All respondents
RANDOMIZE AND RECORD

NEX_PBC [Grid; prompt once]

When thinking about your food, energy, and water consumption in your home, please read the statements below and evaluate how true you find them to be:

<u>Statements in row:</u>

1. It is easy for me to control the types of food my household eats.
2. I have the ability to reduce my household’s level of electricity usage.
3. I have the skills and knowledge to use water wisely in my home.

<u>Answers in column:</u>

1. Completely not true 1
2. 2
3. 3
4. 4
5. 5
6. 6
7. Completely true 7

Base: All respondents
RANDOMIZE AND RECORD

NEX_PN [Grid; prompt once]
How strongly do you agree or disagree with the following statements about food, energy, and water:

Statements in row:
1. I feel morally obligated to not waste food.
2. I would feel guilty if I did not take actions to reduce the environmental impacts of the food I buy.
3. I would feel proud to not waste food and reduce impacts of the food I buy.
4. I feel morally obligated to not waste water.
5. I would feel guilty if I did not conserve water.
6. I would feel proud to conserve and not waste water.
7. I feel morally obligated to not waste energy.
8. I would feel guilty if I did not take actions to reduce the environmental impacts of my energy use.
9. I would feel proud to not waste energy and reduce impacts of the energy I use.

Answers in column:
1. Strongly disagree 1
2. 2
3. 3
4. 4
5. 5
6. 6
7. Strongly agree 7

Base: All respondents

CC [S; prompt once]
How worried are you about global warming?

1. Not at all worried
2. Not very worried
3. Somewhat worried
4. Very worried

Base: All respondents

CC_HAPP [S; prompt once]
Recently, you may have noticed that global warming has been getting some attention in the news. Global warming refers to the idea that the world's average temperature has been increasing over the past 150 years, may be increasing more in the future, and that the world's climate may change as a result. What do you think: Do you think that global warming is happening?

1. Yes
2. No
3. Don't know

Base: IF CC_HAPP=1

CC_YESHAPP [S; prompt once]
How sure are you that global warming is happening?

1. Not at all sure
2. Somewhat sure
3. Very sure
4. Extremely sure

Base: IF CC_HAPP=2 OR 3 OR REFUSED

CC_NOHAPP [S; prompt once]
How sure are you that global warming is not happening?

1. Not at all sure
2. Somewhat sure
3. Very sure
4. Extremely sure

Base: All respondents
RANDOMIZE AND RECORD

QOL [Grid; prompt once]
How important are each of the following items regarding your quality of life:

Statements in row:

1. It is important for me to have control over the resources I need to survive.
2. Being connected to people in the community around me is important to me.
3. I would change my purchasing decisions if I thought it would benefit the health of my family.
4. I would change my purchasing decisions if I thought it would benefit the safety of my family.
5. Participation in decision making about the resources I need to survive is important to me.
6. It is important to me that I produce at least some of the resources I need to survive.

Answers in column:

1. Not all important 1
2. 2
3. 3
4. 4
5. 5
6. 6
7. Extremely important 7

Base: All respondents
RANDOMIZE AND RECORD

NEP_SHORT [Grid; prompt once]

How strongly do you agree or disagree with the following statements regarding the environment:

Statements in row:

1. When humans interfere with nature it often produces disastrous consequences.
2. Humans are severely abusing the environment.
3. Plants and animals have as much right as humans to exist.
4. Despite our special abilities humans are still subject to the laws of nature.
5. The earth is like a spaceship with very limited room and resources.

Answers in column:

1. Strongly disagree 1
2. 2
3. 3
4. 4
5. 5
6. 6
7. Strongly agree 7

Base: All respondents
RANDOMIZE AND RECORD

ECO_CIT [Grid; prompt once]

How strongly do you agree or disagree with the following statements:

Statements in row:

1. Each person should not consume more of the world's resources than what allows all people to have their basic needs met.
2. Resources should be distributed equally among all people of the world.
3. Many products consumed in the United States affect the environment in other countries negatively.
4. When we consume products in the United States, we often consume resources from other countries.
5. The concern that American consumption harms the environment elsewhere is exaggerated.

6. A great deal of hazardous waste produced by Americans ends up in poor countries.
7. Environmentally friendly products have less negative environmental impact.
8. Environmentally friendly products are better for individuals who produce the products.
9. The development of environmentally friendly products affects the development of society.
10. Politicians and authorities should not concern themselves with whether or not people act environmentally friendly.
11. It is good that politicians and authorities try to make people act more environmentally friendly.
12. If I choose to drive a car, it is my private business.
13. If I choose to eat meat, it is my private business.
14. Everybody has the right to consume freely without anybody butting in.

Answers in column:

1. Strongly disagree 1
2. 2
3. 3
4. 4
5. 5
6. 6
7. Strongly agree 7

Base: All respondents
RANDOMIZE AND RECORD

NEX_AWARE [Grid; prompt once]

How strongly do you agree or disagree with the following statements:

Statements in row:

1. The price of water is too low; it does not take into account the full environmental costs of its multiple uses.
2. It worries me that global disparities in affordable and accessible food, energy, and water are linked to poverty and warfare.
3. It doesn't make sense how food, energy and water are produced and delivered without meaningful input from a diverse group of stakeholders.

Answers in column:

1. Strongly disagree 1
2. 2
3. 3
4. 4
5. 5
6. 6
7. Strongly agree 7

Base: All respondents
RANDOMIZE AND RECORD

PEB_ACT [Grid; prompt once]
In your household do you currently…

Statements in row:

1. Reduce or eliminate dairy from your diet?
2. Reduce or eliminate meat from your diet?
3. Reduce your household food waste?
4. Regularly identify sources of household heat or cool air loss and fix them by installing weather stripping around doors and windows?
5. Monitor and turn off your home's exterior and interior lights when they are not needed?
6. Monitor and limit your household hot water use?
7. Reduce the number of loads of laundry that you wash?
8. Take shorter or fewer showers?

Answers in column:

1. Yes
2. No

Base: All respondents
RANDOMIZE AND RECORD

PEB_REG [Grid; prompt once]
From the list of items earlier that you indicated you do in your household, how often do you do each action? (if you would like to see the list of options again to change your answers, please click here **[LINK "click here" TO PEB_ACT SCREEN]**)

Statements in row:

1. Reduce or eliminate dairy from your diet
2. Reduce or eliminate meat from your diet
3. Reduce your household food waste
4. Regularly identify sources of household heat or cool air loss and fix them by installing weather stripping around doors and windows
5. Monitor and turn off your home's exterior and interior lights when they are not needed
6. Monitor and limit your household hot water use
7. Reduce the number of loads of laundry that you wash
8. Take shorter or fewer showers

Answers in column:

1. Very rarely 1
2. 2
3. 3
4. 4
5. 5

6. 6
7. All the time 7

Section 2
Survey design measures

Measures
Unless otherwise stated below, participant responses are indicated on a seven-point Likert scale from 1 (not at all important; strongly disagree) to 7 (extremely important; strongly agree). The main outcome variable under investigation, household resource (i.e. food, energy, and water) conservation, evaluates the extent of food, energy and water conservation adoption in the home. In contrast with indices which conceptualize indicators as formative or causal measures of the latent variable at hand, indicators in the multi-part survey instrument are conceptualized as scales, which are reflective measures of distinct effects that define the parameters of the latent variable (Coltman, Devinney, Midgley, and Venaik, 2008; Hennessy, Bleakley, and Fishbein, 2012). These national survey data are based on a probability web-based panel design that randomly collects and assigns voluntary participants (i.e. US householders) to the survey, but since no measures assign participants to explicitly designed control and manipulation groupings, these data are nonexperimental.

Values
A questionnaire from van der Werff and Steg (2016) was used to measure values that following four general value groupings: biospherism, social-altruism, egoism, and hedonism. Biospheric values are measured with four items (Protecting the environment: preserving nature; Respecting the earth: harmony with other species; Preventing pollution: protecting natural resources; Unity with nature: fitting into nature). Social-altruistic values are measured with four items (Equality: equal opportunity for all; Helpful: working for the welfare of others; A world at peace: free of war and conflict; Social justice: correcting injustice, care for the weak). Egoistic values are measured with four items (Influential: having an impact on people and events; Authority: the right to lead or command; Social power: control over others, dominance; Wealth: material possessions, money). Finally, Hedonic values are also measured with four items (Pleasure: joy, gratification of desires; Enjoying life: enjoying food, sex, leisure, etc.; Ambitious: hardworking, aspiring; Self-indulgent: doing pleasant things). Participants evaluate each value statement by indicating how important each item reflects their general goals in life.

Environmental self-identity
Focusing on independent self-construal as a predictor of personal norm, fitting into the value-identity-personal norm model, validated survey questions from Carfora et al. (2017), Lacasse (2016), and van der Werff and Steg (2016) provide reliable measurements of environmental self-identity. Adopted from these studies, environmental self-identity is measured with three items (I see myself as an environmentally friendly person; I am the type of person who acts environmentally friendly; Acting

environmentally friendly is an important part of who I am). Participants evaluate each belief statement and indicated how closely they identify with each one.

Social justice
Ten measurement items are derived from Jagers et al. (2016), Jagers et al. (2014) and Dobson (2003) as indicators of social justice: (Each person should not consume more of the world's resources than what allows all people to have their basic needs met; Resources should be distributed equally among all people of the world; Many products consumed in the United States affect the environment in other countries negatively; When we consume products in the United States, we often consume resources from other countries; The concern that American consumption harms the environment elsewhere is exaggerated; A great deal of hazardous waste produced by Americans ends up in poor countries; Environmentally friendly products have less negative environmental impact; Environmentally friendly products are better for individuals who produce the products; The development of environmentally friendly products affects the development of society).

Ecological citizenship
Ecological citizenship, the duties and obligations to actively manage global natural resources, is measured with five items. Adapted from Jagers et al. (2016), the ecological citizenship item specifically measures the dismantling of the public-private distinction dimension: (Politicians and authorities should not concern themselves with whether or not people act environmentally friendly; It is good that politicians and authorities try to make people act more environmentally friendly; If I choose to drive a car, it is my private business; If I choose to eat meat, it is my private business; Everybody has the right to consume freely without anybody butting in).

Personal norm
The three operational items used in the personal norm construct studied by van der Werff and Steg (2016) are reformulated to reflect food, energy, and water personal norms together. Using food as an example, these items are: I feel morally obligated to not waste food; I would feel guilty if I did not take actions to reduce the environmental impacts of the food I buy; I would feel proud to not waste food and reduce impacts of the food I buy. This pattern is repeated in energy and water personal norm measurements (9 items in total).

Perceived behavioral control
Similar to Kidwell and Jewell's (2003) definition of internal control, perceived behavior control in this survey instrument was measured using requisite skills, abilities and ease of performance as the key dimensions. These items include: It is easy for me to control the types of food my household eats; I have the ability to reduce my household's level of electricity usage; I have the skills and knowledge to use water wisely in my home. Participants are asked to evaluate how true they consider the above statements to be using a seven-point Likert scale from 1 (completely not true) to 7 (completely true).

Quality of life

Quality of life is measured with six items (It is important for me to have control over the resources I need to survive; Being connected to people in the community around me is important to me; I would change my purchasing decisions if I thought it would benefit the health of my family; I would change my purchasing decisions if I thought it would benefit the safety of my family; Participation in decision making about the resources I need to survive is important to me; It is important to me that I produce at least some of the resources I need to survive).

Concern toward global warming
The concern toward global warming variable, adopted from the multi-part survey instrument in the *Yale Program on Climate Change Communication* (Leiserowitz et al., 2017), is measured in a three-stage process. First, respondents are asked to indicate how worried they feel about global warming, measured with a four-point scale from 1 (not at all worried) to 4 (very worried). Next, following a brief description of increasing global average temperature documented over the past 150 years, respondents are asked to evaluate if global warming is happening on a binary yes/no scale including an option to indicate 'don't know.' In the final stage, respondents indicating 'yes' to the previous item are piped to a question item to evaluate how sure global warming is happening (evaluated on a binary scale), and those that indicated 'no' or 'don't know' are piped to an item to evaluate how sure global warming is not happening, evaluated on a four-point scale from 1 (not at all sure) to 4 (extremely sure).

Environmental attitudes
Environmental attitudes are derived from the New Ecological Paradigm (NEP), which measures five core attributes of individual attitudes toward the environment. These are concerns regarding ecological crisis, anti-exemptionalism (a concept that measures the level of acknowledgement that humans are indeed not exempt from the constraints facing nature), limits to growth, balance of nature/fragility, and anti-anthropocentrism (a concept that measures anti-dominant or anti-essentialist feelings toward the role of nature's existence) (Dunlap, Van Liere, Mertig, and Jones, 2000). Five items from the NEP are adopted from Dunlap et al. (2000) to showcase each of the above elements (When humans interfere with nature it often produces disastrous consequences; Humans are severely abusing the environment; Plants and animals have as much right as humans to exist; Despite our special abilities humans are still subject to the laws of nature; The earth is like a spaceship with very limited room and resources).

Awareness of consequences
Items measuring the extent of awareness of consequences here were designed in a FEW nexus frame. This means each item in the FEW nexus construct were self-made, and they contain FEW resource insecurity impacts reflected by price instability, global conflict, and stakeholder exclusion. Three awareness items are included to measure the extent of this receptiveness (The price of water is too low; it does not take into account the full environmental costs of its multiple uses; It worries me that global disparities in affordable and accessible food, energy, and water are linked to poverty and warfare; It doesn't make sense how food, energy and water are produced and delivered without meaningful input from a diverse group of stakeholders).

Household FEW conservation

Household resource conservation is a self-developed scale that measures the magnitude of various household food, energy and water activities that treat the consumption of resource goods and services with both efficiency and frugality. Moreover, conservation is conceptualized here as environmentally oriented anti-consumption (EOA), defined as overt rejection, avoidance or abstinence of consumptive activities across food, energy and water domains (Ortega-Egea and García-de-Frutos, 2019). Participants first indicated whether or not they perform each of eight corresponding household conservation activities (Reduce or eliminate dairy from your diet; Reduce or eliminate meat from your diet; Reduce your household food waste; Regularly identify sources of household heat or cool air loss and fix them by installing weather stripping around doors and windows; Monitor and turn off your home’s exterior and interior lights when they are not needed; Monitor and limit your household hot water use; Reduce the number of loads of laundry that you wash; Take shorter or fewer showers) on a binary yes/no scale. Secondly, participants self-evaluate the frequency they perform the corresponding actions they indicated they do in their household from earlier, similar to a layperson’s perceptions of pro-environmental behaviour (Truelove and Gillis, 2018). These frequencies are evaluated on a seven-point Likert scale from 1 (very rarely) to 7 (all the time). Shown in Table 1, these activities do not involve any financial commitments of cash or capital such as purchasing water or energy efficient devices for the home, as these are examples of environmentally oriented consumption or EOC. They do however suggest that consumers as hosts for (non)environmentally oriented actions spend added time for collecting knowledge and information in order to implement alternatives for replacing carbon intensive actions with more environmentally friendly ones in the home (Ortega-Egea and García-de-Frutos, 2019). Similar to the short list of effective household actions found in Gardner and Stern’s (2008) report, these actions involve a range of difficulty to perform in each resource category, and specifically involve volitional behaviors to monitor, reduce and/or eliminate a range of food, energy and water uses.

Table 1
Household reosurce conservation behavior characterisitics and consumption type

Behavior	Domain	Regularity	Difficulty	Consumption type
1. Reduce meat consumption	Food	Daily	Hard	EOA
2. Reduce dairy consumption	Food	Daily	Hard	EOA
3. Reduce food waste	Food	Daily	Easy/moderate	EOA
4. Identify sources of heat or cool air loss and installing weatherstripping around doors and windows	Energy	Non-daily	Moderate	EOC/EOA
5. Monitoring and turning off exterior and interior lights when not in use	Energy	Daily	Easy	EOA
6. Monitoring and limiting hot water use	Water	Daily	Easy	EOA
7. Reduce loads of laundry washed	Water	Daily/non-daily	Moderate	EOA
8. Take shorter or fewer showers	Water	Daily	Easy/moderate	EOA

Notes: EOC = environmentally oriented consumption, EOA = environmentally oriented anti-consumption.

Section 3
Survey design collection and total survey error assessment

Sample and data collection methods

The multipart questionnaire in this study was administered by Ipsos electronically as both survey programmer and host. Due to the lack of transparency and presence of publicly available information on specific panel data frames and selection strategies, the information that follows is a limited account of what is known (and can safely assume) about how private firms collect and balance sample frames generally (Callegaro et al., 2014a). In this study a pre-recruited probability-based web panel survey design is used to answer the main research questions. Eligible US householders are recruited to be panelists and a random sample of participants is drawn based on the KnowledgePanel collection procedure to generate a representation of the US population (Callegaro and DiSogra, 2008).

The KnowledgePanel design is conducted in three stages shown in Figure 3. The first stage begins with initial recruitment, followed by the second stage which involves panelist profiling and enrollment, and ending with the third stage which samples and assigns active panelists to complete client surveys. For web-based panels, a sample is constructed from existing panelists and from recruitment efforts. To replenish inactive panelists, Ipsos conducts ongoing recruitment of new panel members to complement inactive panelist attrition from the active pool (Callegaro and DiSogra, 2008; Callegaro et al., 2014a; DiSogra and Callegaro, 2016). First, Ipsos selects participants using address-based sampling methods utilizing the United States Postal Service's Delivery Sequence File (DSF), a database (and population frame from which the sample frame is drawn) denoting residential and non-residential delivery points with verified addresses categorized by postal codes, delivery type, and vacancy status (Dillman, Smyth, and Christian, 2009; USPS, 2019). Next, Ipsos conducts a point of contact using known mailing addresses, telephone numbers, email addresses or face-to-face interviews. Finally, participants complete a core profile, which is an assessment of bas demographic information, and upon completion householders enroll and become active members (i.e. panelists) of KnowledgePanel's recruitment pool or "active panel" (Callegaro and DiSogra, 2008).

The third stage of the process involves assigning panelists to study specific surveys by drawing a sample from the active pool. Once the active panel is constructed and panelists have completed profiling, a simple random sampling approach is used to draw a sample that meets Current Population Survey (CPS) benchmarks to accurately represent the general US population. These benchmarks include age, race, gender, education, income, home ownership status, and census geography and metropolitan status. Furthermore, participants are compensated by financial incentives (e.g. cash prizes, sweepstakes drawings and raffles) to take electronic surveys to respect their voluntary participation as well as promote loyalty (Ipsos, 2019a). Panelists are selected and assigned client surveys using the equal probability of selection method (EPSEM), where all elements of a sample frame (i.e. active panel) are assigned the same likelihood of selection (Ipsos, 2019a). Using CPS benchmarks, a probability proportionate to size (PPS) approach is used to select the sample (Ipsos, 2019a); subsequent sample and post-stratification weighting procedures control and balance out a selected sample so it is the same across all possible samples (Groves et al., 2009).

Total survey error

An assessment of total survey error (TSE) is necessary because it helps organize and diagnose threats to both data integrity and the generalizability of results in forthcoming statistical tests. The TSE approach also provides remedies to these issues, and at the very least establishes key boundaries that provide known limits and constraints denoted in the findings. A literature review of seminal works on contemporary survey design and implementation (De Vaus, 2002; Dillman et al., 2009; Groves et al., 2009) provide a range of encouraging and discouraging stances on the strengths and weakness of probability-based web-panel approaches. In this section, I denote the critical areas that bias and constrain the extent of generalizability of the survey data from a TSE perspective. These are organized by sampling and coverage, measurement, and non-response sources of bias.

Sampling and coverage error

Two likely and powerful sources of error in this survey design include under-coverage of households with limited access and use of the internet (Bosnjak et al., 2013; Couper, 2000) as well as under or overrepresented households in the DSF database. A study by Farrell and Petersen in 2010 reported internet usage amongst the general US population is over 75% and growing amongst those minority and hard to reach populations. Today, according to the most recent internet use and subscription statistics available in the American Community Survey and the Current Population Survey, 89% of total households in the US have a laptop and 81% of all households have a broadband internet subscription (used as a proxy for internet "use") (Ryan, 2018). Furthermore, web-enabled cell phone ownership and use is most pronounced in the 15- to 34-year-old cohort of households at 93% (Ryan, 2018). Although the spread of internet access and use is encouraging, a digital divide constrains some households to access and use affordable high-speed internet based on demographic traits such as aging populations and dwellings located in rural areas where internet can be more expensive (Martin, 2019). In addition, African American, Hispanic, and low-income households are less likely to have internet access while middle to upper-income households and highly educated households are fifteen to twenty times more likely to have internet access by comparison (Couper, 2000).

Enumerating US households to accurately frame the population is a difficult task that biases samples taken from the DSF database as a population frame. Other geographic and structural attributes explain some under and over-coverage errors. For example, areas in transition, indigenous communities, and multi-family or multi-person dwellings (e.g. apartment complexes) tend to be underrepresented while households with multiple mailing addresses (e.g. P.O. boxes) are overrepresented (Dillman et al., 2009). Rest assured, evaluations of the DSF database are known to cover 95% of all delivery points in the US (Iannacchione, Staab, and Redden, 2003, as cited in Dillman et al., 2009) with vendor lists matching enumerated addresses as high as 99%, though rural addresses still tend to be under-covered (Dohrmann, Han, and Mohadjer, 2006).

A pre-recruited probability web-panel approach to constructing a reliable web-sample frame helps correct for coverage and sampling bias in a variety of ways (see Figure 3). For those population frame elements that lack internet access or web-enabled devices necessary to complete client surveys through Ipsos, eligible participants selected in the address-based sampling approach can be reached either by telephone, mail or face-to-face, and are provided a web-enabled device with free internet service (Ipsos, 2019a).

Once available panel members have been weighted according to 2018 CPS demographic benchmarks, a PPS approach ensures that all available panelists have a known non-zero chance of selection, and that the data collected from each respondent is proportionate to the CPS benchmarks (Ipsos, 2019a). Altogether, these steps do not eliminate bias from coverage and sampling totally, but it does help reduce the likelihood of error significantly.

Measurement error

Farrell and Petersen (2010) remark that survey data collected using web-enabled devices compared to face-to-face interviews is likely to be more accurate, but respondents are mainly troubled by lack of motivation and basic comprehension in self-administered surveys. This shows that internet modes of questionnaire administration decrease measurement error and improve internal validity, but it is not immune to other sources of measurement error. Some examples of measurement bias are found in respondents taking less than optimal routes to completing client surveys or satisficing. Examples of satisficing include providing false or quick answers that are careless and exhibit little cognitive processing or repeating similar or identical answers to successive questions (Hays, Liu, and Kapetyn, 2015).

Respondents may also consistently answer questions with “don’t know” responses or only choose the first answer option available, which is usually a problem with completing questionnaires over smart phones compared to desktops or tablets because respondents may not see all the options on the screen for questions asking them to “check all that apply”; the result of these short processing times increase measurement error due to primacy or straight-lining effects ” (Lugtig and Toepoel, 2015). Since the provision of “web-enabled devices” generally is a term that’s too loose and ambiguous, Lugtig and Toepoel (2015) interrogate the possibility that panelists providing answers over different web-enabled devices such as personal computers, laptops, tablets, and mobile phones could influence differences in cognitive processes. Their results showed, however, that device switching over the lifespan of a survey produces a negligible level of measurement error (Lugtig and Toepoel, 2015). Indicated in Figure 3 in the recruitment stage, though panel members are invited to join across multiple modes of recruitment (e.g. a toll-free hotline, postage paid paper forms or secure online forms), KnowledgePanel controls for mixed-mode effects by providing single mode only data collection using a web-enabled device (Ipsos, 2018). Panelists that violate a mandatory four-day rest period or respond to similar client surveys over the same types of goods, services or behaviors are excluded (i.e. category eliminations) due to measurement bias because of priming from recent answers covering categorically similar topics (Ipsos, 2019b). Furthermore, additional monitoring allows time differences between when a question is asked and an answer is provided by the respondent to be recorded (Ipsos, 2019b). This means that panel data provided too quickly are flagged and omitted for straight-lining or primacy effects. These steps help to reduce the effects of measurement error.

Non-response error

Non-response error is also a significant source of bias in probability web-panel survey designs (Lee, 2006). There are numerous placeholders for non-response error to impact data integrity in this investigation. These include technical difficulties and perceptions of confidentiality (Couper, 2000; Fan and Yan, 2010), bias due to timeliness and respondent survival (Pratesi, Manfreda, Biffignandi, and Vehovar, 2004), multiple panel membership (Callegaro et al., 2014b), and correlates between panel attrition and dependent measures (Dillman et al., 2009). Hardware and software incompatibilities can create technical issues effecting how potential respondents interact with their computers, tablets or other web-enabled devices discouraging them from providing completed questionnaires. Some examples include insufficient modem speeds or web browsers, and connection and time costs related to internet service providers. Some respondents may feel that privacy and anonymity of the data being shared is at risk due to sensitivities over the internet security (Couper, 2000). Dillman et al. (2009) states that unacceptable amounts of time respondents must spend to enter information to pass through security on web platforms to complete surveys have given rise to widespread use of the completely automated public Turing test to tell computers and humans apart (i.e. CAPTCHA). CAPTCHA uses visual aids to verify human presence at the point of data entry, helping provide an additional layer of security and eliminate the need for participants to remember usernames and passwords making it easier and faster to participate in client surveys that are web-enabled (Dillman et al., 2009).

Figure 5 denotes several steps Ipsos takes to tackle other places non-response error can surface. Respondent survival (and ultimately survey completion) depends on the ability to react, respond and complete the four steps of the web-panel participation flow in a timely manner: reacting to the email invitation, accessing the introductory page, clicking start, and completing the questionnaire (Pratesi et al., 2004). Some possible outcomes respondents can choose after reviewing the invitation include the option to refuse, noncontact and nonreaction, quitting after partial responses, or completing the survey instrument. There exists the potential that non-response could potentially correlate with dependent or independent measures. If the act of non-response is truly independent of variables in the survey instrument, suggesting data are missing completely at random (MCAR) according to non-response correction theory, then self-selection and non-response bias are controlled for and have low impact (Bethlehem, 2010). When this is not the case, the potential for non-response to bias data depends on how the survey design controls data that are missing at random (MAR). Ipsos conducts robust efforts to reduce non-response bias by sending periodic reminders, making non-respondent conversion calls, limiting multiple-panel membership and disallowing self-selection into the panel and client studies (Ipsos, 2019a, 2019b). Web survey methodological reviews by Bethlehem (2010), Bosnjak (2013) and Callegaro et al. (2014b) provide compelling evidence confirming that volunteer opt-in (i.e. nonprobability) self-selection, which influences exclusion of unwilling participants, overrepresents the proportion of willing participants and allows duplicates of participant data, therefore diminishing the inferential value of the entire panel. For the survey design used in this study, no self-selection is permitted. Efforts to reduce non-response by sending periodic notifications and reminders have seen modest and noteworthy improvements in response rates (Fan and Yan, 2010). Ipsos also has established refusal-conversion protocols to convert nonresponding households providing an additional thrust to reduce non-response bias (Ipsos, 2018, 2019a). Altogether, after evaluating the panel construction and sampling procedure in the probability web-based panel design and workflow implemented by

Ipsos, these steps do not eliminate the effects of non-response bias, but it does significantly reduce its effects.

Section 4
Survey data analysis

Analyses

The national survey data were analyzed using SPSS and SPSS AMOS, version 26 (Arbuckle, 2019; IBM Corp., 2019). Data presented in Appendix E, D1 and D2 show Pearson correlations and multiple analysis of variance (MANOVA) results that initially inspected the data for multicollinearity effects and begin the process of learning about which census demographic indicators represented significant differences across each of the eight FEW household conservation or anti-consumption measures specified above. To test, assess and validate the explanatory power of the VBN, VIP and EC theoretical models, models that involve a wide range of socio-political, individual and cognitive independent variables and multiple dependent variables, structural equation modelling (SEM) makes the most sense. This analytical strategy constructs and estimates latent variable relationships from measurement models based on theory (Byrne, 2010; Hair et al., 2018). Furthermore, SEM allows the restrictive contexts of theory or theories to be lifted, opening up the possibility for alternative models to be available to represent the data well enough. This refers to generating comprehensive models or more than one a priori model that correspond to (i.e. fit) the data in a way that makes sense, is parsimonious, and establishes probabilistic causation. Probabilistic causation refers to the effect size or outcome probability of some change in the causal variable that is estimated based on known probability distributions (Kline, 2015).

Some offer a critique of SEM approaches in nonexperimental data – data that do not explicitly articulate and learn from designs that control and manipulate variables with respect to their relationships to dependent variable outcomes. Several obstacles are found in establishing causal inference such as the limited ability of some study designs to measure and possess a solid understanding of relationships or associations between known variables X and Y without alternative or reciprocal explanations or other phenomena affecting the relationship, threatening the directionality of the causal relationship between X and Y (Kline, 2015). Nonexperimental sciences have also shown a lack of understanding in causal inference due to the prevalence of spurious associations between other "confounding" variables producing significant effects on dependent variable(s) without control and violating assumptions of a priori theory. This is perhaps why parameter estimates in SEM in nonexperimental data are often described as piecemeal or estimates that possess values capable of making causal claims, lack coefficients with large magnitudes to verify correct theoretical associations between independent and dependent variables beforehand based on the author's selected model (Hoyle, 2012). Others are optimistic of SEM approaches in nonexperimental designs because SEM provides a confirmatory approach that makes hypothesis testing possible thus opening up the range of research questions that can be asked and answered with statistical values, SEM estimates error variances associated with each parameter, SEM makes it possible to analyze and evaluate both observed and unobserved or latent variables, and that the availability of alternative methods of analyzing multivariate data are limited (Byrne, 2010). Thus, the prevalence of SEM strategies in the social sciences that collect individual level data are widely adopted and continue to emerge (Breitsohl, 2019).

APPENDIX B
Demographic items

Section 1
Demographic variables

Variable	Label	Values
ppage	Age	Age- in number of years
ppagecat	Age, 7 categories	1 = 18-24; 2 = 25-34; 3 = 35-44; 4 = 45-54; 5 = 55-64; 6 = 65-74; 7 = 75 or older
ppagecat4	Age, 4 categories	1 = 18-29; 2 = 30-44; 3 = 45-59; 4 = 60 or older
ppeduc	Education (highest degree received)	1 = no formal education 2 = 1st, 2nd, 3rd, or 4th grade 3 = 5th or 6th grade 4 = 7th or 8th grade 5 = 9th grade 6 = 10th grade 7 = 11th grade 8 = 12th grade, no diploma 9 = Highschool graduate with highschool diploma or equivalent GED 10 = Some college, no degree 11 = Associate degree 12 = Bachelors degree 13 = Masters degree 14 = Doctorate or professional degree
ppeducat	Education, 4 categories	1 = Less than highschool; 2 = Highschool; 3 = Some college; 4 = Bachelors degree or higher
ppethm	Race or ethnicity	1 = White, non-Hispanic; 2 = Black, non-Hispanic; 3 = Other, non-Hispanic; 4 = Hispanic; 5 = 2 or more race, non-Hispanic
ppgender	Gender	1 = Male; 2 = Female
pphead	Household head	0 = No; 1 = Yes
pphhsize	Household size	Total number of members in household
pphouse	Housing type	1 = one family house detached from any other house; 2 = one family house attached to one or more houses; 3 = a building with two or more apartments; 4 = a mobile home; 5 = a boat, van, recreational vehicle (RV) or other
ppincimp	Household income	1 = Less than $5,000 2 = $5,000 to $7,499 3 = $7,500 to $9,999 4 = $10,000 to $12,499 5 = $12,500 to $14,999 6 = $15,000 to $19,999 7 = $20,000 to $24,999 8 = $25,000 to $29,999 9 = "$30,000 to $34,999 10 = $35,000 to $39,999 11 = $40,000 to $49,999 12 = $50,000 to $59,999 13 = $60,000 to $74,999 14 = $75,000 to $84,999 15 = $85,000 to $99,999" 16 = $100,000 to $124,999 17 = $125,000 to $149,999 18 = $150,000 to $174,999 19 = $175,000 to $199,999 20 = $200,000 to $249,999 21 = $250,000 or more
ppmarit	Marital status	1 = Married; 2 = Widowed; 3 = Divorced; 4 = Separated; 5 = Never married; 6 = Living with partner
ppmsacat	MSA status	0 = Non-metro; 1 = Metro
ppreg4	Census region, 4 categories (based on state of residence	1 = Northeast; 2 = Midwest; 3 = South; 4 = West
ppreg9	Census region, 9 categories (based on status of residence)	1 = New England 2 = Mid-Atlantic 3 = East-North Central 4 = West-North Central 5 = South Atlantic 6 = East-South Central 7 = West-South Central 8 = Mountain 9 = Pacific
pprent	Ownership status of living quarters	1 = Owned or being bought by you or someone in your household; 2 = Rented for cash; 3 = Occupied without payment of cash rent
ppstaten	State (numeric)	State of residence (initials)
ppt01	Total number of household members age 0 to 1 years	Number of household members in age group

ppt25	Total number of household members age 2 to 5 years	Number of household members in age group
ppt612	Total number of household members age 6 to 12 years	Number of household members in age group
ppt1317	Total number of household members age 13 to 17 years	Number of household members in age group
ppt18ov	Total number of household members age 18+ years	Number of household members in age group
ppwork	Current employment status	1 = Working – paid employee; 2 = Working – self-employed; 3 = Not working – on temporary layoff from a job; 4 = Not working – looking for work; 5 = Not working – retired; 6 = Not working – disabled; 7 = Not working - other
political	Political ideology	1 = Extremely liberal; 2 = Liberal; 3 = Slightly liberal; 4 = Moderate, middle of the road; 5 = Slightly conservative; 6 = Conservative; 7 = Extremely conservative
party	Party identity	1 = Republican; 2 = Other; 3 = Democrat

Notes: Additional data provided for all interviews:

1. Start Time – date/Time respondent began taking survey
2. End Time – date/Time respondent finished completing survey
3. Duration – the length of time in minutes for self-administration of the instrument for a respondent

Section 1
Demographic background results

Demographic background

The average age is 47 years, and the age range of the respondents is 18 to 93 years. In terms of individual backgrounds characteristics, the mean respondent education level attained is a little more than 10, indicating that the average respondent has had some formal education but without a degree attained. 11-12% of respondents are Black and Hispanic respectively, while 69% are White. Most respondents live in single family residential dwellings, but some respondents reported living in apartment buildings, mobile homes, or boats, recreational vehicles or vans. In terms of household ownership status, 75% of respondents own or are on a buying status for their household, and about 24% of respondents are renting. Finally, political ideology and party identification shows that roughly the same proportion of respondents self-reported democratic and republican party associations.

The average respondent salary reported a mean of $60K-75K, however the full range of self-reported income is indicated in Appendix C; some respondents are significantly wealthy, bringing in upwards of $250K or more annually, while others indicated making under $5K This demographic discrepancy warrants some further investigation. Average respondents indicated they live with between 2 to 3 additional occupants or 2 to 3 children in the home. but demographic results below show that more than 75% of respondents positively reported head of household status. More than 65% of respondents are self-employed or working, with more than 20% of respondents indicating they have retired. Although most respondents are working and bringing in at least $60K in terms of self-reported income, with the known mean and range of the number of occupants or children self-reported by each panelist shown below, it is reasonable to expect based on these descriptive demographics that some panelists that indicated they are not heads of household are stay at home parents or caring for another adult or senior in the home.

Table 5
Summary of ordinal demographic sample of US householders ($N = 1,219$)

	Unweighted	*Weighted*

Item(s)	*M*	*S.D.*	*M*	*S.D.*	Skewness	Kurtosis
Age (raw)	51.50	16.89	47.63	17.54	0.13	1.97
Age (7 categories)	4.20	1.69	3.82	1.76	0.06	1.91
Age (4 categories)	2.87	1.05	2.61	1.11	-0.12	1.67
Education (highest degree)	10.40	2.13	10.18	2.20	-0.82	4.40
Education (categorical)	2.93	0.98	2.81	1.01	-0.27	1.90
Head of household status	0.81	0.39	0.77	0.42	-1.26	2.60
Number of occupants (i.e. size)	2.70	1.55	2.81	1.	1.42	5.96
Number of children	2.61	1.47	2.71	1.53	1.56	6.90
Income	13.51	4.59	13.02	4.84	-0.55	2.79

Notes: Weighted demographic characteristics calculated using weights produced by SAS macro through iterated proportional
fitting (i.e. a standard raking procedure).

Table 6
Summary of categorical demographic sample of US householders (*N = 1,219*)

Item(s)	Frequency	Percentage
Race/ethnicity		
White, non-Hispanic	839	68.83
Black, non-Hispanic	136	11.16
Other, non-Hispanic	61	5.00
Hispanic	147	12.06
2+ races, non-Hispanic	36	2.95
Gender		
Male	648	53.16
Female	571	46.84
Household type		
Detached, single famliy	907	74.41
Attached, single famliy	103	8.45
Apartment building	164	13.45
Mobile home	42	3.45
Other (i.e. boat, RV, van, etc.)	3	0.25
Marital status		
Married	727	59.64
Widowed	52	4.27
Divorced	130	10.66
Separated	20	1.64
Never married	229	18.79
Living with partner	61	5.00
Metropolitan status		
Non-metro	146	11.98
Metro	1,073	88.02
Census region (4 categ.)		
Northeast	221	18.13
Midwest	257	21.08
South	437	35.85
West	304	24.95
Census region (9 categ.)		
New England	66	5.41
Mid-Atlantic	155	12.72
East-North Central	173	14.19
West-North Central	84	6.89
South Atlantic	250	20.51
East-South Central	57	4.68
West-South Central	130	10.66

(continued)	Frequency	Percentage
2-5 years old		
0	1,126	92.37
1	77	6.32
2	15	1.23
3	1	0.08
6-12 years old		
0	1,069	87.69
1	102	8.37
2	41	3.36
3	7	0.57
13-17 years old		
0	1,049	86.05
1	130	10.66
2	36	2.95
3	4	0.33
18 years old or over		
1	266	21.82
2	630	51.68
3	180	14.77
4	111	9.11
5	24	1.97
6	5	0.41
7	2	0.16
10	1	0.08
Employment status		
Working, paid	671	55.05
Working, self-employed	109	8.94
Not working, laid off	1	0.08
Not working, looking for work	46	3.77
Not working, retired	267	21.90
Not working, disabled	55	4.51
Not working, other	70	5.74
Political ideology		
Refused	66	5.41
Extremely liberal	34	2.79
Liberal	157	12.88
Slightly liberal	95	7.79
Moderate	400	32.81

Mountain	111	9.11	Slightly conservative	155	12.72
Pacific	193	15.83	Conservative	252	20.67
Household ownership status			Extremely conservative	60	4.92
Owned or being bought	915	75.06	Party identification		
Rented	287	23.54	Refused	62	5.09
Occupied only	17	1.39	Republican	544	44.63
Children by age group			Other	45	3.63
0-1 years old			Democrat	568	46.60
0	1,173	96.23			
1	40	3.28			
2	1	0.08			
8	3	0.25			
9	2	0.16			

APPENDIX C
National survey codebook

Section 1
National survey metadata (weighting plan and weight analysis, current population and sample distributions)

Weighting plan:
Start with the base weights of the assigned sample, respondents are weighted to represent the ages 18+ population on the following variables:

1. Gender (male, female) by age (18-29, 30-44, 45-59, 60+)
2. Race-ethnicity (white, black, other, hispanic, 2+ races)
3. Census region (northeast, midwest, south, west) by metropolitan status (metro, non-metro)
4. Education (less than high school, high school, some college, bachelor or higher)
5. Household income (under $25k, $25-$49,999, $50k-$74,999, $75k-$99,999, $100k-$149,999, $150k and over)
   Note: weights are scaled to sum to the un-weighted sample size of total respondents (weight; n=1,219)

Table 1
Timeline of datafile deliverables

Delivery date	File type	File name	File size	N records
6/2/2019	SPSS	Foodwaterenergy_michgantech_pretest_client	0.1 mb	23
7/30/2019	SPSS	Foodwaterenergy_michgantech_main_client_unweighted	1.0 mb	1,219
8/5/2019	SPSS	Foodwaterenergy_michgantech_main_client_weighted	1.0 mb	1,219
4/28/2020	Stata	Few_data_mar2020_wpolitics	3.68 mb	1,219

Notes: pre-test start date 5/31/2019, close date 6/2/2019 (3-day duration). Main survey collection start date 7/12/2019, close date 7/27/2019 (15-day duration).

Table 2
National survey panelist response rate

N sampled	N complete	Rate of completion	Rate of qualification
2,000	1,219	61%	100%

Notes: panelists that did not respond were automatically delivered email reminders on day 3 of the full main data collection window, a standard practice. If non-response persisted, subsequent reminders were delivered to panelists on days 7 and 11 of the full data collection window.

Table 3
Descriptive statistics of variable "weight"

N	Minimum	Maximum	Mean	Median	Coeff of variation	1st pctl	99th pctl	Sum
1219	0.267	2.807	1	0.916	37.021	0.347	2.171	1219

Notes: trimming: none; design effect: 1.1371

Table 4
Age 18+ years united states population benchmarks (source: March 2018 cps supplement data)

Gender by age category	Frequency	Percent
Age 18-29 male	26506775	10.64
Age 18-29 female	25991139	10.43
Age 30-44 male	30872523	12.39
Age 30-44 female	31457599	12.63
Age 45-59 male	30829765	12.38
Age 45-59 female	32311958	12.97
Age 60+ male	32442015	13.02
Age 60+ female	38667248	15.52

Table 5
FEW national survey instrument - total respondents (weighted by weight)

Gender by age category	Frequency	Percent
Age 18-29 male	129.7249	10.64
Age 18-29 female	127.2014	10.43
Age 30-44 male	151.091	12.39
Age 30-44 female	153.9544	12.63
Age 45-59 male	150.8818	12.38
Age 45-59 female	158.1357	12.97
Age 60+ male	158.7722	13.02
Age 60+ female	189.2386	15.52

Race (i.e. Ppethm)	Frequency	Percent
White, non-hispanic	1.58e+08	63.49
Black, non-hispanic	29577500	11.87
Other, non-hispanic	17615743	7.07
Hispanic	40443051	16.24
2+ race, non-hispanic	3302650	1.33

Race (i.e. Ppethm)	Frequency	Percent
White, non-hispanic	773.9422	63.49
Black, non-hispanic	144.7531	11.87
Other, non-hispanic	86.21196	7.07
Hispanic	197.9295	16.24
2+ race, non-hispanic	16.16327	1.33

Census region by metropolitan status	Frequency	Percent
Northeast metro	41187757	16.54
Northeast non-metro	3046988	1.22
Midwest metro	41093114	16.5
Midwest non-metro	10693928	4.29
South metro	79503556	31.92
South non-metro	14400517	5.78
West metro	53603831	21.52
West non-metro	5549332	2.23

Census region by metropolitan status	Frequency	Percent
Northeast metro	201.5741	16.54
Northeast non-metro	14.91205	1.22
Midwest metro	201.1109	16.5
Midwest non-metro	52.33639	4.29
South metro	389.0927	31.92
South non-metro	70.47655	5.78
West metro	262.3387	21.52
West non-metro	27.15859	2.23

Education (4-category)	Frequency	Percent
Less than hs	27155645	10.9
Hs	71336782	28.64
Some college	70228395	28.2
Bachelor or higher	80358201	32.26

Education (4-category)	Frequency	Percent
Less than hs	132.9005	10.9
Hs	349.1243	28.64
Some college	343.6998	28.2
Bachelor or higher	393.2754	32.26

Income (6-category)	Frequency	Percent
Under $25,000	36117887	14.5
$25,000-$49,999	47622170	19.12
$50,000-$74,999	41438925	16.64
$75,000-$99,999	34796791	13.97
$100,000-$149,999	42688257	17.14
$150,000 and over	46414993	18.63

Income (6-category)	Frequency	Percent
Under $25,000	176.762	14.5
$25,000-$49,999	233.0643	19.12
$50,000-$74,999	202.8033	16.64
$75,000-$99,999	170.2965	13.97
$100,000-$149,999	208.9176	17.14
$150,000 and over	227.1563	18.63

Section 2
Social, psychological, and environmental behavior variables

Module 1: values .... numeric (byte), 1 unit
Scale: 7-point Likert, semantic differential [0=not at all important; 6=extremely important] including an additional value and value label denoting specific individual value opposition [-1=opposed to my values]
Unique values: 8
Question text: how important are each of the following items to your general goals in life:

Name: bio1
Label: Respecting the earth: harmony with other species.

Summary		Value	Coding logic	Count	Percent	Cumulative
Observations	1,186	-1	“opposed to my values”	13	1.10	1.10
Missing	33/1,219	0	“not at all important”	36	3.04	4.13
Range (min/max)	[-1,6]	1	1	60	5.06	9.19
Mean	3.978	2	2	139	11.72	20.91
Std. Dev.	1.747	3	3	186	15.68	36.59
Variance	3.053	4	4	229	19.31	55.90
Skewness	-0.627	5	5	219	18.47	74.37
Kurtosis	2.659	6	“extremely important”	304	25.63	100.00
			Total	1,186	100.00	

Remarks: Biospheric values (BIO), indicator one. 5 non-missing values are not labeled. Data from the raw few national survey instrument were generated with an inappropriate coding schema → [1=opposed to my values; 2=not at all important; 8=extremely important]. All the values for values needed to be recoded for consistency purposes following similar measurement and operationalization of values constructs used by van der Werff and Steg (2016). To do so, numerical data were first converted to string type. Then, new labels were defined and reassigned according to the scale above. The raw dataset also labeled missing observations as "refused to answer." These strings were converted to "9999" numerals to denote those missing observations unwanted in further analysis. Since missing observations must be omitted, final variable indicators were generated with values from -1 to 6, not -1 to 9999. Subsequent values indicators in this survey module use the same rules and processes shown here and need not repeating below. Count percentages (from n=1,219 observations) rounded to the nearest hundredth percent, .005 or greater rounded up, .0049 rounded down. Additional summary statistics produced using summarize [var1] [var2] … [varx] [vary], detail.

Name: bio2
Label: Unity with nature: fitting in with nature.

Summary		Value / Coding logic	Count	Percent	Cumulative
Observations	1,184	-1 = "opposed to my values"	23	1.94	1.94
Missing	35/1,219	0 = "not at all important"	78	6.59	8.53
Range (min/max)	[-1,6]	1 = 1	104	8.78	17.31
Mean	3.421	2 = 2	159	13.43	30.47
Std. Dev.	1.896	3 = 3	226	19.09	49.83
Variance	3.593	4 = 4	210	17.74	67.57
Skewness	-0.333	5 = 5	170	14.36	81.93
Kurtosis	2.244	6 = "extremely important"	214	18.07	100.00
		Total	1,184	100.00	

Remarks: Biospheric values (BIO), indicator two. 5 non-missing values are not labeled.

Name: bio3
Label: Protecting the environment: preserving nature.

Summary		Value / Coding logic	Count	Percent	Cumulative
Observations	1,187	-1 = "opposed to my values"	13	1.10	1.10
Missing	32/1,219	0 = "not at all important"	35	2.95	4.04
Range (min/max)	[-1,6]	1 = 1	53	4.47	8.51
Mean	4.068	2 = 29	118	9.94	18.45
Std. Dev.	1.733	3 = 3	198	16.68	35.13
Variance	3.003	4 = 4	219	18.45	53.58
Skewness	-0.700	5 =5	223	18.79	72.37
Kurtosis	2.809	6 = "extremely important"	328	27.63	100.00
		Total	1,187	100.00	

Remarks: Biospheric values (BIO), indicator three. 5 non-missing values are not labeled.

Name: bio4
Label: Preventing pollution: protecting natural resources.

Summary		Value / Coding logic	Count	Percent	Cumulative
Observations	1,186	-1 = "opposed to my values"	13	1.10	1.10
Missing	33/1,219	0 = "not at all important"	30	2.53	3.63
Range (min/max)	[-1,6]	1 = 1	54	4.55	8.18
Mean	4.032	2 = 2	113	9.53	17.71
Std. Dev.	1.689	3 = 3	208	17.54	35.24
Variance	2.851	4 = 4	254	21.42	56.66
Skewness	-0.665	5 =5	209	17.62	74.28
Kurtosis	2.882	6 = "extremely important"	305	25.72	100.00
		Total	1,186	100.00	

Remarks: Biospheric values (BIO), indicator four. 5 non-missing values are not labeled.

Name: alt1
Label: Equality: equal opportunity for all.

Summary		Value / Coding logic	Count	Percent	Cumulative
Observations	1,184	-1 = "opposed to my values"	15	1.27	1.27
Missing	35/1,219	0 = "not at all important"	40	3.38	4.65
Range (min/max)	[-1,6]	1 = 1	40	3.38	8.02

Summary		Value = Coding logic	Count	Percent	Cumulative
Mean	4.359	2 = 2	93	7.85	15.88
Std. Dev.	1.771	3 = 3	142	11.99	27.87
Variance	3.138	4 = 4	180	15.20	43.07
Skewness	-1.026	5 =5	240	20.27	63.34
Kurtosis	3.304	6 = “extremely important”	434	36.66	100.00
		Total	1,184	100.00	

Remarks: Social-altruistic values (ALT), indicator one. 5 non-missing values are not labeled.

Name: alt2
Label: A world at peace: free of war and conflict.

Summary		Value = Coding logic	Count	Percent	Cumulative
Observations	1,187	-1 = “opposed to my values”	14	1.18	1.18
Missing	33/1,219	0 = “not at all important”	31	2.61	3.79
Range (min/max)	[-1,6]	1 = 1	38	3.20	6.99
Mean	4.420	2 = 2	92	7.75	14.74
Std. Dev.	1.737	3 = 3	156	13.14	27.89
Variance	3.016	4 = 4	173	14.57	42.46
Skewness	-1.018	5 =5	219	18.45	60.91
Kurtosis	3.324	6 = “extremely important”	464	39.09	100.00
		Total	1,187	100.00	

Remarks: Social-altruistic values (ALT), indicator two. 5 non-missing values are not labeled.

Name: alt3
Label: Social justice: correcting injustice, care for the weak.

Summary		Value = Coding logic	Count	Percent	Cumulative
Observations	1,187	-1 = “opposed to my values”	25	2.11	2.11
Missing	32/1,219	0 = “not at all important”	64	5.39	7.50
Range (min/max)	[-1,6]	1 = 1	96	8.09	15.59
Mean	3.683	2 = 2	135	11.37	26.96
Std. Dev.	1.930	3 = 3	183	15.42	42.38
Variance	3.726	4 = 4	216	18.02	60.57
Skewness	-0.519	5 =5	190	16.01	76.58
Kurtosis	2.340	6 = “extremely important”	278	23.42	100.00
		Total	1,187	100.00	

Remarks: Social-altruistic values (ALT), indicator three. 5 non-missing values are not labeled.

Name: alt4
Label: Helpful: working for the welfare of others.

Summary		Value = Coding logic	Count	Percent	Cumulative
Observations	1,184	-1 = “opposed to my values”	18	1.52	1.52
Missing	35/1,219	0 = “not at all important”	52	4.39	5.91
Range (min/max)	[-1,6]	1 = 1	87	7.35	13.26
Mean	3.649	2 = 2	157	13.26	26.52
Std. Dev.	1.814	3 = 3	208	17.57	44.09
Variance	3.291	4 = 4	232	19.59	63.68
Skewness	-0.448	5 =5	194	16.39	80.07
Kurtosis	2.419	6 = “extremely important”	236	19.93	100.00
		Total	1,184	100.00	

Remarks: Social-altruistic values (ALT), indicator four. 5 non-missing values are not labeled.

Name: ego1
Label: Social power: control over others, dominance.

Summary		Value = Coding logic	Count	Percent	Cumulative
Observations	1,186	-1 = “opposed to my values”	303	25.55	25.55
Missing	33/1,219	0 = “not at all important”	385	32.46	58.01
Range (min/max)	[-1,6]	1 = 1	160	13.49	71.50
Mean	0.805	2 = 2	125	10.54	82.04
Std. Dev.	1.800	3 = 3	101	8.52	90.56
Variance	3.241	4 = 4	51	4.30	94.86
Skewness	1.137	5 =5	25	2.11	96.96

Summary	Value / Coding logic	Count	Percent	Cumulative
Kurtosis ... 3.639	6 = “extremely important”	36	3.04	100.00
	Total	1,186	100.00	

Remarks: Egoistic values (EGO), indicator one. 5 non-missing values are not labeled.

Name: ego2
Label: Wealth: material possessions, money.

Summary	Value / Coding logic	Count	Percent	Cumulative
Observations ... 1,187	-1 = “opposed to my values”	40	3.37	3.37
Missing ... 32/1,219	0 = “not at all important”	140	11.79	15.16
Range (min/max) ... [-1,6]	1 = 1	152	12.81	27.97
Mean ... 2.612	2 = 2	217	18.28	46.25
Std. Dev. ... 1.804	3 = 3	255	21.48	67.73
Variance ... 3.254	4 = 4	203	17.10	84.84
Skewness ... -0.013	5 =5	102	8.59	93.43
Kurtosis ... 2.290	6 = “extremely important”	78	6.57	100.00
	Total	1,187	100.00	

Remarks: Egoistic values (EGO), indicator two. 5 non-missing values are not labeled.

Name: ego3
Label: Authority: the right to lead or command.

Summary	Value / Coding logic	Count	Percent	Cumulative
Observations ... 1,183	-1 = “opposed to my values”	75	6.34	6.34
Missing ... 36/1,219	0 = “not at all important”	242	20.46	26.80
Range (min/max) ... [-1,6]	1 = 1	153	12.93	39.73
Mean ... 2.123	2 = 2	228	19.27	59.00
Std. Dev. ... 1.936	3 = 3	193	16.31	75.32
Variance ... 3.747	4 = 4	132	11.16	86.42
Skewness ... 0.282	5 =5	90	7.61	94.08
Kurtosis ... 2.173	6 = “extremely important”	70	5.92	100.00
	Total	1,183	100.00	

Remarks: Egoistic values (EGO), indicator three. 5 non-missing values are not labeled.

Name: ego4
Label: Influential: having an impact on people and events.

Summary	Value / Coding logic	Count	Percent	Cumulative
Observations ... 1,191	-1 = “opposed to my values”	32	2.69	2.69
Missing ... 28/1,219	0 = “not at all important”	137	11.50	14.19
Range (min/max) ... [-1,6]	1 = 1	115	9.60	23.85
Mean ... 2.889	2 = 2	206	17.30	41.14
Std. Dev. ... 1.896	3 = 3	250	20.99	62.13
Variance ... 3.596	4 = 4	187	15.70	77.83
Skewness ... -0.088	5 =5	136	11.42	89.25
Kurtosis ... 2.174	6 = “extremely important”	128	10.75	100.00
	Total	1,191	100.00	

Remarks: Egoistic values (EGO), indicator four. 5 non-missing values are not labeled.

Name: hed1
Label: Ambitious: hardworking, aspiring.

Summary	Value / Coding logic	Count	Percent	Cumulative
Observations ... 1,187	-1 = “opposed to my values”	8	0.67	0.67
Missing ... 32/1,219	0 = “not at all important”	20	1.68	2.36
Range (min/max) ... [-1,6]	1 = 1	43	3.62	5.98

Mean....4.249	2 = 2	110	9.27	15.25
Std. Dev....1.606	3 = 3	169	14.24	29.49
Variance....2.580	4 = 4	246	20.72	50.21
Skewness....-0.774	5 =5	249	20.98	71.19
Kurtosis....3.030	6 = "extremely important"	342	28.81	100.00
	Total	1,187	100.00	

Remarks: Hedonic values (HED), indicator one. 5 non-missing values are not labeled.

Name: hed2
Label: Pleasure: joy, gratification of desires.

Summary	Value / Coding logic	Count	Percent	Cumulative
Observations....1,188	-1 = "opposed to my values"	16	1.35	1.35
Missing....31/1,219	0 = "not at all important"	46	3.87	5.22
Range (min/max)....[-1,6]	1 = 1	84	7.07	12.29
Mean....3.631	2 = 2	146	12.29	24.58
Std. Dev....1.733	3 = 3	231	19.44	44.02
Variance....3.003	4 = 4	273	22.98	67.00
Skewness....-0.446	5 =5	183	15.40	82.41
Kurtosis....2.588	6 = "extremely important"	209	17.59	100.00
	Total	1,188	100.00	

Remarks: Hedonic values (HED), indicator two. 5 non-missing values are not labeled.

Name: hed3
Label: Enjoying life: enjoying food, sex, leisure, etc.

Summary	Value / Coding logic	Count	Percent	Cumulative
Observations....1,188	-1 = "opposed to my values"	9	0.76	0.76
Missing....31/1,219	0 = "not at all important"	24	2.02	2.78
Range (min/max)....[-1,6]	1 = 1	27	2.27	5.05
Mean....4.345	2 = 2	102	8.59	13.64
Std. Dev....1.580	3 = 3	146	12.29	25.93
Variance....2.496	4 = 4	256	21.55	47.47
Skewness....-0.927	5 = 5	266	22.39	69.87
Kurtosis....3.463	6 = "extremely important"	358	30.13	100.00
	Total	1,188	100.00	

Remarks: Hedonic values (HED), indicator three. 5 non-missing values are not labeled.

Name: hed4
Label: Self-indulgent: doing pleasant things.

Summary	Value / Coding logic	Count	Percent	Cumulative
Observations....1,184	-1 = "opposed to my values"	28	2.36	2.36
Missing....35/1,219	0 = "not at all important"	71	6.00	8.36
Range (min/max)....[-1,6]	1 = 1	112	9.46	17.82
Mean....3.280	2 = 2	177	14.95	32.77
Std. Dev....1.836	3 = 3	225	19.00	51.77
Variance....2.851	4 = 4	255	21.54	73.31
Skewness....-0.665	5 = 5	146	12.33	85.64
Kurtosis....2.882	6 = "extremely important"	170	14.36	100.00
	Total	1,184	100.00	

Remarks: Hedonic values (HED), indicator four. 5 non-missing values are not labeled.

Module 2: environmental self-identity.... numeric (byte), 1 unit
Scale: 7-point Likert, semantic differential [1=strongly disagree; 7=strongly agree]
Unique values: 7
Question text: how closely do you agree with the statements below:

Name: esi1
Label: Acting environmentally friendly is an important part of who I am.

Summary	Value / Coding logic	Count	Percent	Cumulative
Observations....1,201	1 = "strongly disagree"	74	6.16	6.16
Missing....18/1,219	2 = 2	89	7.41	13.57

Range (min/max) ... [1,7]	3 = 3	152	12.66	26.23
Mean ... 4.535	4 = 4	260	21.65	47.88
Std. Dev. ... 1.723	5 = 5	256	21.32	69.19
Variance ... 2.967	6 = 6	171	14.24	83.43
Skewness ... -0.288	7 = "strongly agree"	199	16.57	100.00
Kurtosis ... 2.297	Total	1,201	100.00	

Remarks: Environmental self-identity (ESI), indicator one. 5 non-missing values are not labeled. Data from the raw few national survey instrument for ESI variables were mainly correct. "refused" responses were originally coded [-1="refused"]. Following a brief look at the summary statistics (i.e. Mean, range, standard deviation, and minimum and maximum values), it showed the inclusion of the missing data incorrectly coded as -1. These were fixed using recode command to indicate missing (recode esi1 esi2 esi3 (-1=.)). After a do over, new summary statistics indicated the correct recoded missing data were excluded since mean values increased and standard deviations decreased. All other values correctly follow the scale and value label system shown above. Subsequent environmental self-identity indicators in this survey module use the same rules and processes shown here and need not repeating below. Count percentages (from n=1,219 observations) rounded to the nearest hundredth percent, .005 or greater rounded up, .0049 rounded down. Additional summary statistics produced using summarize [var1] [var2] … [varx] [vary], detail.

Name: esi2
Label: I am the type of person who acts environmentally friendly.

Summary	Value / Coding logic	Count	Percent	Cumulative
Observations ... 1,199	1 = "strongly disagree"	39	3.25	3.25
Missing ... 20/1,219	2 = 2	68	5.67	8.92
Range (min/max) ... [1,7]	3 = 3	137	11.43	20.35
Mean ... 4.032	4 = 4	246	20.52	40.87
Std. Dev. ... 1.571	5 = 5	305	25.44	66.31
Variance ... 2.468	6 = 6	208	17.35	83.65
Skewness ... -0.390	7 = "strongly agree"	196	16.35	100.00
Kurtosis ... 2.553	Total	1,199	100.00	

Remarks: Environmental self-identity (ESI), indicator two. 5 non-missing values are not labeled.

Name: esi3
Label: I see myself as an environmentally friendly person.

Summary	Value / Coding logic	Count	Percent	Cumulative
Observations ... 1,202	1 = "strongly disagree"	37	3.08	3.08
Missing ... 17/1,219	2 = 2	57	4.74	7.82
Range (min/max) ... [1,7]	3 = 3	132	10.98	18.80
Mean ... 4.844	4 = 4	236	19.63	38.44
Std. Dev. ... 1.550	5 = 5	317	26.37	64.81
Variance ... 2.403	6 = 6	215	17.98	82.70
Skewness ... -0.438	7 = "strongly agree"	208	17.30	100.00
Kurtosis ... 2.644	Total	1,202	100.00	

Remarks: Environmental self-identity (ESI), indicator three. 5 non-missing values are not labeled.

Module 3: perceived behavior control ... numeric (byte), 1 unit
Scale: 7-point Likert, semantic differential [1=completely not true; 7=completely true]
Unique values: 7
Question text: when thinking about your food, energy, and water consumption in your home, please read the statements below and evaluate how true you find them to be:

Name: pbc1
Label: It is easy for me to control the types of food my household eats.

Summary	Value / Coding logic	Count	Percent	Cumulative
Observations ... 1,203	1 = "completely not true"	45	3.74	3.74
Missing ... 16/1,219	2 = 2	51	4.24	7.98
Range (min/max) ... [1,7]	3 = 3	93	7.37	15.71
Mean ... 5.239	4 = 4	178	14.80	30.51
Std. Dev. ... 1.677	5 = 5	219	18.20	48.71
Variance ... 2.813	6 = 6	249	20.70	69.41
Skewness ... -0.782	7 = "completely true"	368	30.59	100.00
Kurtosis ... 2.792	Total	1,203	100.00	

Remarks: Perceived behavior control (PBC), indicator one. 5 non-missing values are not labeled. Data from the raw few national survey instrument for PBC variables were mainly correct. "refused" responses were originally coded [-1="refused"]. Following a brief look at the summary statistics (i.e. Mean, range, standard deviation, and minimum and maximum values), it showed the inclusion of the missing data incorrectly coded as -1. These were fixed using recode command to indicate missing (recode pbc1 pbc2 pbc3 (-1=.)). After a do over, new summary statistics indicated the correct recoded missing data were excluded since mean values increased and standard deviations decreased. All other values correctly follow the scale and value label system shown above. Subsequent environmental self-identity indicators in this survey module use the same rules and processes shown here and need not repeating below. Count percentages (from n=1,219 observations) rounded to the nearest hundredth percent, .005 or greater rounded up, .0049 rounded down. Additional summary statistics produced using summarize [var1] [var2] … [varx] [vary], detail.

Name: pbc2
Label: I have the ability to reduce my household's level of electricity usage.

Summary		Value / Coding logic	Count	Percent	Cumulative
Observations	1,204	1 = "completely not true"	21	1.74	1.74
Missing	15/1,219	2 = 2	35	2.91	4.65
Range (min/max)	[1,7]	3 = 3	84	6.98	11.63
Mean	5.463	4 = 4	165	13.70	25.33
Std. Dev.	1.524	5 = 5	229	19.02	44.35
Variance	2.322	6 = 6	260	21.59	65.95
Skewness	-0.844	7 = "completely true"	410	34.05	100.00
Kurtosis	3.015	Total	1,204	100.00	

Remarks: Perceived behavior control (PBC), indicator two. 5 non-missing values are not labeled.

Name: pbc3
Label: I have the skills and knowledge to use water wisely in my home.

Summary		Value / Coding logic	Count	Percent	Cumulative
Observations	1,203	1 = "completely not true"	15	1.25	1.25
Missing	16/1,219	2 = 2	20	1.66	2.91
Range (min/max)	[1,7]	3 = 3	56	4.66	7.56
Mean	5.617	4 = 4	159	13.22	20.78
Std. Dev.	1.383	5 = 5	231	19.20	39.98
Variance	1.914	6 = 6	311	25.85	65.84
Skewness	-0.958	7 = "completely true"	411	34.16	100.00
Kurtosis	3.522	Total	1,203	100.00	

Remarks: Perceived behavior control (PBC), indicator three. 5 non-missing values are not labeled.

Module 4: Personal norm .... numeric (byte), 1 unit
Scale: 7-point Likert, semantic differential [1=strongly disagree; 7=strongly agree]
Unique values: 7
Question text: how strongly do you agree or disagree with the following statements about food, energy, and water:

Name: pn1
Label: I feel morally obligated to not waste food.

Summary		Value / Coding logic	Count	Percent	Cumulative
Observations	1,199	1 = "strongly disagree"	64	5.34	5.34
Missing	20/1,219	2 = 2	74	6.17	11.51
Range (min/max)	[1,7]	3 = 3	100	8.34	19.85
Mean	4.970	4 = 4	209	17.43	37.28
Std. Dev.	1.770	5 = 5	204	17.01	54.30
Variance	3.134	6 = 6	245	20.43	74.73
Skewness	-0.616	7 = "strongly agree"	303	25.27	100.00
Kurtosis	2.446	Total	1,199	100.00	

Remarks: Personal norm (PN), indicator one; food related measure of individual moral compulsion 5 non-missing values are not labeled. PN variables originally labelled "refused" responses were coded [-1="refused"]. Sum composite scores of PN as well as PBC, ESI, and others showed that missing data were wrongfully included. Each indicator organized under each module in this codebook is a distinct manifest variable – a subjective measure through self-evaluation – of a latent variable construct. To fix the missing data, a four-step process was used. First, indicators with missing data were recoded using the recode command (recode [var1] [var2] … [varx] [vary] (-1=.)). Next, missing data were counted for each indicator using the (count if missing) command, to check that recoded changes and missing data counts correspond with each other. Updated values and statistics were provided using (codebook, all) and (summarize,

detail) commands. Finally sum composite scores were generated using the command (egen [latvar] = rowtotal([var1] [var2] … [varx] [vary]), missing). These rules and procedures were subsequently used uniformly for manifest and latent variables for esi, pbc, pn (here), qol, nep, sof, aef, orm, dppd, and ac constructs and need not repeating further. Count percentages (from n=1,219 observations) rounded to the nearest hundredth percent, .005 or greater rounded up, .0049 rounded down.

Name: pn2
Label: I would feel guilty if I did not take actions to reduce the environmental impacts of the food I buy.

Summary		Value	Coding logic	Count	Percent	Cumulative
Observations	1,203	1	= "strongly disagree"	128	10.64	10.64
Missing	16/1,219	2	= 2	134	11.14	21.78
Range (min/max)	[1,7]	3	= 3	184	15.30	37.07
Mean	4.159	4	= 4	223	18.54	55.61
Std. Dev.	1.867	5	= 5	208	17.29	72.90
Variance	3.485	6	= 6	159	13.22	86.12
Skewness	-0.092	7	= "strongly agree"	167	13.88	100.00
Kurtosis	1.975	Total		1,203	100.00	

Remarks: Personal norm (PN), indicator two; food related appeal to individual sense of shame or guilt. 5 non-missing values are not labeled.

Name: pn3
Label: I would feel proud to not waste food and reduce impacts of the food I buy.

Summary		Value	Coding logic	Count	Percent	Cumulative
Observations	1,202	1	= "strongly disagree"	43	3.58	3.58
Missing	17/1,219	2	= 2	62	5.16	8.74
Range (min/max)	[1,7]	3	= 3	111	9.23	17.97
Mean	5.102	4	= 4	199	16.56	34.53
Std. Dev.	1.691	5	= 5	212	17.64	52.16
Variance	2.858	6	= 6	248	20.63	72.80
Skewness	-0.639	7	= "strongly agree"	327	27.20	100.00
Kurtosis	2.529	Total		1,202	100.00	

Remarks: Personal norm (PN), indicator three; food related appeal to individual sense of pride. 5 non-missing values are not labeled.

Name: pn4
Label: I feel morally obligated to not waste water.

Summary		Value	Coding logic	Count	Percent	Cumulative
Observations	1,199	1	= "strongly disagree"	76	6.34	6.34
Missing	20/1,219	2	= 2	81	6.76	13.09
Range (min/max)	[1,7]	3	= 3	129	10.76	23.85
Mean	4.794	4	= 4	211	17.60	41.45
Std. Dev.	1.815	5	= 5	212	17.68	59.13
Variance	3.296	6	= 6	211	17.60	76.73
Skewness	-0.475	7	= "strongly agree"	279	23.27	100.00
Kurtosis	2.243	Total		1,199	100.00	

Remarks: Personal norm (PN), indicator four; water related measure of individual moral compulsion. 5 non-missing values are not labeled.

Name: pn5
Label: I would feel guilty if I did not conserve water.

Summary		Value	Coding logic	Count	Percent	Cumulative
Observations	1,202	1	= "strongly disagree"	99	8.24	8.24
Missing	17/1,219	2	= 2	104	8.65	16.89
Range (min/max)	[1,7]	3	= 3	143	11.90	28.79
Mean	4.532	4	= 4	223	18.55	47.34
Std. Dev.	1.866	5	= 5	217	18.05	65.39
Variance	3.482	6	= 6	178	14.81	80.20
Skewness	-0.312	7	= "strongly agree"	238	19.80	100.00
Kurtosis	2.073	Total		1,202	100.00	

Remarks: Personal norm (PN), indicator five; water related appeal to individual sense of shame or guilt. 5 non-missing values are not labeled.

Name: pn6 Label: I would feel proud to conserve and not waste water.				
Summary	Value Coding logic	Count	Percent	Cumulative
Observations 1,200	1 = "strongly disagree"	46	3.83	3.83
Missing 19/1,219	2 = 2........	54	4.50	8.33
Range (min/max) .... [1,7]	3 = 3........	97	8.08	16.42
Mean 5.188	4 = 4........	200	16.67	33.08
Std. Dev. 1.696	5 = 5........	197	16.42	49.50
Variance 2.878	6 = 6........	247	20.58	70.08
Skewness .... -0.719	7 = "strongly agree"........	359	29.92	100.00
Kurtosis 2.652	Total	1,200	100.00	
Remarks: Personal norm (PN), indicator six; water related appeal to individual sense of pride. 5 non-missing values are not labeled.				

Name: pn7 Label: I feel morally obligated to not waste energy.				
Summary	Value Coding logic	Count	Percent	Cumulative
Observations 1,201	1 = "strongly disagree"	70	5.83	5.83
Missing 18/1,219	2 = 2	82	6.83	12.66
Range (min/max) .... [1,76]	3 = 3	124	10.32	22.98
Mean 4.816	4 = 4	213	17.74	40.72
Std. Dev. 1.788	5 = 5	219	18.23	58.95
Variance 3.199	6 = 6	220	18.32	77.27
Skewness .... -0.491	7 = "strongly agree"........	273	22.73	100.00
Kurtosis 2.291	Total	1,201	100.00	
Remarks: Personal norm (PN), indicator seven; energy related measure of individual moral compulsion. 5 non-missing values are not labeled.				

Name: pn8 Label: I would feel guilty if I did not take actions to reduce the environmental impacts of my energy use.				
Summary	Value Coding logic	Count	Percent	Cumulative
Observations 1,197	1 = "strongly disagree"	100	8.35	8.35
Missing 22,1,219	2 = 2........	113	9.44	17.79
Range (min/max) .... [1,7]	3 = 3........	153	12.78	30.58
Mean 4.452	4 = 4........	235	19.63	50.21
Std. Dev. 1.868	5 = 5........	195	16.29	66.50
Variance 3.490	6 = 6........	178	14.87	81.37
Skewness .... -0.242	7 = "strongly agree"........	223	18.63	100.00
Kurtosis 2.020	Total	1,197	100.00	
Remarks: Personal norm (PN), indicator eight; energy related appeal to individual sense of shame or guilt. 5 non-missing values are not labeled.				

Name: pn9 Label: I would feel proud to not waste energy and reduce the impacts of the energy I use.				
Summary	Value Coding logic	Count	Percent	Cumulative
Observations 1,202	1 = "strongly disagree"	48	3.99	3.99
Missing 17/1,219	2 = 2	54	4.49	8.49
Range (min/max) .... [1,7]	3 = 3	97	8.07	16.56
Mean 5.110	4 = 4	210	17.47	34.03
Std. Dev. 1.673	5 = 5	219	18.22	52.25
Variance 2.797	6 = 6	258	21.46	73.71
Skewness .... -0.683	7 = "strongly agree"........	316	26.29	100.00
Kurtosis 2.682	Total	1,202	100.00	
Remarks: Personal norm (PN), indicator nine; energy related appeal to individual sense of pride. 5 non-missing values are not labeled.				

Module 5: concern for global warming .... numeric (integer), 1 unit

Scale: [0=not at all worried; 1= not very worried; 2=somewhat worried; 3=very worried]
Unique values: 4
Question text: how worried are you about global warming?

Name: cgw
Label: Concern for global warming.

Summary		Value	Coding logic	Count	Percent	Cumulative
Observations	1,212	0	= "not at all worried"	181	14.93	14.93
Missing	7/1,219	1	= "not very worried"	250	20.63	35.56
Range (min/max)	[0,3]	2	= "somewhat worried"	455	37.54	73.10
Mean	1.764	3	= "very worried"	326	26.90	100.00
Std. Dev.	1.009	Total		1,212	100.00	
Variance	1.018					
Skewness	-0.389					
Kurtosis	2.074					

Remarks: Concern for global warming (CGW). 7 observations recoded from [9999="refused to answer"] to missing data [recode cgw (9999=.)].

Module 6: global warming belief..........numeric (integer), 1 unit
Scale: categorical, dichotomy [0=no; 1= yes; 2=unsure]
Unique values: 3
Question text: recently, you may have noticed that global warming has been getting some attention in the news. Global warming refers to the idea that the world's average temperature has been increasing over the past 150 years, may be increasing more in the future, and that the world's climate may change as a result. What do you think: do you think that global warming is happening?

Name: gwbelieve
Label: Do you think that global warming is happening?

Summary		Value	Coding logic	Count	Percent	Cumulative
Observations	1,211	0	= "no"	184	15.19	15.19
Missing	8/1,219	1	= "yes"	800	66.06	81.26
Range (min/max)	[0,2]	2	= "unsure"	227	18.74	100.00
Mean	na	Total		1,211	100.00	
Std. Dev.	na					
Variance	na					
Skewness	na					
Kurtosis	na					

Remarks: Believe in global warming (gwbelieve). 8 observations recoded from [9999="refused to answer"] to missing data using the command [recode cgw (9999=.)]. No detail statistics provided since this variable is categorical (nominal data, not ordinal).

Module 7: global warming is happening..........numeric (byte), 1 unit
Scale: [1=not at all sure; 2=somewhat sure; 3=very sure; 4=extremely sure]
Unique values: 4
Question text: how sure are you that global warming is happening?

Name: yesgw
Label: How sure are you that global warming is happening?

Summary		Value	Coding logic	Count	Percent	Cumulative
Observations	799	1	= "not at all sure"	11	1.38	1.38
Missing	420/1,219	2	= "somewhat sure"	211	26.41	27.78
Range (min/max)	[1,4]	3	= "very sure"	279	34.92	62.70
Mean	3.081	4	= "extremely sure"	298	37.30	100.00
Std. Dev.	0.828	Total		799	100.00	
Variance	0.686					
Skewness	-0.298					
Kurtosis	1.884					

Remarks: This is a piped question; if respondents to gwbelieve answered with "yes" they are directed to yesgw and exempted from answering nogw. This item asks only those that responded "yes" to evaluate how sure they are that global warming is happening (i.e. Missing values are coded . = "." (gwbelieve=0; gwbelieve=2; gwbelieve=.)). The values numerically labeled "-1" found in variables yesgw and nogw are respondents that refused to indicate an answer.

While there were only 419 missing values in yesgw, 1 observation contained -1=refused. Both yesgw and nogw were recoded to indicate missing data [recode yesgw nogw (-1=.]). This brings the missing data for yesgw to 420.

Module 8: global warming is not happening.. numeric (byte), 1 unit
Scale: [1=not at all sure; 2=somewhat sure; 3=very sure; 4=extremely sure]
Unique values: 4
Question text: how sure are you that global warming is not happening?

Name: nogw
Label: How sure are you that global warming is not happening?

Summary		Value	Coding logic	Count	Percent	Cumulative
Observations	411	1	"not at all sure"	171	41.61	41.61
Missing	808/1,219	2	"somewhat sure"	125	30.41	72.02
Range (min/max)	[1,4]	3	"very sure"	69	16.79	88.81
Mean	1.976	4	"extremely sure"	46	11.19	100.00
Std. Dev.	1.017	Total		411	100.00	
Variance	1.034					
Skewness	0.690					
Kurtosis	2.297					

Remarks: Piped question; if respondents to gwbelieve answered with "no" or "unsure" or if they refused to answer, they are directed to nogw and exempted from yesgw. This item asks only those that responded with anything besides a "yes" answer to evaluate how sure they are that global warming is not happening (i.e. Missing values are coded . = "." (gwbelieve=1)). The values numerically labeled "-1" found in variables yesgw and nogw are respondents that refused to indicate an answer. While there were only 800 missing values in nogw, 8 observations contained -1=refused. They were recoded to indicate missing data [recode yesgw nogw (-1=.]). This brings the missing values for nogw to 808.

Module 9: quality of life .... numeric (byte), 1 unit
Scale: 7-point Likert, semantic differential [1=not at all important; 7=extremely important]
Unique values: 7
Question text: how important are each of the following items regarding your quality of life:

Name: qol1
Label: It is important for me to have control over the resources I need to survive.

Summary		Value	Coding logic	Count	Percent	Cumulative
Observations	1,194	1	"not at all important"	19	1.59	1.59
Missing	25/1,219	2	2	46	3.85	5.44
Range (min/max)	[1,7]	3	3	66	5.35	10.97
Mean	5.295	4	4	221	18.51	29.48
Std. Dev.	1.495	5	5	247	20.69	50.17
Variance	2.235	6	6	271	22.70	72.86
Skewness	-0.686	7	"extremely important"	324	27.14	100.00
Kurtosis	2.880	Total		1,194	100.00	

Remarks: Quality of life (QoL), indicator one. Appeal to individual non-environmental appreciation of control over vital life-support resources. 5 non-missing values are not labeled.

Name: qol2
Label: Being connected to people in the community around me is important to me.

Summary		Value	Coding logic	Count	Percent	Cumulative
Observations	1,199	1	"not at all important"	98	8.17	8.17
Missing	20/1,219	2	2	108	9.01	17.18
Range (min/max)	[1,7]	3	3	162	13.51	30.69
Mean	4.323	4	4	267	22.27	52.96
Std. Dev.	1.765	5	5	234	19.52	72.48
Variance	3.114	6	6	165	13.76	86.24
Skewness	-0.200	7	"extremely important"	165	13.76	100.00
Kurtosis	2.191	Total		1,199	100.00	

Remarks: Quality of life (QoL), indicator two. Appeal to individual nonenvironmental attachment to people in one's immediate community. 5 non-missing values are not labeled.

Name: qol3 Label: I would change my purchasing decisions if I thought it would benefit the health of my family.					
Summary		Value / Coding logic	Count	Percent	Cumulative
Observations	1,197	1 = "not at all important"	23	1.92	1.92
Missing	22/1,219	2 = 2	12	1.00	2.92
Range (min/max)	[1,7]	3 = 3	48	4.01	6.93
Mean	5.708	4 = 4	134	11.19	18.13
Std. Dev.	1.388	5 = 5	223	18.63	36.76
Variance	1.926	6 = 6	309	25.81	62.57
Skewness	-1.169	7 = "extremely important"	448	37.43	100.00
Kurtosis	4.193	Total	1,197	100.00	
Remarks: Quality of life (QoL), indicator three. Appeal to individual nonenvironmental concern towards supplementing family health. 5 non-missing values are not labeled.					

Name: qol4 Label: I would change my purchasing decisions if I thought it would benefit the safety of my family.					
Summary		Value / Coding logic	Count	Percent	Cumulative
Observations	1,200	1 = "not at all important"	18	1.50	1.50
Missing	19/1,219	2 = 2	16	1.33	2.83
Range (min/max)	[1,7]	3 = 3	59	4.92	7.75
Mean	5.724	4 = 4	136	11.33	19.08
Std. Dev.	1.394	5 = 5	184	15.33	34.42
Variance	1.943	6 = 6	331	27.58	62.00
Skewness	-1.149	7 = "extremely important"	456	38.00	100.00
Kurtosis	3.926	Total	1,200	100.00	
Remarks: Quality of life (QoL), indicator four. Appeal to individual nonenvironmental concern towards safety of family members. 5 non-missing values are not labeled.					

Name: qol5 Label: Participation in decision making about the resources I need to survive is important to me.					
Summary		Value / Coding logic	Count	Percent	Cumulative
Observations	1,194	1 = "not at all important"	30	2.51	2.51
Missing	25/1,219	2 = 2	50	4.19	6.70
Range (min/max)	[1,7]	3 = 3	86	7.20	13.90
Mean	5.232	4 = 4	200	16.75	30.65
Std. Dev.	1.581	5 = 5	236	19.77	50.42
Variance	2.500	6 = 6	265	22.19	72.61
Skewness	-0.714	7 = "extremely important"	327	27.39	100.00
Kurtosis	2.813	Total	1,194	100.00	
Remarks: Quality of life (QoL), indicator five. Appeal to individual nonenvironmental motivation towards engagement in decisions affecting life-support systems and resources. 5 non-missing values are not labeled.					

Name: qol6 Label: It is important to me that I produce at least some of the resources I need to survive.					
Summary		Value / Coding logic	Count	Percent	Cumulative
Observations	1,196	1 = "not at all important"	80	6.69	6.69
Missing	23/1,219	2 = 2	113	9.45	16.14
Range (min/max)	[1,7]	3 = 3	141	11.79	27.93
Mean	4.493	4 = 4	264	22.07	50.00
Std. Dev.	1.793	5 = 5	212	17.73	67.73
Variance	3.216	6 = 6	173	14.46	82.19
Skewness	-0.245	7 = "extremely important"	213	17.81	100.00
Kurtosis	2.131	Total	1,196	100.00	
Remarks: Quality of life (QoL), indicator six. Appeal to individual nonenvironmental motivation towards self-sufficiency by producing some necessary life-supporting resources. 5 non-missing values are not labeled.					

Module 9: environmental values... numeric (byte), 1 unit
Scale: 7-point Likert, semantic differential [1=strongly disagree; 7=strongly agree]
Unique values: 7
Question text: how strongly do you agree or disagree with the following statements regarding the environment:

Name: nep1 Label: When humans interfere with nature it often produces disastrous consequences.					
Summary	Value	Coding logic	Count	Percent	Cumulative
Observations 1,195	1	= "strongly disagree"	45	3.77	3.77
Missing 24/1,219	2	= 2	30	2.51	6.28
Range (min/max) .... [1,7]	3	= 3	81	6.78	13.05
Mean 5.252	4	= 4	223	18.66	31.72
Std. Dev. 1.618	5	= 5	214	17.91	49.62
Variance 2.617	6	= 6	248	20.75	70.38
Skewness .... -0.764	7	= "strongly agree"	354	29.62	100.00
Kurtosis 2.946	Total		1,195	100.00	
Remarks: New ecological paradigm (NEP), indicator one. Balance of nature measure. 5 non-missing values are not labeled.					

Name: nep2 Label: Humans are severely abusing the environment.					
Summary	Value	Coding logic	Count	Percent	Cumulative
Observations 1,195	1	= "strongly disagree"	46	3.85	3.85
Missing 24/1,219	2	= 2	47	3.93	7.78
Range (min/max) .... [1,7]	3	= 3	83	6.95	14.73
Mean 5.340	4	= 4	171	14.31	29.04
Std. Dev. 1.680	5	= 5	220	18.41	47.45
Variance 2.823	6	= 6	231	19.33	66.78
Skewness .... -0.838	7	= "strongly agree"	397	33.22	100.00
Kurtosis 2.898	Total		1,195	100.00	
Remarks: New ecological paradigm (NEP), indicator two. Eco-crisis measure. 5 non-missing values are not labeled.					

Name: nep3 Label: Plants and animals have as much right as humans to exist.					
Summary	Value	Coding logic	Count	Percent	Cumulative
Observations 1,195	1	= "strongly disagree"	46	5.86	5.86
Missing 24/1,219	2	= 2	47	4.94	10.79
Range (min/max) .... [1,7]	3	= 3	83	6.61	17.41
Mean 5.278	4	= 4	171	13.56	30.96
Std. Dev. 1.840	5	= 5	220	13.72	44.69
Variance 3.385	6	= 6	231	17.82	62.51
Skewness .... -0.870	7	= "strongly agree"	397	37.49	100.00
Kurtosis 2.693	Total		1,195	100.00	
Remarks: New ecological paradigm (NEP), indicator three. Anti-anthropocentrism measure. 5 non-missing values are not labeled.					

Name: nep4 Label: Despite our special abilities humans are still subject to the laws of nature.					
Summary	Value	Coding logic	Count	Percent	Cumulative
Observations 1,189	1	= "strongly disagree"	15	1.26	1.26
Missing 30/1,219	2	= 2	17	1.43	2.69
Range (min/max) .... [1,7]	3	= 3	32	2.69	5.38
Mean 5.881	4	= 4	123	10.34	15.73
Std. Dev. 1.340	5	= 5	189	15.90	31.62
Variance 1.795	6	= 6	280	23.55	55.17
Skewness .... -1.298	7	= "strongly agree"	533	44.83	100.00
Kurtosis 4.464	Total		1,189	100.00	
Remarks: New ecological paradigm (NEP), indicator four. Anti-exemption measure. 5 non-missing values are not labeled.					

Name: nep5 Label: The earth is like a spaceship with very limited room and resources.					
Summary	Value	Coding logic	Count	Percent	Cumulative
Observations 1,194	1	= "strongly disagree"	91	7.62	7.62

Missing 25/1,219 Range (min/max) [1,7] Mean 4.876 Std. Dev. 1.860 Variance 3.460 Skewness -0.584 Kurtosis 2.342	2 = 2 72 6.03 13.65 3 = 3 92 7.71 21.36 4 = 4 217 18.17 39.53 5 = 5 201 16.83 56.37 6 = 6 209 17.50 73.87 7 = "strongly agree" 312 26.13 100.00 Total 1,194 100.00
Remarks: New ecological paradigm (NEP), indicator four. Ecological limits measure. 5 non-missing values are not labeled.	

Module 10: ecological citizenship .... numeric (byte), 1 unit
Scale: 7-point Likert, semantic differential [1=strongly disagree; 7=strongly agree]
Unique values: 7
Question text: how strongly do you agree or disagree with the following statements:

Name: sof1
Label: Each person should not consume more of the world's resources than what allows all people to have their basic needs met.

Summary		Value / Coding logic	Count	Percent	Cumulative
Observations	1,190	1 = "strongly disagree"	108	9.08	9.08
Missing	29/1,219	2 = 2	86	7.23	16.30
Range (min/max)	[1,7]	3 = 3	162	13.61	29.92
Mean	4.330	4 = 4	286	24.03	53.95
Std. Dev.	1.777	5 = 5	220	18.49	72.44
Variance	3.158	6 = 6	153	12.86	85.29
Skewness	-0.204	7 = "strongly agree"	175	14.71	100.00
Kurtosis	2.232	Total	1,190	100.00	

Remarks: Sense of fairness (SoF), indicator one. 5 non-missing values are not labeled.

Name: sof2
Label: Resources should be distributed equally among all people of the world.

Summary		Value / Coding logic	Count	Percent	Cumulative
Observations	1,185	1 = "strongly disagree"	108	9.08	9.08
Missing	34/1,219	2 = 2	86	7.23	16.30
Range (min/max)	[1,7]	3 = 3	162	13.61	29.92
Mean	4.809	4 = 4	286	24.03	53.95
Std. Dev.	1.921	5 = 5	220	18.49	72.44
Variance	3.691	6 = 6	153	12.86	85.29
Skewness	-0.097	7 = "strongly agree"	175	14.71	100.00
Kurtosis	1.973	Total	1,185	100.00	

Remarks: Sense of fairness (SoF), indicator two. 5 non-missing values are not labeled.

Name: aef1
Label: Many products consumed in the united states affect the environment in other countries negatively.

Summary		Value / Coding logic	Count	Percent	Cumulative
Observations	1,187	1 = "strongly disagree"	85	7.16	7.16
Missing	32/1,219	2 = 2	108	9.10	16.26
Range (min/max)	[1,7]	3 = 3	141	11.88	28.14
Mean	4.373	4 = 4	315	26.54	54.68
Std. Dev.	1.749	5 = 5	205	17.27	71.95
Variance	3.060	6 = 6	149	12.55	84.50
Skewness	-0.167	7 = "strongly agree"	184	15.50	100.00
Kurtosis	2.232	Total	1,187	100.00	

Remarks: Awareness of ecological footprints (AEF), indicator one. 5 non-missing values are not labeled.

Name: aef2
Label: When we consume products in the united states, we often consume resources from other countries.

Summary		Value / Coding logic	Count	Percent	Cumulative
Observations	1,188	1 = "strongly disagree"	33	2.78	2.78
Missing	31/1,219	2 = 2	33	2.78	5.56

Summary	Value / Coding logic	Count	Percent	Cumulative
Range (min/max) .... [1,7]	3 = 3	83	6.99	12.54
Mean 5.148	4 = 4	223	18.77	31.31
Std. Dev. 1.504	5 = 5	288	24.24	55.56
Variance 2.263	6 = 6	260	21.89	77.44
Skewness .... -0.664	7 = "strongly agree"	268	22.56	100.00
Kurtosis 3.039	Total	1,188	100.00	

Remarks: Awareness of ecological footprints (AEF), indicator two. 5 non-missing values are not labeled.

Summary	Value / Coding logic	Count	Percent	Cumulative
Observations 1,190	1 = "strongly agree"	142	11.93	11.93
Missing 29/1,219	2 = 2	126	10.59	22.52
Range (min/max) .... [1,7]	3 = 3	174	14.62	37.14
Mean 4.082	4 = 4	264	22.18	59.33
Std. Dev. 1.864	5 = 5	169	14.20	73.53
Variance 3.475	6 = 6	164	13.78	87.31
Skewness .... -0.062	7 = "strongly disagree"	151	12.69	100.00
Kurtosis 2.001	Total	1,190	100.00	

Remarks: Awareness of ecological footprints (AEF), indicator three. Reverse coded. 5 non-missing values are not labeled.

Name: aef4
Label: A great deal of hazardous waste produced by Americans ends up in poor countries.

Summary	Value / Coding logic	Count	Percent	Cumulative
Observations 1,187	1 = "strongly disagree"	100	8.42	8.42
Missing 32/1,219	2 = 2	101	8.51	16.93
Range (min/max) .... [1,7]	3 = 3	153	12.89	29.82
Mean 4.306	4 = 4	316	26.62	56.44
Std. Dev. 1.771	5 = 5	193	16.26	72.70
Variance 3.137	6 = 6	147	12.38	85.09
Skewness .... -0.146	7 = "strongly agree"	177	14.91	100.00
Kurtosis 2.215	Total	1,187	100.00	

Remarks: Awareness of ecological footprints (AEF), indicator four. 5 non-missing values are not labeled.

Name: orm1
Label: Environmentally friendly products have less negative environmental impact.

Summary	Value / Coding logic	Count	Percent	Cumulative
Observations 1,187	1 = "strongly disagree"	45	3.79	3.79
Missing 32/1,219	2 = 2	46	3.88	7.67
Range (min/max) .... [1,7]	3 = 3	107	9.01	16.68
Mean 4.858	4 = 4	277	23.34	40.02
Std. Dev. 1.556	5 = 5	281	23.67	63.69
Variance 2.422	6 = 6	222	18.70	82.39
Skewness .... -0.477	7 = "strongly agree"	209	17.61	100.00
Kurtosis 2.767	Total	1,187	100.00	

Remarks: 'Other' regarding motivations (ORM), indicator one. 5 non-missing values are not labeled.

Name: orm2
Label: Environmentally friendly products are better for individuals who produce the products.

Summary	Value / Coding logic	Count	Percent	Cumulative
Observations 1,189	1 = "strongly disagree"	71	5.97	5.97
Missing 30/1,219	2 = 2	64	5.38	11.35
Range (min/max) .... [1,7]	3 = 3	145	12.20	23.55
Mean 4.458	4 = 4	357	30.03	53.57
Std. Dev. 1.611	5 = 5	228	19.18	72.75
Variance 2.422	6 = 6	170	14.30	87.05
Skewness .... -0.477	7 = "strongly agree"	154	12.95	100.00
Kurtosis 2.570	Total	1,189	100.00	

Remarks: 'Other' regarding motivations (ORM), indicator two. 5 non-missing values are not labeled.

Name: orm3
Label: The development of environmentally friendly products affects the development of society.

Summary		Value / Coding logic	Count	Percent	Cumulative
Observations	1,188	1 = "strongly disagree"	52	4.38	4.38
Missing	31/1,219	2 = 2	68	5.72	10.10
Range (min/max)	[1,7]	3 = 3	111	9.34	19.44
Mean	4.671	4 = 4	315	26.52	45.96
Std. Dev.	1.583	5 = 5	255	21.46	67.42
Variance	2.506	6 = 6	216	18.18	85.61
Skewness	-0.383	7 = "strongly agree"	171	14.39	100.00
Kurtosis	2.624	Total	1,188	100.00	

Remarks: 'Other' regarding motivations (ORM), indicator three. 5 non-missing values are not labeled.

Name: dppd1
Label: Politicians and authorities should not concern themselves with whether or not people act environmentally friendly.

Summary		Value / Coding logic	Count	Percent	Cumulative
Observations	1,194	1 = "strongly agree"	110	9.21	9.21
Missing	25/1,219	2 = 2	73	6.11	15.33
Range (min/max)	[1,7]	3 = 3	117	9.80	25.13
Mean	4.747	4 = 4	219	18.34	43.47
Std. Dev.	1.933	5 = 5	174	14.57	58.04
Variance	3.735	6 = 6	192	16.08	74.12
Skewness	-0.477	7 = "strongly disagree"	309	25.88	100.00
Kurtosis	2.131	Total	1,194	100.00	

Remarks: Dismantling public-private distinction (DPPD), indicator one. Reverse coded. 5 non-missing values are not labeled.

Name: dppd2
Label: It is good that politicians and authorities try to make people act more environmentally friendly.

Summary		Value / Coding logic	Count	Percent	Cumulative
Observations	1,190	1 = "strongly disagree"	103	8.66	8.66
Missing	29/1,219	2 = 2	90	7.56	16.22
Range (min/max)	[1,7]	3 = 3	120	10.08	26.30
Mean	4.585	4 = 4	212	17.82	44.12
Std. Dev.	1.840	5 = 5	246	20.67	64.79
Variance	3.387	6 = 6	198	16.64	81.43
Skewness	-0.422	7 = "strongly agree"	221	18.57	100.00
Kurtosis	2.211	Total	1,190	100.00	

Remarks: Dismantling public-private distinction (DPPD), indicator two. 5 non-missing values are not labeled.

Name: dppd3
Label: If I choose to drive a car, it is my private business.

Summary		Value / Coding logic	Count	Percent	Cumulative
Observations	1,191	1 = "strongly agree"	500	41.98	41.98
Missing	28/1,219	2 = 2	238	19.98	61.96
Range (min/max)	[1,7]	3 = 3	191	16.04	78.00
Mean	2.310	4 = 4	168	14.11	92.11
Std. Dev.	1.465	5 = 5	54	4.53	96.64
Variance	2.147	6 = 6	20	1.68	98.32
Skewness	1.032	7 = "strongly disagree"	20	1.68	100.00
Kurtosis	3.486	Total	1,191	100.00	

Remarks: Dismantling public-private distinction (DPPD), indicator three. Reverse coded. 5 non-missing values are not labeled.

Name: dppd4
Label: If I choose to eat meat, it is my private business.

Summary		Value / Coding logic	Count	Percent	Cumulative
Observations	1,193	1 = "strongly agree"	601	50.38	50.38
Missing	26/1,219	2 = 2	213	17.85	68.23

Range (min/max) [1,7]	3 = 3 160 13.41 81.64
Mean 2.111	4 = 4 138 11.57 93.21
Std. Dev. 1.432	5 = 5 46 3.86 97.07
Variance 2.050	6 = 6 16 1.34 98.41
Skewness 1.284	7 = "strongly disagree" 19 1.59 100.00
Kurtosis 4.096	Total 1,193 100.00

Remarks: Dismantling public-private distinction (DPPD), indicator four. Reverse coded. 5 non-missing values are not labeled.

Name: dppd5
Label: Everybody has the right to consume freely without anybody butting in.

Summary		Value	Coding logic	Count	Percent	Cumulative
Observations	1,188	1	"strongly agree"	202	17.00	17.00
Missing	31/1,219	2	2	131	11.03	28.03
Range (min/max)	[1,7]	3	3	193	16.25	44.28
Mean	3.758	4	4	259	21.80	66.08
Std. Dev.	1.889	5	5	158	13.30	79.38
Variance	3.567	6	6	119	10.02	89.39
Skewness	0.113	7	"strongly disagree"	126	10.61	100.00
Kurtosis	2.009	Total		1,188	100.00	

Remarks: Dismantling public-private distinction (DPPD), indicator five. Reverse coded. 5 non-missing values are not labeled.

Module 11: awareness of consequences .... numeric (byte), 1 unit
Scale: 7-point Likert, semantic differential [1=strongly disagree; 7=strongly agree]
Unique values: 7
Question text: how strongly do you agree or disagree with the following statements:

Name: ac1
Label: The price of water is too low; it does not take into account the full environmental costs of its multiple uses.

Summary		Value	Coding logic	Count	Percent	Cumulative
Observations	1,193	1	"strongly disagree"	346	29.00	29.00
Missing	26/1,219	2	2	207	17.35	46.35
Range (min/max)	[1,7]	3	3	150	12.57	58.93
Mean	2.960	4	4	283	23.72	82.65
Std. Dev.	1.733	5	5	107	8.97	91.62
Variance	3.002	6	6	46	3.86	95.47
Skewness	0.532	7	"strongly agree"	54	4.53	100.00
Kurtosis	2.403	Total		1,193	100.00	

Remarks: Awareness of consequence (AC), indicator one. 5 non-missing values are not labeled.

Name: ac2
Label: It worries me that global disparities in affordable and accessible food, energy, and water are linked to poverty and warfare.

Summary		Value	Coding logic	Count	Percent	Cumulative
Observations	1,193	1	"strongly disagree"	125	10.48	10.48
Missing	26/1,219	2	2	105	8.80	19.28
Range (min/max)	[1,7]	3	3	134	11.23	30.51
Mean	4.290	4	4	283	23.72	54.23
Std. Dev.	1.840	5	5	204	17.10	71.33
Variance	3.386	6	6	165	13.83	85.16
Skewness	-0.214	7	"strongly agree"	177	14.84	100.00
Kurtosis	2.118	Total		1,193	100.00	

Remarks: Awareness of consequence (AC), indicator two. 5 non-missing values are not labeled.

Name: ac3
Label: It doesn't make sense how food, energy and water are produced and delivered without meaningful input from a diverse group of stakeholders.

Summary		Value	Coding logic	Count	Percent	Cumulative
Observations	1,189	1	"strongly disagree"	169	14.21	14.21

Missing 30/1,219	2 = 2 .... 138 11.61 25.82
Range (min/max) .... [1,7]	3 = 3 .... 170 14.30 40.12
Mean 3.742	4 = 4 .... 350 29.44 69.55
Std. Dev. 1.733	5 = 5 .... 174 14.63 84.19
Variance 3.005	6 = 6 .... 92 7.74 91.93
Skewness 0.073	7 = “strongly agree” 96 8.07 100.00
Kurtosis 2.288	Total 1,189 100.00
Remarks: Awareness of consequence (AC), indicator three. 5 non-missing values are not labeled.	

Module 12: pro-environmental behaviors........ numeric (byte), 1 unit
Scale: dichotomy; binary [0=no; 1=yes]
Unique values: 2
Question text: in your household do you currently:

Name: dairy_b
Label: Reduce or eliminate dairy from your diet?

Summary	Value	Coding logic	Count	Percent	Cumulative
Observations 1,204	0 = “no”		918	76.25	76.25
Missing 15/1,219	1 = “yes”		286	23.75	100.00
Range (min/max) .... [0,1]	Total		1,204	100.00	
Mean 0.238					
Std. Dev. 0.426					
Variance 0.181					
Skewness 1.233					
Kurtosis 2.521					

Remarks: Pro-environmental behaviors (PEBs), indicator one, a moderate to hard food related PEB item. Purchase behavior features embedded in this item include contingencies for replacing food items that are dairy rich or locally sourced. Responses to this series of PEB measurements were intended to simply reflect the degree of positive self-evaluation that each singular PEB activity is currently being employed in the respondent’s household. The raw survey data were correctly coded from the multi-part survey instrument correctly, but inappropriately [1=yes; 2=no; -1=refused]. Data were recoded and relabeled according to the scale indicated above. Subsequent PEB indicators in this survey module use the same rules and processes for recoding and relabeling shown here and need not repeating below. There are three main purposes embedded in each PEB item: (1) each must reflect a range of food, energy, or water relevant actions that take place in a household setting, (2) each must include a range of difficulties (i.e. Easy-moderate-hard items to accomplish), and (3) each must indicate both types of volitional intentions: cognitively and physically efforting a conservation strategy, and purchase behavior.

Name: meat_b
Label: Reduce or eliminate meat from your diet?

Summary	Value	Coding logic	Count	Percent	Cumulative
Observations 1,207	0 = “no”		896	74.23	74.23
Missing 12/1,219	1 = “yes”		311	23.75	100.00
Range (min/max) .... [0,1]	Total		1,207	100.00	
Mean 0.258					
Std. Dev. 0.438					
Variance 0.191					
Skewness 1.108					
Kurtosis 2.228					

Remarks: Pro-environmental behaviors (PEBs), indicator two, a moderate to hard food related PEB item. Purchase behavior features embedded in this item include contingencies for replacing or reducing indirect water and carbon footprints associated with pork, beef, poultry or other types of carbon intensive meat products.

Name: waste_b
Label: Reduce your household food waste?

Summary	Value	Coding logic	Count	Percent	Cumulative
Observations 1,207	0 = “no”		352	29.16	29.16
Missing 12/1,219	1 = “yes”		855	70.84	100.00
Range (min/max) .... [0,1]	Total		1,207	100.00	
Mean 0.708					
Std. Dev. 0.455					
Variance 0.207					

Summary	
Skewness	-0.917
Kurtosis	1.841

Remarks: Pro-environmental behaviors (PEBs), indicator three, an easy food related PEB item. Purchase behavior features embedded in this item include environmentally friendly compost bins or other vessels for collecting various food scraps from meals normally discarded.

Name: hvac_b
Label: Regularly identify sources of household heat or cool air loss and fix them by installing weather stripping around doors and windows?

Summary		Value	Coding logic	Count	Percent	Cumulative
Observations	1,208	0 = “no”		557	46.11	46.11
Missing	11/1,219	1 = “yes”		651	53.89	100.00
Range (min/max)	[0,1]	Total		1,208	100.00	
Mean	0.539					
Std. Dev.	0.499					
Variance	0.249					
Skewness	-0.156					
Kurtosis	1.024					

Remarks: Pro-environmental behaviors (PEBs), indicator four, a moderately difficult energy related PEB item. Purchase behavior features embedded in this item (heating, ventilation and air conditioning) implies contingencies for installing efficient or replacing inefficient types of household weatherstripping to prevent thermal loss escaping through doors and windows. This might also imply replacing an inefficient thermostat or purchasing a smart or learning enabled thermostat.

Name: lights_b
Label: Monitor and turn off your home’s exterior and interior lights when they are not needed?

Summary		Value	Coding logic	Count	Percent	Cumulative
Observations	1,207	0 = “no”		133	11.02	11.02
Missing	12/1,219	1 = “yes”		1,074	88.98	100.00
Range (min/max)	[0,1]	Total		1,207	100.00	
Mean	0.900					
Std. Dev.	0.313					
Variance	0.098					
Skewness	-2.490					
Kurtosis	7.199					

Remarks: Pro-environmental behaviors (PEBs), indicator five, an easy energy related PEB item. Purchase behavior features embedded in this item include timers, switches, or led bulbs (to replace compact fluorescents).

Name: hotwater_b
Label: Monitor and limit your household hot water use?

Summary		Value	Coding logic	Count	Percent	Cumulative
Observations	1,206	0 = “no”		697	57.79	57.79
Missing	13/1,219	1 = “yes”		509	42.21	100.00
Range (min/max)	[0,1]	Total		1,206	100.00	
Mean	0.422					
Std. Dev.	0.494					
Variance	0.244					
Skewness	0.316					
Kurtosis	1.100					

Remarks: Pro-environmental behaviors (PEBs), indicator six, a moderate to hard water related PEB item. Purchase behavior features embedded in this item include contingencies for replacing inefficient hot heaters (gas or electric) or replacing other household appliances that are functionally inefficient with regard to household location (this implies that some adjustments to gas vs. Electric appliances might have greater or lesser financial savings in the home).

Name: laundry_b
Label: Reduce the number of loads of laundry that you wash?

Summary		Value	Coding logic	Count	Percent	Cumulative
Observations	1,207	0 = “no”		599	49.63	49.63
Missing	12/1,219	1 = “yes”		608	50.37	100.00
Range (min/max)	[0,1]	Total		1,207	100.00	

Mean.......0.504 Std. Dev.......0.500 Variance.......0.250 Skewness.......-0.015 Kurtosis.......1.000	
Remarks: Pro-environmental behaviors (PEBs), indicator seven, an easy to moderately difficult energy related PEB item. Purchase behavior features embedded in this item include contingencies for replacing inefficient laundry washers and maximizing the utility of optimal laundry load size (this implies smaller loads use an inefficiently larger amount of water than is needed to achieve the same hygienic outcome of a larger load using a more efficient and optimal amount of water).	

Name: showers_b
Label: Take shorter or fewer showers?

Summary	Value / Coding logic	Count	Percent	Cumulative
Observations.......1,205	0 = "no"	641	53.20	53.20
Missing.......14/1,219	1 = "yes"	564	46.80	100.00
Range (min/max).......[0,1]	Total	1,205	100.00	
Mean.......0.468				
Std. Dev.......0.499				
Variance.......0.249				
Skewness.......0.128				
Kurtosis.......1.016				

Remarks: Pro-environmental behaviors (PEBs), indicator eight, an easy to moderately difficult water related PEB item. Purchase behavior features embedded in this item include contingencies for replacing inefficient shower heads with low flow alternatives.

Module 13: pro-environmental behavior regularity....... numeric (byte), 1 unit
Scale: 7-point Likert, semantic differential [1=very rarely; 7=all the time]
Unique values: 7
Question text: from the list of items earlier that you indicated you do in your household, how often do you do each action?

Name: dairy_reg
Label: Frequency of reducing household dairy consumption.

Summary	Value / Coding logic	Count	Percent	Cumulative
Observations.......283	1 = "very rarely"	8	2.83	2.83
Missing.......936/1,219	2 = 2	6	2.12	4.95
Range (min/max).......[1,7]	3 = 3	10	3.53	8.48
Mean.......5.307	4 = 4	58	20.49	28.98
Std. Dev.......1.490	5 = 5	65	22.97	51.94
Variance.......2.221	6 = 6	57	20.14	72.08
Skewness.......-0.761	7 = "all the time"	79	27.92	100.00
Kurtosis.......3.310	Total	283	100.00	

Remarks: Pro-environmental behavior regularity, indicator one. 5 non-missing values are not labeled. 3 missing observations [-1=refused] recoded to missing (recode dairy_reg(-1=.)). Those missing values for regularity items here express those panelists that indicated [0="no"], or did not answer, corresponding to each PEB indicator in module 15. This is simply to make sure that panelists that indicated they do not perform those PEBs in question are not subsequently asked about how often they do them in their households. Panelists who indicated [1="yes"] were directed to answer how often they perform the action in question (a self-evaluation of household PEB regularity). Note that some panelists that positively indicated a PEB performance [1="yes"] (directed to the "regularity" self-evaluation measurement question in this module) refused to answer and did not attach a frequency or self-evaluated pattern of regularity to the respective PEB. These responses are known for each indicator in this module using the (count if [var]==-1) command and are reported in the remarks section. Since these have a bearing on subsequent latent variable analysis of household few behavior, without a regularity measure attached to its respective PEB(s), they are omitted and reported as missing data. These missing values are recoded using the recode command (recode [var1] [var2] … [varx] [vary] (-1=.)). These rules and processes apply to the rest of the indicators in this module below.

Name: meat_reg
Label: Frequency of reducing household meat consumption.

Summary	Value / Coding logic	Count	Percent	Cumulative
Observations.......309	1 = "very rarely"	6	1.94	1.94

Missing	910/1,219	2 = 2	3	0.97	2.91
Range (min/max)	[1,7]	3 = 3	33	10.68	13.59
Mean	4.939	4 = 4	90	29.13	42.72
Std. Dev.	1.437	5 = 5	68	22.01	64.72
Variance	2.064	6 = 6	48	15.53	80.26
Skewness	-0.182	7 = "all the time"	61	19.74	100.00
Kurtosis	2.573	Total	309	100.00	

Remarks: Pro-environmental behavior regularity, indicator two. 5 non-missing values are not labeled. 2 missing observations [-1=refused] recoded to missing (recode meat_reg(-1=.)).

Name: foodwaste_reg
Label: Frequency of reducing household food waste.

Summary		Value = Coding logic	Count	Percent	Cumulative
Observations	853	1 = "very rarely"	4	0.47	0.47
Missing	366/1,219	2 = 2	10	1.17	1.64
Range (min/max)	[1,7]	3 = 3	41	4.81	6.45
Mean	5.476	4 = 4	157	18.41	24.85
Std. Dev.	1.330	5 = 5	217	25.44	50.29
Variance	1.768	6 = 6	157	18.44	68.70
Skewness	-0.480	7 = "all the time"	267	31.30	100.00
Kurtosis	2.560	Total	853	100.00	

Remarks: Pro-environmental behavior regularity, indicator two. 5 non-missing values are not labeled. 2 missing observations [-1=refused] recoded to missing (recode foodwaste_reg(-1=.)).

Name: hvac_reg
Label: Frequency of reducing household heat or cool air loss.

Summary		Value = Coding logic	Count	Percent	Cumulative
Observations	649	1 = "very rarely"	15	2.31	2.31
Missing	570/1,219	2 = 2	22	3.39	5.70
Range (min/max)	[1,7]	3 = 3	74	11.40	17.10
Mean	5.042	4 = 4	135	20.80	37.90
Std. Dev.	1.598	5 = 5	142	21.88	59.78
Variance	2.552	6 = 6	86	13.25	73.04
Skewness	-0.379	7 = "all the time"	175	26.96	100.00
Kurtosis	2.367	Total	649	100.00	

Remarks: Pro-environmental behavior regularity, indicator two. 5 non-missing values are not labeled. 2 missing observations [-1=refused] recoded to missing (recode hvac_reg(-1=.)).

Name: lights_reg
Label: Frequency of monitoring and reducing use of household lights.

Summary		Value = Coding logic	Count	Percent	Cumulative
Observations	1,068	1 = "very rarely"	5	0.47	0.47
Missing	151/1,219	2 = 2	6	0.56	1.03
Range (min/max)	[1,7]	3 = 3	24	2.25	3.28
Mean	6.178	4 = 4	78	7.30	10.58
Std. Dev.	1.173	5 = 5	143	13.39	23.97
Variance	1.376	6 = 6	202	18.91	42.88
Skewness	-1.512	7 = "all the time"	610	57.12	100.00
Kurtosis	5.043	Total	1,068	100.00	

Remarks: Pro-environmental behavior regularity, indicator two. 5 non-missing values are not labeled. 6 missing observations [-1=refused] recoded to missing (recode lights_reg(-1=.)).

Name: hotwater_reg
Label: Frequency of monitoring and reducing household hot water use.

Summary		Value = Coding logic	Count	Percent	Cumulative
Observations	506	1 = "very rarely"	5	0.99	0.99
Missing	713/1,219	2 = 2	13	2.57	3.56
Range (min/max)	[1,7]	3 = 3	32	6.32	9.88
Mean	5.281	4 = 4	98	19.37	29.25
Std. Dev.	1.421	5 = 5	132	26.09	55.34

Variance 2.020	6 = 6 .... 89 17.59 72.92
Skewness .... -0.490	7 = "all the time" 137 27.08 100.00
Kurtosis 2.692	Total 506 100.00

Remarks: Pro-environmental behavior regularity, indicator two. 5 non-missing values are not labeled. 3 missing observations [-1=refused] recoded to missing (recode hotwater_reg(-1=.)).

Name: laundry_reg
Label: Frequency of reducing household laundry loads.

Summary		Value	Coding logic	Count	Percent	Cumulative
Observations	606	1	"very rarely"	4	14.21	14.21
Missing	613/1,219	2	2	7	11.61	25.82
Range (min/max)	[1,7]	3	3	36	14.30	40.12
Mean	5.388	4	4	112	29.44	69.55
Std. Dev.	1.346	5	5	165	14.63	84.19
Variance	1.811	6	6	108	7.74	91.93
Skewness	-0.445	7	"all the time"	174	8.07	100.00
Kurtosis	2.616	Total		606	100.00	

Remarks: Pro-environmental behavior regularity, indicator two. 5 non-missing values are not labeled. 2 missing observations [-1=refused] recoded to missing (recode laundry_reg(-1=.)).

Name: showers_reg
Label: Frequency of taking shorter or fewer showers.

Summary		Value	Coding logic	Count	Percent	Cumulative
Observations	558	1	"very rarely"	2	0.36	0.36
Missing	661/1,219	2	2	12	2.15	2.51
Range (min/max)	[1,7]	3	3	25	4.48	6.99
Mean	5.382	4	4	115	20.61	27.60
Std. Dev.	1.351	5	5	143	25.63	53.23
Variance	1.827	6	6	100	17.92	71.15
Skewness	-0.419	7	"all the time"	161	28.85	100.00
Kurtosis	2.506	Total		558	100.00	

Remarks: Pro-environmental behavior regularity, indicator two. 5 non-missing values are not labeled. 6 missing observations [-1=refused] recoded to missing (recode showers_reg(-1=.)).

Section 3
Socio-economic and demographic measures
(note: based on United States Census Bureau Current Population Survey (CPS))

Name: age
Label: Age

Summary		Percentiles								
		1%	5%	10%	25%	50%	75%	90%	95%	99%
Observations	1,219	18	24	28	37	53	65	72	77	85
Missing	0/1,219									
Range (min/max)	[18,93]									
Mean	51.501									
Std. Dev.	16.894									
Variance	285.418									
Skewness	-0.123									
Kurtosis	2.067									

Remarks: CPS variable name: ppage; 73 unique values. Organized by median ages corresponding to percentiles.

Name: age7
Label: Age – 7 categories

Summary		Value	Coding logic	Count	Percent	Cumulative
Observations	1,219	1	"18-24"	74	6.07	6.07
Missing	0/1,219	2	"25-34"	166	13.62	19.69
Range (min/max)	[1,7]	3	"35-44"	197	16.16	35.85
Mean	4.203	4	"45-54"	192	15.75	51.60
Std. Dev.	1.688	5	"55-64"	271	22.23	73.83

Summary		Value / Coding logic	Count	Percent	Cumulative
Variance	2.848	6 = "65-74"	230	18.87	92.70
Skewness	-0.193	7 = "75+"	89	7.30	100.00
Kurtosis	2.033	Total	1,219	100.00	

Remarks: CPS variable name: ppagecat; 7 unique values.

Name: age4
Label: Age – 4 categories

Summary		Value / Coding logic	Count	Percent	Cumulative
Observations	1,219	1 = "18-29"	163	13.37	13.37
Missing	0/1,219	2 = "30-44"	274	22.48	35.85
Range (min/max)	[1,4]	3 = "45-59"	340	27.89	63.74
Mean	2.870	4 = "60+"	442	36.26	100.00
Std. Dev.	1.052	Total	1,219	100.00	
Variance	1.106				
Skewness	-0.430				
Kurtosis	1.928				

Remarks: CPS variable name: ppagecat4; 4 unique values.

Name: educ
Label: Education (Highest degree received)

Summary		Value / Coding logic	Count	Percent	Cumulative
Observations	1,219	1 = "No formal education"	3	0.25	0.25
Missing	0/1,219	2 = "1st, 2nd, 3rd, or 4th grade"	2	0.16	0.41
Range (min/max)	[1,14]	3 = "5th or 6th grade"	6	0.49	0.90
Mean	10.404	4 = "7th or 8th grade"	16	1.31	2.21
Std. Dev.	2.132	5 = "9th grade"	16	1.31	3.53
Variance	4.546	6 = "10th grade"	15	1.23	4.76
Skewness	-0.886	7 = "11 grade"	28	2.30	7.05
Kurtosis	4.760	8 = "12th grade No Diploma"	17	1.39	8.45
		9 = "High school graduate – High school diploma or equivalent GED"	318	26.09	34.54
		10 = "Some college, no degree"	235	19.28	53.81
		11 = "Associate degree"	128	10.50	64.32
		12 = "Bachelors degree"	231	18.95	83.26
		13 = "Masters degree"	157	12.88	96.14
		14 = "Professional or Doctorate degree"	47	3.86	100.00
		Total	1,219	100.00	

Remarks: CPS variable name: ppeduc; 14 unique values.

Name: educat
Label: Education (Categorical)

Summary		Value / Coding logic	Count	Percent	Cumulative
Observations	1,219	1 = "Less than high school"	103	8.45	8.45
Missing	0/1,219	2 = "High school"	318	26.09	34.54
Range (min/max)	[1,4]	3 = "Some college"	363	29.78	64.32
Mean	2.927	4 = "Bachelor's degree or higher"	435	35.68	100.00
Std. Dev.	0.975	Total	1,219	100.00	
Variance	0.950				
Skewness	-0.401				
Kurtosis	2.027				

Remarks: CPS variable name: ppeducat; 4 unique values.

Name: race
Label: Race/ethnicity

Summary		Value / Coding logic	Count	Percent	Cumulative
Observations	1,219	1 = "White, Non-Hispanic"	839	68.83	68.83
Missing	0/1,219	2 = "Black, Non-Hispanic"	136	11.16	79.98
		3 = "Other, Non-Hispanic"	61	5.00	84.99

	4 = "Hispanic"............................ 147 12.06 97.05 5 = "2+ Races, Non-Hispanic" .... 36 2.95 100.00 Total 1,219 100.00
Remarks: CPS variable name: ppethm; 5 unique values.	

Name: gender Label: Gender					
Summary	**Value**	**Coding logic**	**Count**	**Percent**	**Cumulative**
Observations 1,219	0 = "Male"		648	53.16	53.16
Missing 0/1,219	1 = "Female"		571	46.84	100.00
Range (min/max) .... [0,1]	Total		1,219	100.00	
Mean 0.468					
Std. Dev. 0.499					
Variance 0.249					
Skewness 0.127					
Kurtosis 1.016					
Remarks: CPS variable name: ppgender; 2 unique values (dichotomy), categorical variable. The variable gender was recoded (recode gender (1=0) (2=1)).					

Name: hhhead Label: Household head					
Summary	**Value**	**Coding logic**	**Count**	**Percent**	**Cumulative**
Observations 1,219	0 = "No"		231	18.95	18.95
Missing 0/1,219	1 = "Yes"		988	81.05	100.00
Range (min/max) .... [0,1]	Total		1,219	100.00	
Mean 0.811					
Std. Dev. 0.392					
Variance 0.154					
Skewness .... -1.585					
Kurtosis 3.511					
Remarks: CPS variable name: pphhead; 2 unique values (dichotomy).					

Name: hhsize Label: Household size					
Summary	**Value**	**Coding logic**	**Count**	**Percent**	**Cumulative**
Observations 1,219	1 = 1		239	19.61	19.61
Missing 0/1,219	2 = 2		463	37.98	57.59
Range (min/max) .... [1,10]	3 = 3		199	16.32	73.91
Mean 2.705	4 = 4		180	14.77	88.68
Std. Dev. 1.549	5 = 5		77	6.32	95.00
Variance 2.399	6 = 6		33	2.71	97.70
Skewness 1.491	7 = 7		11	0.90	98.61
Kurtosis 6.287	8 = 8		5	0.41	99.02
	9 = 9		5	0.41	99.43
	10 = 10		7	0.57	
	Total		1,219	100.00	
Remarks: CPS variable name: pphhsize. 10 unique values. This variable indicates the total number of occupants or members of the household.					

Name: house Label: Housing type					
Summary	**Value**	**Coding logic**	**Count**	**Percent**	**Cumulative**
Observations 1,219	1 = "A one-family house detached from any other house"		907	74.41	74.41
Missing 0/1,219	2 = "A one-family house attached to one or more houses"		103	8.45	82.85
	3 = "A building with 2 or mor apartments		164	13.45	96.31
	4 = "A mobile home"		42	3.45	100.00
	5 = "Boat, RV, van, etc.		3	0.25	

		Total		1,219	100.00	

Remarks: CPS variable name: pphouse; 5 unique values, categorical variable.

Name: income
Label: Household income

Summary		Value	Coding logic	Count	Percent	Cumulative
Observations	1,219	1 =	“Less than $5,000”	24	1.97	1.97
Missing	0/1,219	2 =	“$5,000 to $7,499”	7	0.57	2.54
Range (min/max)	[1,21]	3 =	“$7,500 to $9,999”	9	0.74	3.28
Mean	13.509	4 =	“$10,000 to $12,499”	16	1.31	4.59
Std. Dev.	4.594	5 =	“$12,500 to $14,999”	17	1.39	5.99
Variance	21.110	6 =	“$15,000 to $19,999”	26	2.13	8.12
Skewness	-0.602	7 =	“$20,000 to $24,999”	41	3.36	11.48
Kurtosis	2.992	8 =	“$25,000 to $29,999”	40	3.28	14.77
		9 =	“$30,000 to $34,999”	51	4.18	18.95
		10 =	“$35,000 to $39,999”	51	4.18	23.13
		11 =	“$40,000 to $49,999”	77	6.32	29.45
		12 =	“$50,000 to $59,999”	80	6.56	36.01
		13 =	“$60,000 to $74,999”	124	10.17	46.19
		14 =	“$75,000 to $84,999”	88	7.22	53.40
		15 =	“$85,000 to $99,999”	99	8.12	61.53
		16 =	“$100,000 to $124,999”	144	11.81	73.34
		17 =	“$125,000 to $149,999”	77	6.32	79.66
		18 =	“$150,000 to $174,999”	95	7.79	87.45
		19 =	“$175,000 to $199,999”	49	4.02	91.45
		20 =	“$200,000 to $249,999”	52	4.27	95.73
		21 =	“$250,000 or more”	52	4.27	100.00
		Total		1,219	100.00	

Remarks: CPS variable name: ppincimp; 21 unique values.

Name: mar
Label: Marital status

Summary		Value	Coding logic	Count	Percent	Cumulative
Observations	1,219	1 =	“Married”	727	59.64	59.64
Missing	0/1,219	2 =	“Widowed”	52	4.27	63.90
		3 =	“Divorced”	130	10.66	74.57
		4 =	“Separated”	20	1.64	76.21
		5 =	“Never married”	229	18.79	95.00
		6 =	“Living with partner”	61	5.00	100.00
		Total		1,219	100.00	

Remarks: CPS variable name: ppmarit; 6 unique values, categorical variable.

Name: metro
Label: MSA status

Summary		Value	Coding logic	Count	Percent	Cumulative
Observations	1,219	0 =	“Non-metro”	146	11.98	11.98
Missing	0/1,219	1 =	“Metro”	1,073	88.02	100.00
		Total		1,219	100.00	

Remarks: CPS variable name: ppmsacat; 2 unique values, categorical variable.

Name: reg4
Label: Census region, 4 categories (based on state of residence)

Summary		Value	Coding logic	Count	Percent	Cumulative
Observations	1,219	1 =	“Northeast”	221	18.13	18.13
Missing	0/1,219	2 =	“Midwest”	257	21.08	39.21
		3 =	“South”	437	35.85	75.06
		4 =	“West”	304	24.95	100.00
		Total		1,219	100.00	

Remarks: CPS variable name: ppreg4; 4 unique values, categorical variable.

Name: reg9 Label: Census region, 9 categories (based on state of residence)				
Summary	**Value / Coding logic**	**Count**	**Percent**	**Cumulative**
Observations .... 1,219 Missing 0/1,219	1 = "New England"	66	5.41	5.41
	2 = "Mid-Atlantic	155	12.72	18.13
	3 = "East-North Central"	173	14.19	32.32
	4 = "West-North Central"	84	6.89	39.21
	5 = "South Atlantic"	250	20.51	59.72
	6 = "East-South Central"	57	4.68	64.40
	7 = West-South Central	130	10.66	75.06
	8 = Mountain	111	9.11	84.17
	9 = Pacific	193	15.83	100.00
	Total	1,219	100.00	
Remarks: CPS variable name: ppreg9; 9 unique values, categorical variable.				

Name: own Label: Ownership status of living quarters				
Summary	**Value / Coding logic**	**Count**	**Percent**	**Cumulative**
Observations .... 1,219 Missing 0/1,219	1 = "Owned of being bought by you or someone in your household"	915	75.06	75.06
	2 = "Rented for cash"	287	23.54	98.61
	3 = "Occupied without payment of cash rent"	17	1.39	100.00
	Total	1,219	100.00	
Remarks: CPS variable name: pprent; 3 unique values, categorical variable.				

Name: state Label: State				
Summary	**Value / Coding logic**	**Count**	**Percent**	**Cumulative**
Observations .... 1,219 Missing 0/1,219	ME = ME ("Maine")	11	0.90	0.90
	NH = NH ("New Hampshire")	5	0.41	1.31
	VT = VT ("Vermont")	2	0.16	1.48
	MA = MA ("Massachusetts")	26	2.13	3.61
	RI = RI ("Rhode Island")	6	0.49	4.10
	CT = CT ("Connecticut")	16	1.31	5.41
	NY = NY ("New York")	61	5.00	10.42
	NJ = NJ ("New Jersey")	34	2.79	13.21
	PA = PA ("Pennsylvania")	60	4.92	18.13
	OH = OH ("Ohio")	46	3.77	21.90
	IN = IN ("Indiana")	18	1.48	23.38
	IL = IL ("Illinois")	45	3.69	27.07
	MI = MI ("Michigan")	35	2.87	29.94
	WI = WI ("Wisconsin")	29	2.38	32.32
	MN = MN ("Minnesota")	27	2.21	34.54
	IA = IA ("Iowa")	12	0.98	35.52
	MO = MO ("Missouri")	17	1.39	36.92
	ND = ND ("North Dakota")	3	0.25	37.16
	SD = SD ("South Dakota")	7	0.57	37.74
	NE = NE ("Nebraska)	8	0.66	38.39
	KS = KS ("Kansas")	10	0.82	39.21
	DE = DE ("Delaware")	3	0.25	39.46
	MD = MD ("Maryland")	30	2.46	41.92
	VA = VA ("Virginia")	37	3.04	44.95
	WV = WV ("West Virginia")	6	0.49	45.45
	NC = NC ("North Carolina")	37	3.04	48.48
	SC = SC ("South Carolina")	16	1.31	49.79
	GA = GA ("Georgia")	35	2.87	52.67
	FL = FL ("Florida")	86	7.05	59.72
	KY = KY ("Kentucky")	14	1.15	60.87
	TN = TN ("Tennessee")	23	1.89	62.76

	Value / Coding logic	Count	Percent	Cumulative
	AL = AL ("Alabama")	12	0.98	63.74
	MS = MS ("Mississippi")	8	0.66	64.40
	AR = AR ("Arkansas")	9	0.74	65.14
	LA = LA ("Louisiana")	11	0.90	66.04
	OK = OK (Oklahoma")	12	0.98	67.02
	TX = TX ("Texas")	98	8.04	75.06
	MT = MT ("Montana")	3	0.25	75.31
	ID = ID ("Idaho")	9	0.74	76.05
	WY = WY ("Wyoming")	3	0.25	76.29
	CO = CO ("Colorado")	22	1.80	78.10
	NM = NM ("New Mexico")	10	0.82	78.92
	AZ = AZ ("Arizona")	32	2.63	81.54
	UT = UT ("Utah")	17	1.39	82.94
	NV = NV ("Nevada")	15	1.23	84.17
	WA = WA ("Washington")	24	1.97	86.14
	OR = OR ("Oregon")	18	1.48	87.61
	CA = CA ("California")	142	11.65	99.26
	AK = AK ("Alaska")	4	0.33	99.59
	HI = HI ("Hawaii")	5	0.41	100.00
	Total	1,219	100.00	

Remarks: CPS variable name: pptstaten; 50 unique values, categorical variable.

Name: child01
Label: Presence of household members – Children 0-1

Summary		Value / Coding logic	Count	Percent	Cumulative
Observations	1,219	0 = 0	1,173	96.23	96.23
Missing	0/1,219	1 = 1	40	3.28	99.51
Range (min/max)	[0,9]	2 = 2	1	0.08	99.59
Mean	0.069	8 = 8	3	0.25	99.84
Std. Dev.	0.567	9 = 9	2	0.16	100.00
Variance	0.322	Total	1,219	100.00	
Skewness	13.307				
Kurtosis	195.246				

Remarks: CPS variable name: ppt01; 4 unique values.

Name: child25
Label: Presence of household members – Children 2-5

Summary		Value / Coding logic	Count	Percent	Cumulative
Observations	1,219	0 = 0	1,126	92.37	92.37
Missing	0/1,219	1 = 1	77	6.32	98.69
Range (min/max)	[0,3]	2 = 2	15	1.23	99.92
Mean	0.090	3 = 3	1	0.08	100.00
Std. Dev.	0.334	Total	1,219	100.00	
Variance	0.112				
Skewness	4.097				
Kurtosis	6.287				

Remarks: CPS variable name: ppt25; 4 unique values.

Name: child612
Label: Presence of household members – Children 6-12

Summary		Value / Coding logic	Count	Percent	Cumulative
Observations	1,219	0 = 0	1,069	87.69	87.69
Missing	0/1,219	1 = 1	102	8.37	96.06
Range (min/max)	[0,3]	2 = 2	41	3.36	99.43
Mean	0.168	3 = 3	7	0.57	100.00
Std. Dev.	0.492	Total	1,219	100.00	
Variance	0.242				
Skewness	3.209				
Kurtosis	13.512				

Remarks: CPS variable name: ppt612; 4 unique values.

Name: child1317 Label: Presence of household members – Children 13-17					
Summary	**Value**	**Coding logic**	**Count**	**Percent**	**Cumulative**
Observations ... 1,219	0 = 0		1,049	86.05	86.05
Missing ... 0/1,219	1 = 1		130	10.66	96.72
Range (min/max) ... [0,3]	2 = 2		36	2.95	99.67
Mean ... 0.176	3 = 3		4	0.33	100.00
Std. Dev. ... 0.473	Total		1,219	100.00	
Variance ... 0.224					
Skewness ... 2.219					
Kurtosis ... 11.735					
Remarks: CPS variable name: ppt1317; 4 unique values.					

Name: child18ov Label: Presence of household members – adults 18+					
Summary	**Value**	**Coding logic**	**Count**	**Percent**	**Cumulative**
Observations ... 1,219	1 = 1		266	21.82	21.82
Missing ... 0/1,219	2 = 2		630	51.68	73.50
Range (min/max) ... [1,10]	3 = 3		180	14.77	88.27
Mean ... 2.202	4 = 4		111	9.11	97.37
Std. Dev. ... 1.013	5 = 5		24	1.97	99.34
Variance ... 1.027	6 = 6		5	0.41	99.75
Skewness ... 1.394	7 = 7		2	0.16	99.92
Kurtosis ... 7.064	10 = 10		1	0.08	100.00
	Total		1,219	100.00	
Remarks: CPS variable name: ppt18ov; 4 unique values.					

Name: Children Label: Total number of children per household					
Summary	**Value**	**Coding logic**	**Count**	**Percent**	**Cumulative**
Observations ... 1,219	1 = 1		242	19.85	19.85
Missing ... 0/1,219	2 = 2		486	39.87	59.72
Range (min/max) ... [1,10]	3 = 3		210	17.23	76.95
Mean ... 2.614	4 = 4		162	13.29	90.24
Std. Dev. ... 1.472	5 = 5		74	6.07	96.31
Variance ... 2.166	6 = 6		23	1.89	98.20
Skewness ... 1.627	7 = 7		8	0.66	98.85
Kurtosis ... 7.268	8 = 8		2	0.16	99.02
	9 = 9		5	0.41	99.43
	10 = 10		7	0.57	100.00
	Total		1,219	100.00	
Remarks: 10 unique values. Additive composite score: egen children = rowtotal(child01 child612 child1317 child18ov), missing.					

Name: work Label: Current employment status					
Summary	**Value**	**Coding logic**	**Count**	**Percent**	**Cumulative**
Observations ... 1,219	1 = "Working – as a paid employee"		671	55.05	55.05
Missing ... 0/1,219	2 = "Working – self-employed"		109	8.94	63.99
	3 = "Not working – on temporary layoff from a job"		1	0.08	64.07
	4 = "Not working – looking for work"		46	3.77	67.84
	5 = "Not working – retired"		267	21.90	89.75
	6 = "Not working – disabled"		55	4.51	94.26
	7 = "Not working – other"		70	5.74	100.00
	Total		1,219	100.00	

Remarks: CPS variable name: ppwork; 7 unique values. No detail statistics provided since this variable is categorical (nominal data, not ordinal).

Name: political Label: Political ideology					
Summary	Value	Coding logic	Count	Percent	Cumulative
Observations 1,219	-1 = "Refused"		66	5.41	5.41
Missing 0/1,219	1 = "Extremely liberal"		34	2.79	8.20
Range (min/max) .... [1,7]	2 = "Liberal"		157	12.88	21.08
Mean 3.998	3 = "Slightly liberal"		95	7.79	28.88
Std. Dev. 1.897	4 = "Moderate, middle of the road"		400	32.81	61.69
Variance 3.598	5 = "Slightly conservative"		155	12.72	74.41
Skewness .... -0.807	6 = "Conservative"		252	20.67	95.08
Kurtosis 3.531	7 = "Extremely conservative"		60	4.92	100.00
	Total		1,219	100.00	
Remarks: CPS variable name: ppp10012; 8 unique values. No detail statistics provided since this variable is categorical (nominal data, not ordinal).					

Name: party Label: Party identity					
Summary	Value	Coding logic	Count	Percent	Cumulative
Observations 1,219	-1 = "Refused"		62	5.09	5.09
Missing 0/1,219	1 = "Republican"		544	44.63	49.71
	2 = "Other"		45	3.63	53.40
	3 = "Democrat"		568	46.60	100.00
	Total		1,219	100.00	
Remarks: CPS variable name: partyid3; 4 unique values. No detail statistics provided since this variable is categorical (nominal data, not ordinal).					

Section 4
Latent variables (unweighted sum composite scores)

Name: BV Label: Biospherism										
Summary		Percentiles								
Variables	Label	1%	5%	10%	25%	50%	75%	90%	95%	99%
Observations .... 1,199 Missing .... 20/1,219 Range (min/max) .... [-4,24] Mean .... 15.329 Std. Dev. .... 6.259 Variance .... 39.172 Skewness .... -0.443 Kurtosis 2.606		-1	4	7	11	16	20	24	24	24
Remarks: Biospheric value orientation, sum composite score: egen BV = rowtotal(bio1 bio2 bio3 bio4), missing. 28 unique values.										

Name: AV Label: Social altruism									
Summary	Percentiles								
	1%	5%	10%	25%	50%	75%	90%	95%	99%
Observations .... 1,198 Missing .... 21/1,219 Range (min/max) .... [-4,24] Mean .... 15.944 Std. Dev. .... 5.991 Variance .... 35.889 Skewness .... -0.617 Kurtosis 2.838	0	5	8	12	17	21	24	24	24
Remarks: Social-altruistic value orientation, sum composite score: egen AV = rowtotal(alt1 alt2 alt3 alt4), missing. 29 unique values.									

Name: EV
Label: Egoism

Summary	Percentiles								
Observations ... 1,219	1%	5%	10%	25%	50%	75%	90%	95%	99%
Missing ... 0/1,219	-2	0	1	4	8	12	16	19	24
Range (min/max) ... [-4,24]									
Mean ... 8.201									
Std. Dev. ... 5.565									
Variance ... 30.967									
Skewness ... 0.494									
Kurtosis ... 3.102									

Remarks: Egoistic value orientation, sum composite score: egen EV = rowtotal(ego1 ego2 ego3 ego4), missing. 29 unique values.

Name: HV
Label: Hedonism

Summary	Percentiles								
Observations ... 1,219	1%	5%	10%	25%	50%	75%	90%	95%	99%
Missing ... 0/1,219	0	5	8	12	16	19	22	24	24
Range (min/max) ... [-4,24]									
Mean ... 15.096									
Std. Dev. ... 5.515									
Variance ... 30.410									
Skewness ... -0.570									
Kurtosis ... 3.178									

Remarks: Hedonic value orientation, sum composite score: egen HV = rowtotal(hed1 hed2 hed3 hed4), missing. 28 unique values.

Name: ESI
Label: Environmental self-identity

Summary	Percentiles								
Observations ... 1,205	1%	5%	10%	25%	50%	75%	90%	95%	99%
Missing ... 14/1,219	3	6	8	11	15	18	21	21	21
Range (min/max) ... [1,21]									
Mean ... 14.095									
Std. Dev. ... 4.613									
Variance ... 21.280									
Skewness ... -0.302									
Kurtosis ... 2.532									

Remarks: Sum composite score: egen ESI = rowtotal(esi1 esi2 esi3), missing. 20 unique values.

Name: PBC
Label: Perceived behavior control

Summary	Percentiles								
Observations ... 1,206	1%	5%	10%	25%	50%	75%	90%	95%	99%
Missing ... 13/1,219	6	9	11	14	17	20	21	21	21
Range (min/max) ... [3,21]									
Mean ... 16.284									
Std. Dev. ... 3.903									
Variance ... 15.232									
Skewness ... -0.701									
Kurtosis ... 3.065									

Remarks: Sum composite score: egen PBC = rowtotal(pbc1 pbc2 pbc3), missing. 18 unique values.

Name: PN_moral
Label: Personal norm – moral obligation

Summary	Percentiles								
Observations ... 1,205	1%	5%	10%	25%	50%	75%	90%	95%	99%

Summary	1%	5%	10%	25%	50%	75%	90%	95%	99%
Missing 14/1,219	3	5	7	12	15	19	21	21	21
Range (min/max) .... [2,21]									
Mean 14.515									
Std. Dev. 4.977									
Variance 24.768									
Skewness .... -0.502									
Kurtosis 2.462									
Remarks: Sum composite score: egen PN_moral = rowtotal(pn1 pn4 pn7), missing. 20 unique values.									

Name: PN_guilt
Label: Personal norm - guilt

Summary	Percentiles								
Observations 1,206	1%	5%	10%	25%	50%	75%	90%	95%	99%
Missing 13/1,219	3	3	6	9	13	18	21	21	21
Range (min/max) .... [1,21]									
Mean 13.084									
Std. Dev. 5.241									
Variance 27.468									
Skewness .... -0.212									
Kurtosis 2.124									
Remarks: Sum composite score: egen PN_guilt = rowtotal(pn2 pn5 pn8), missing. 21 unique values.									

Name: PN_pride
Label: Personal norm - pride

Summary	Percentiles								
Observations 1,204	1%	5%	10%	25%	50%	75%	90%	95%	99%
Missing 15/1,219	3	6	9	12	16	20	21	21	21
Range (min/max) .... [1,21]									
Mean 15.365									
Std. Dev. 4.722									
Variance 22.300									
Skewness .... -0.637									
Kurtosis 2.692									
Remarks: Sum composite score: egen PN_pride = rowtotal(pn3 pn6 pn9), missing. 20 unique values.									

Name: PN
Label: Personal norm

Summary	Percentiles								
Observations 1,207	1%	5%	10%	25%	50%	75%	90%	95%	99%
Missing 12/1,219	9	17	24	33	44	54	62	63	63
Range (min/max) .... [4,63]									
Mean 42.892									
Std. Dev. 14.071									
Variance 197.996									
Skewness .... -0.431									
Kurtosis 2.453									
Remarks: Sum composite score: egen PN = rowtotal (pn1 pn2 pn3 pn4 pn5 pn6 pn7 pn8 pn9), missing. 58 unique values.									

Name: QoL
Label: Quality of life

Summary	Percentiles								
Observations 1,201	1%	5%	10%	25%	50%	75%	90%	95%	99%
Missing 18/1,219	11	18	22	25	31	36	40	42	42
Range (min/max) .... [4,42]									
Mean 30.664									
Std. Dev. 7.327									
Variance 53.683									
Skewness .... -0.570									
Kurtosis 3.190									

Remarks: Sum composite score: egen QoL = rowtotal(qol1 qol2 qol3 qol4 qol5 qol6), missing. 36 unique values.

Name: NEP Label: New Ecological Paradigm									
Summary	Percentiles								
Observations 1,202	1%	5%	10%	25%	50%	75%	90%	95%	99%
Missing.. 17/1,219	8	14	17	22	28	32	35	35	35
Range (min/max)................................ [4,35]									
Mean.. 26.403									
Std. Dev... 6.767									
Variance... 45.788									
Skewness ....-0.735									
Kurtosis 3.038									
Remarks: Sum composite score: egen NEP = rowtotal(nep1 nep2 nep3 nep4 nep5), missing. 32 unique values.									

Name: SoF Label: Sense of fairness									
Summary	Percentiles								
Observations 1,197	1%	5%	10%	25%	50%	75%	90%	95%	99%
Missing.. 22/1,219	2	2	4	6	8	11	13	14	14
Range (min/max)................................ [1,14]									
Mean.. 8.353									
Std. Dev... 3.269									
Variance... 10.687									
Skewness ....-0.117									
Kurtosis 2.273									
Remarks: Sum composite score: egen SoF = rowtotal(sof1 sof2), missing. 14 unique values.									

Name: AEF Label: Awareness of ecological footprints									
Summary	Percentiles								
Observations 1,197	1%	5%	10%	25%	50%	75%	90%	95%	99%
Missing.. 22/1,219	4	9	11	15	18	21	25	27	28
Range (min/max)................................ [1,28]									
Mean.. 17.774									
Std. Dev... 5.212									
Variance... 27.170									
Skewness ....-0.201									
Kurtosis 2.974									
Remarks: Sum composite score: egen AEF = rowtotal(aef1 aef2 aef3 aef4), missing. 28 unique values.									

Name: ORM Label: Other regarding motivations									
Summary	Percentiles								
Observations 1,197	1%	5%	10%	25%	50%	75%	90%	95%	99%
Missing.. 22/1,219	3	7	9	12	14	16	19	21	21
Range (min/max)................................ [2,21]									
Mean.. 13.881									
Std. Dev... 3.745									
Variance... 14.025									
Skewness ....-0.253									
Kurtosis 3.234									
Remarks: Sum composite score: egen ORM = rowtotal(orm1 orm2 orm3), missing. 20 unique values.									

Name: DPPD Label: Dismantling the public-private distinction									
Summary	Percentiles								
Observations 1,199	1%	5%	10%	25%	50%	75%	90%	95%	99%

Missing........20/1,219 Range (min/max)........[1,35] Mean........17.396 Std. Dev........5.916 Variance........35.001 Skewness........-0.054 Kurtosis........2.809	5 7 10 13 18 21 25 28 32
Remarks: Sum composite score: egen DPPD = rowtotal(dppd1 dppd2 dppd3 dppd4 dppd5), missing. 33 unique values.	

Name: SJ Label: Social justice									
Summary	Percentiles								
Observations........1,201 Missing........18/1,219 Range (min/max)........[1,63] Mean........39.874 Std. Dev........10.248 Variance........105.025 Skewness........-0.338 Kurtosis........3.281	1% 13	5% 22	10% 27	25% 34	50% 40	75% 47	90% 53	95% 57	99% 61
Remarks: Sum composite score: egen SJ = rowtotal(SoF AEF ORM), missing. 61 unique values.									

Name: AC Label: Awareness of consequences									
Summary	Percentiles								
Observations........1,197 Missing........22/1,219 Range (min/max)........[1,21] Mean........10.942 Std. Dev........4.363 Variance........19.038 Skewness........0.056 Kurtosis........2.612	1% 3	5% 3	10% 5	25% 8	50% 11	75% 14	90% 16	95% 18	99% 21
Remarks: Sum composite score: egen ac = rowtotal(ac1 ac2 ac3 ac4), missing. 21 unique values.									

Section 5
Dependent variable composite constructions
(household food, energy and water conservation measures)

Name: dairy Label: Household dairy conservation and/or curtailment score					
Summary	Value	Coding logic	Count	Percent	Cumulative
Observations........1,219	0 = 0	(dairy_b = 0 and dairy_reg = 0)	936	76.78	76.78
Missing........0/1,219	1 = 1	(dairy_b = 1 and dairy_reg = 1)	8	0.66	77.44
Range (min/max)........[0,7]	2 = 2	(dairy_b = 1 and dairy_reg = 2)	6	0.49	77.93
Mean........1.232	3 = 3	(dairy_b = 1 and dairy_reg = 3)	10	0.82	78.75
Std. Dev........2.354	4 = 4	(dairy_b = 1 and dairy_reg = 4)	58	4.76	83.51
Variance........5.540	5 = 5	(dairy_b = 1 and dairy_reg = 5)	65	5.33	88.84
Skewness........1.534	6 = 6	(dairy_b = 1 and dairy_reg = 6)	57	4.68	93.52
Kurtosis........3.632	7 = 7	(dairy_b = 1 and dairy_reg = 7)	79	6.48	100.00
	Total		1,219	100.00	
Remarks: Household dairy conservation or curtailment, 8 unique values. The conservation and curtailment variables were generated by taking the positive behavior indicator and multiplying it by the regularity evaluative measure that subsequently followed (gen dairy = dairy_b*dairy_reg). In some cases evaluating the behavior regularity after indicating its performance (i.e. 1="Yes") results in a negative value from refusing to answer its regularity (i.e. 1="Yes" and [var]_reg = -1 ("Refused")). From earlier, refused and missing values are coded ".". Missing values are recoded with the following command, recode dairy_reg (. = 0), gen(dairy). These and subsequent conservation and curtailment measures should (and do) look exactly like the [var]_reg variables in Module 16, with the addition of those few negative observations from respondents who refused to answer the regularity evaluations for the respective pro-environmental behaviors indicated earlier.					

Name: meat Label: Household meat conservation and/or curtailment score			
Summary	Value	Coding logic	Count Percent Cumulative
Observations .... 1,219 Missing .... 0/1,219 Range (min/max) .... [0,7] Mean .... 1.252 Std. Dev. .... 2.267 Variance .... 5.141 Skewness .... 1.449 Kurtosis 3.485	0 = 0 (meat_b = 0 and meat_reg = 0) .... 910 74.65 74.65 1 = 1 (meat_b = 1 and meat_reg = 1) .... 6 0.49 75.14 2 = 2 (meat_b = 1 and meat_reg = 2) .... 3 0.25 75.39 3 = 3 (meat_b = 1 and meat_reg = 3) .... 33 2.71 78.10 4 = 4 (meat_b = 1 and meat_reg = 4) .... 90 7.38 85.48 5 = 5 (meat_b = 1 and meat_reg = 5) .... 68 5.58 91.06 6 = 6 (meat_b = 1 and meat_reg = 6) .... 48 3.94 95.00 7 = 7 (meat_b = 1 and meat_reg = 7) .... 61 5.00 100.00 Total 1,219 100.00		
Remarks: Household meat conservation or curtailment, 8 unique values.			

Name: waste Label: Household foodwaste conservation and/or curtailment score			
Summary	Value	Coding logic	Count Percent Cumulative
Observations .... 1,219 Missing .... 0/1,219 Range (min/max) .... [0,7] Mean .... 3.832 Std. Dev. .... 2.746 Variance .... 7.542 Skewness .... -0.410 Kurtosis 1.590	0 = 0 (waste_b = 0 and waste_reg = 0) .... 366 30.02 30.02 1 = 1 (waste_b = 1 and waste_reg = 1) .... 4 0.33 30.35 2 = 2 (waste_b = 1 and waste_reg = 2) .... 10 0.82 31.17 3 = 3 (waste_b = 1 and waste_reg = 3) .... 41 3.36 34.54 4 = 4 (waste_b = 1 and waste_reg = 4) .... 157 12.88 47.42 5 = 5 (waste_b = 1 and waste_reg = 5) .... 217 17.80 65.22 6 = 6 (waste_b = 1 and waste_reg = 6) .... 157 12.88 78.10 7 = 7 (waste_b = 1 and waste_reg = 7) .... 267 21.90 100.00 Total 1,219 100.00		
Remarks: Household foodwaste conservation or curtailment, 8 unique values.			

Name: hvac Label: Household thermal loss conservation and/or curtailment score			
Summary	Value	Coding logic	Count Percent Cumulative
Observations .... 1,219 Missing .... 0/1,219 Range (min/max) .... [0,7] Mean .... 2.684 Std. Dev. .... 2.773 Variance .... 7.691 Skewness .... 0.315 Kurtosis 1.463	0 = 0 (waste_b = 0 and waste_reg = 0) .... 570 46.76 46.76 1 = 1 (waste_b = 1 and waste_reg = 1) .... 15 1.23 47.99 2 = 2 (waste_b = 1 and waste_reg = 2) .... 22 1.80 49.79 3 = 3 (waste_b = 1 and waste_reg = 3) .... 74 6.07 55.87 4 = 4 (waste_b = 1 and waste_reg = 4) .... 135 11.07 66.94 5 = 5 (waste_b = 1 and waste_reg = 5) .... 142 11.65 78.59 6 = 6 (waste_b = 1 and waste_reg = 6) .... 86 7.05 85.64 7 = 7 (waste_b = 1 and waste_reg = 7) .... 175 14.36 100.00 Total 1,219 100.00		
Remarks: Household foodwaste conservation or curtailment, 8 unique values.			

Name: lights Label: Household lighting conservation and/or curtailment score			
Summary	Value	Coding logic	Count Percent Cumulative
Observations .... 1,219 Missing .... 0/1,219 Range (min/max) .... [0,7] Mean .... 5.413 Std. Dev. .... 2.313 Variance .... 5.351 Skewness .... -1.506 Kurtosis 3.941	0 = 0 (lights_b = 0 and lights_reg = 0) .... 151 12.39 12.39 1 = 1 (lights_b = 1 and lights_reg = 1) .... 5 0.41 12.80 2 = 2 (lights_b = 1 and lights_reg = 2) .... 6 0.49 13.29 3 = 3 (lights_b = 1 and lights_reg = 3) .... 24 1.97 15.26 4 = 4 (lights_b = 1 and lights_reg = 4) .... 78 6.40 21.66 5 = 5 (lights_b = 1 and lights_reg = 5) .... 143 11.73 33.39 6 = 6 (lights_b = 1 and lights_reg = 6) .... 202 16.57 49.96 7 = 7 (lights_b = 1 and lights_reg = 7) .... 610 50.04 100.00 Total 1,219 100.00		
Remarks: Household lighting conservation or curtailment, 8 unique values.			

Name: hotwater Label: Household hot water conservation and/or curtailment score			
Summary	Value	Coding logic	Count Percent Cumulative

Observations	1,219	0 = 0 (hotwater_b = 0 and hotwater_reg = 0)	713	58.49	58.49
Missing	0/1,219	1 = 1 (hotwater_b = 1 and hotwater_reg = 1)	5	0.41	58.90
Range (min/max)	[0,7]	2 = 2 (hotwater_b = 1 and hotwater_reg = 2)	13	1.07	59.97
Mean	2.192	3 = 3 (hotwater_b = 1 and hotwater_reg = 3)	32	2.63	62.59
Std. Dev.	2.759	4 = 4 (hotwater_b = 1 and hotwater_reg = 4)	98	8.04	70.63
Variance	7.613	5 = 5 (hotwater_b = 1 and hotwater_reg = 5)	132	10.83	81.46
Skewness	0.631	6 = 6 (hotwater_b = 1 and hotwater_reg = 6)	89	7.30	88.76
Kurtosis	1.668	7 = 7 (hotwater_b = 1 and hotwater_reg = 7)	137	11.24	100.00
		Total	1,219	100.00	

Remarks: Household hot water conservation or curtailment, 8 unique values.

Name: laundry
Label: Household laundry conservation and/or curtailment score

Summary		Value / Coding logic	Count	Percent	Cumulative
Observations	1,219	0 = 0 (laundry_b = 0 and laundry_reg = 0)	613	50.29	50.29
Missing	0/1,219	1 = 1 (laundry_b = 1 and laundry_reg = 1)	4	0.33	50.62
Range (min/max)	[0,7]	2 = 2 (laundry_b = 1 and laundry_reg = 2)	7	0.57	51.19
Mean	2.678	3 = 3 (laundry_b = 1 and laundry_reg = 3)	36	2.95	54.14
Std. Dev.	2.857	4 = 4 (laundry_b = 1 and laundry_reg = 4)	112	9.19	63.33
Variance	8.163	5 = 5 (laundry_b = 1 and laundry_reg = 5)	165	13.54	76.87
Skewness	0.300	6 = 6 (laundry_b = 1 and laundry_reg = 6)	108	8.86	85.73
Kurtosis	1.363	7 = 7 (laundry_b = 1 and laundry_reg = 7)	174	14.27	100.00
		Total	1,219	100.00	

Remarks: Household laundry conservation or curtailment, 8 unique values.

Name: showers
Label: Household shower use conservation and/or curtailment score

Summary		Value / Coding logic	Count	Percent	Cumulative
Observations	1,219	0 = 0 (showers_b = 0 and showers_reg = 0)	661	54.22	54.22
Missing	0/1,219	1 = 1 (showers_b = 1 and showers_reg = 1)	2	0.16	54.39
Range (min/max)	[0,7]	2 = 2 (showers_b = 1 and showers_reg = 2)	12	0.98	55.37
Mean	2.463	3 = 3 (showers_b = 1 and showers_reg = 3)	25	2.05	57.42
Std. Dev.	2.834	4 = 4 (showers_b = 1 and showers_reg = 4)	115	9.43	66.86
Variance	8.030	5 = 5 (showers_b = 1 and showers_reg = 5)	143	11.73	78.59
Skewness	0.445	6 = 6 (showers_b = 1 and showers_reg = 6)	100	8.20	86.79
Kurtosis	1.462	7 = 7 (showers_b = 1 and showers_reg = 7)	161	13.21	100.00
		Total	1,219	100.00	

Remarks: Household shower use conservation or curtailment, 8 unique values.

Name: Foodcons
Label: Household food conservation

Summary		Percentiles								
Observations	1,219	1%	5%	10%	25%	50%	75%	90%	95%	99%
Missing	0/1,219	0	0	0	2	6	9	14	17	21
Range (min/max)	[0,21]									
Mean	6.316									
Std. Dev.	5.308									
Variance	28.170									
Skewness	0.760									
Kurtosis	3.140									

Remarks: Expressed in percentiles (left) and median composite score (right). 22 unique values. This variable is an additive composite score: egen Foodcons = rowtotal(dairy meat waste), missing.

Name: Energycons
Label: Household energy conservation

Summary		Percentiles								
Observations	1,219	1%	5%	10%	25%	50%	75%	90%	95%	99%

Missing 0/1,219	0	0	2	6	7	12	14	14	14
Range (min/max) .... [0,14]									
Mean 8.097									
Std. Dev. 4.045									
Variance 16.365									
Skewness .... -0.328									
Kurtosis 2.402									

Remarks: Expressed in percentiles (left) and median composite score (right). 15 unique values. 22 unique values. This variable is an additive composite score: egen Energycons = rowtotal(hvac lights), missing.

Name: Watercons
Label: Household water conservation

Summary	Percentiles								
Observations 1,219	1%	5%	10%	25%	50%	75%	90%	95%	99%
Missing 0/1,219	0	0	0	0	6	12	18	21	21
Range (min/max) .... [0,21]									
Mean 7.334									
Std. Dev. 6.784									
Variance 46.017									
Skewness 0.511									
Kurtosis 2.069									

Remarks: Expressed in percentiles (left) and median composite score (right). 22 unique values. This variable is an additive composite score: egen Watercons = rowtotal(hotwater laundry showers), missing.

Name: hhEOC
Label: Household FEW conservation

Summary	Percentiles								
Observations 1,219	1%	5%	10%	25%	50%	75%	90%	95%	99%
Missing 0/1,219	0	0	5	12	21	30	39	45	56
Range (min/max) .... [0,56]									
Mean 21.747									
Std. Dev. 12.759									
Variance 162.784									
Skewness 0.388									
Kurtosis 2.701									

Remarks: Expressed in percentiles (left) and median composite score (right). 54 unique values. This variable is an additive composite score: egen hhEOC = rowtotal(Foodcons Energycons Watercons), missing.

Name: Diet
Label: Diet anti-consumption

Summary	Percentiles								
Observations 1,219	1%	5%	10%	25%	50%	75%	90%	95%	99%
Missing 0/1,219	0	0	0	0	0	5	9	11	14
Range (min/max) .... [0,14]									
Mean 2.484									
Std. Dev. 3.910									
Variance 15.291									
Skewness 1.445									
Kurtosis 4.025									

Remarks: Expressed in percentiles (left) and median composite score (right). 14 unique values. This variable is an additive composite score: egen diet = rowtotal(dairy meat), missing.

Name: Efficiency
Label: Practical household efficiencies

Summary	Percentiles								
Observations 1,219	1%	5%	10%	25%	50%	75%	90%	95%	99%
Missing 0/1,219	0	0	4	7	12	16	19	21	21
Range (min/max) .... [0,21]									
Mean 11.929									
Std. Dev. 5.748									

Variance.. 33.040 Skewness ....-0.349 Kurtosis 2.376	
Remarks: Expressed in percentiles (left) and median composite score (right). 20 unique values. This variable is an additive composite score: egen efficiency = rowtotal(waste hvac lights), missing.	

APPENDIX D1
Truncated supplementary multiple analysis of variance (MANOVA) results

Section 1
MANOVA statistics tables

Table 1
MANOVA results of select demographic main effects on biospheric, social-altruistic, egoistic and hedonic values

	Wilks' lambda			*Biospheric values*			*Altruistic values*			*Egositic values*			*Hedonic values*		
Item	Value	Sig.	η_p^2	F	Sig.	η_p^2	F	Sig.	η_p^2	F	Sig.	η_p^2	F	Sig.	η_p^2
age4	.959	**.000*** **	.014	2.86	**.036***	.007	2.23	.083	.006	3.96	**.008****	.010	2.81	**.038***	.007
educat	.988	.294	.004	1.81	.144	.005	1.17	.321	.003	.210	.889	.001	2.59	.051	.007
mar	.978	.155	.006	2.18	.054	.009	1.20	.305	.005	.327	.897	.001	.679	.639	.003
race	.934	**.000*** **	.017	3.16	**.014***	.011	2.35	.053	.008	12.97	**.000*** **	.043	2.03	.088	.007
gender	.974	**.000*** **	.026	12.85	**.000*** **	.011	26.66	**.000*** **	.023	.537	.464	.000	.296	.586	.000
house	.987	.535	.003	.905	.460	.003	1.17	.322	.004	.853	.492	.003	.596	.666	.002
metro	.994	.154	.006	1.91	.168	.002	1.56	.212	.001	4.37	**.037***	.004	.037	.847	.000
work	.962	**.006****	.010	1.62	.138	.008	2.17	**.044***	.011	2.59	**.017***	.013	.305	.935	.002
political	.929	**.000*** **	.018	5.76	**.000*** **	.034	3.75	**.000*** **	.022	1.86	.072	.011	.533	.810	.003
party	.961	**.000*** **	.013	6.53	**.000*** **	.017	11.44	**.000*** **	.029	.823	.481	.002	1.48	.217	.004

Notes: Significant values in **bold**. * p < .05; ** p < .01; *** p < .001. No intercepts included in models. Measured using an F-test, Wilks' lambda (i.e. multivariate F or U statistic) estimates the percent variance of the dependent variable that is not explained by the independent variable specified. Significant p-values indicate a significant relationship between independent and dependent variables. η_p^2 = partial eta squared value.

Table 2
MANOVA results of demographic main effects on VIP and EC model antecedents

	Wilks' lambda			*Environ. self-identity*			*Social justice*			*Ecocitizenship*		
Item	Value	Sig.	η_p^2	F	Sig.	η_p^2	F	Sig.	η_p^2	F	Sig.	η_p^2
age4	.976	**.001****	.008	8.27	**.000*** **	.021	1.09	.353	.003	1.42	.236	.004
educat	.983	**.019***	.006	2.24	.082	.006	1.78	.149	.005	5.44	**.001****	.014
mar	.980	.073	.007	1.78	.114	.008	1.05	.385	.005	1.70	.132	.007
race	.972	**.001****	.009	1.86	.115	.006	.427	.789	.001	4.74	**.001****	.016
gender	.994	.081	.006	1.25	.264	.001	6.64	**.010***	.006	.312	.577	.000
house	.974	**.002****	.009	2.27	.060	.008	4.84	**.001****	.016	2.51	**.040***	.009
metro	.998	.530	.002	1.08	.299	.001	.002	.960	.000	.891	.345	.001
work	.975	**.048***	.008	1.05	.391	.005	1.69	.120	.009	1.22	.293	.006
political	.862	**.000*** **	.048	3.41	**.001****	.020	14.90	**.000*** **	.082	17.17	**.000*** **	.094
party	.948	**.000*** **	.018	3.11	**.026***	.008	13.35	**.000*** **	.033	15.16	**.000*** **	.038

Notes: Significant values in **bold**. * p < .05; ** p < .01; *** p < .001. η_p^2 = partial eta squared value.

Table 3
MANOVA results of demographic main effects on the personal norm

	Wilks' lambda			*Moral obligation*			*Appeal to sense of guilt*			*Appeal to sense of pride*		
Item	Value	Sig.	η_p^2	F	Sig.	η_p^2	F	Sig.	η_p^2	F	Sig.	η_p^2
age4	.983	**.019***	.006	5.14	**.002****	.013	4.32	**.005****	.011	2.66	**.047***	.007
educat	.989	.178	.004	2.84	**.037***	.007	2.80	**.039***	.007	2.86	**.036***	.007
mar	.989	.581	.004	1.32	.254	.006	.881	.493	.004	.587	.710	.003
race	.980	**.027***	.007	4.11	**.003****	.014	3.30	**.011***	.011	3.20	**.013***	.011
gender	.963	**.000*** **	.037	9.52	**.002****	.008	14.80	**.000*** **	.013	35.78	**.000*** **	.030
house	.982	**.048***	.006	2.84	**.023***	.010	.988	.413	.003	3.20	**.013***	.011
metro	.996	.202	.004	4.04	**.045***	.003	3.72	.054	.003	4.17	**.041***	.004
work	.979	.135	.007	.820	.545	.004	.484	.821	.002	2.04	.057	.010
political	.954	**.000*** **	.015	2.51	**.015***	.015	5.76	**.000*** **	.033	3.13	**.003****	.018
party	.989	.148	.004	1.44	.230	.004	3.31	**.020***	.008	1.72	.160	.004

Notes: Significant values in **bold**. * p < .05; ** p < .01; *** p < .001. η_p^2 = partial eta squared value.

Table 4
MANOVA results of demographic main effects on household food conservation

	Wilks' lambda			*Dairy reduction*			*Meat reduction*			*Food waste reduction*		
Item	Value	Sig.	η_p^2	F	Sig.	η_p^2	F	Sig.	η_p^2	F	Sig.	η_p^2
age4	.979	**.002****	.007	.900	.441	.002	1.47	.221	.004	6.56	**.000*** **	.016
educat	.984	**.021***	.006	1.89	.129	.005	3.52	**.015***	.009	.385	.764	.001
mar	.979	**.044***	.007	.766	.574	.003	3.11	**.009***	.013	1.59	.161	.007
race	.975	**.003****	.008	5.16	**.000*** **	.017	2.94	**.020***	.010	1.53	.192	.005
gender	.977	**.000*** **	.023	9.45	**.002****	.008	22.35	**.000*** **	.019	8.97	**.003****	.008
house	.991	.557	.003	1.78	.130	.006	.606	.658	.002	.321	.864	.001
metro	.994	.078	.006	2.46	.117	.002	3.68	.055	.003	1.09	.297	.001
work	.967	**.002****	.011	2.03	.059	.010	2.63	**.015***	.013	2.20	**.041***	.011
political	.974	.074	.009	1.80	.083	.011	2.59	**.012***	.015	.664	.703	.004
party	.980	**.005****	.007	4.45	**.004****	.011	.455	.714	.001	.981	.401	.002

Notes: Significant values in **bold**. * p < .05; ** p < .01; *** p < .001. η_p^2 = partial eta squared value.

Table 5
MANOVA results of demographic main effects on household energy conservation

	Wilks' lambda			*Heat and cool air*			*Monitoring or using lights*		
Item	Value	Sig.	η_p^2	F	Sig.	η_p^2	F	Sig.	η_p^2
age4	.974	**.000*** **	.013	8.88	**.000*** **	.022	.278	.841	.001
educat	.972	**.000*** **	.014	2.44	.063	.006	6.21	**.000*** **	.016
mar	.980	**.009****	.010	.404	.846	.002	4.25	**.001****	.018

race	.976	**.000*****	.012	3.50	**.008****	.012	2.31	.056	.008
gender	.997	.177	.003	.006	.940	.000	3.31	.069	.003
house	.984	**.017***	.008	3.56	**.007****	.012	1.65	.159	.006
metro	.997	.225	.003	2.99	.084	.003	.180	.671	.000
work	.987	.226	.006	1.45	.193	.007	1.38	.220	.007
political	.992	.796	.004	.419	.891	.002	.820	.570	.005
party	.995	.491	.002	.375	.771	.001	1.46	.225	.004

Notes: Significant values in **bold**. * p < .05; ** p < .01; *** p < .001. η_p^2 = partial eta squared value.

Table 6
MANOVA results of demographic main effects on household water conservation

	Wilks' lambda			*Hot water conservation*			*Loads of laundry*			*Shower use*		
Item	Value	Sig.	η_p^2	F	Sig.	η_p^2	F	Sig.	η_p^2	F	Sig.	η_p^2
age4	.985	**.034***	.005	5.12	**.002****	.013	1.02	.382	.003	.856	.463	.002
educat	.996	.869	.001	.156	.926	.000	.974	.404	.002	.302	.824	.001
mar	.971	**.003****	.010	3.25	**.006****	.014	2.41	**.035***	.010	3.35	**.005****	.014
race	.985	.120	.005	2.74	**.028***	.009	1.53	.192	.005	.259	.904	.001
gender	.980	**.000*****	.020	2.95	.086	.002	23.95	**.000*****	.020	3.57	.059	.003
house	.980	**.019***	.007	1.70	.148	.005	.351	.844	.001	1.95	.099	.007
metro	.993	**.044***	.007	1.30	.254	.001	3.08	.079	.003	7.62	**.006****	.006
work	.984	.371	.005	.899	.495	.005	2.36	**.029***	.012	.913	.484	.005
political	.970	**.024***	.010	1.23	.286	.007	2.58	**.012***	.015	2.13	**.038***	.012
party	.992	.378	.003	1.37	.250	.003	.891	.445	.002	.467	.705	.001

Notes: Significant values in **bold**. * p < .05; ** p < .01; *** p < .001. η_p^2 = partial eta squared value.

Section 2
MANOVA results and interpretations

MANOVA of background characteristics on values

Results in Appendix D1 show a summary of multiple analysis of variance results which test for differences in values (i.e. biospheric, social-altruistic, egoistic, hedonic), environmental self-identity, ecological citizenship antecedents (i.e. social justice and dismantling public private distinction), and personal norm (i.e. moral obligation, guilt, pride) across various key demographics distilled from the full demographic compendium from the national survey instrument. These results test for identifying influential demographic variables that produce statistically significant differences of composite means by estimating Wilk's Lambda (Λ), or the unexplained variance explained by the ratio of error variance to total variance. This is contrasted in the results with effect size or partial-eta squared values (η_p^2) which estimates the proportion of variance a variable explains that cannot be explained by all others (Field, 2009). The full demographic MANOVA results are shown in Appendix D2. The key demographics targeted in this study include are age, gender (male-female gender binary), race, and other internal or interpersonal attributes such as household type, household size (occupants), number of children, marital status, employment status, and political ideology and party identification. In addition, each of the FEW household conservation measures are tested for significant differences across key demographics as well. Means reported here are sum composites of indicators specified in the multi-part national survey instrument. All demographic measures are self-reported.

According to Table 1 in Appendix D1. There was a statistically significant difference in values based on race $F(16, 3529) = 4.931$, $p = 0.000$; $\Lambda = 0.934$, $\eta_p^2 = 0.017$, and gender, $F(4, 1155) = 7.842$, $p = 0.000$, $\eta_p^2 = 0.026$. Table 1 in Appendix D1 shows that race and gender both have a statistically significant effect on biospheric values ($F(4, 1158) = 3.156$, $p = 0.014$, $\eta_p^2 = 0.011$; $F(1, 1158) = 12.847$, $p = 0.000$; $\Lambda = 0.974$, $\eta_p^2 = 0.023$). On further inspection though, only race had a significant effect on egoistic values ($F(4, 1158) = 21.972$, $p = 0.000$; $\eta_p^2 = 0.043$) while only gender had a significant effect on altruistic values ($F(1, 1158) = 26.664$, $p = 0.000$; $\eta_p^2 = 0.023$). Pairwise comparisons show that those respondents that self-identified Hispanic or two or more races, but non-Hispanic had statistically significantly higher biospheric values scores than those who self-identified as White, non-Hispanic. In addition, self-identified females have statistically significantly higher biospheric and altruisitic values scores than males. Egoistic values scores were statistically significantly lower for White non-Hispanic respondents, while those who self-identified into Black or Other non-Hispanic race categories scored much higher.

MANOVA of background characteristics on VIP and EC theory

VIP and EC model antecedents are depicted in Table 2 in Appendix D1. A mix of internal background characteristics explain statistically significant differences in environmental self-identity, social justice beliefs and ecological citizenship beliefs. The main influential demographic factors here include age ($F(9, 2821) = 3.157$, $p = 0.001$; $\Lambda = 0.976$, $\eta_p^2 = 0.008$), race ($F(12, 3067) = 2.722$, $p = 0.009$; $\Lambda = 0.972$, $\eta_p^2 = 0.009$), household type ($F(12, 3067) = 2.603$, $p = 0.009$; $\Lambda = 0.974$, $\eta_p^2 = 0.009$), political ideology ($F(21, 3329) = 8.433$, $p = 0.000$; $\Lambda = 0.862$, $\eta_p^2 = 0.048$), and political party identity ($F(9, 2821) = 7.017$, $p = 0.000$; $\Lambda = 0.948$, $\eta_p^2 = 0.019$). Age specifically had a significant effect on environmental self-identity ($F(3, 1161) = 8.269$, $p = 0.000$, $\eta_p^2 = 0.021$). The oldest subset of respondents age 60 years of age or older reported statistically significantly higher levels of environmental self-identity than those in younger age cohorts. Gender and household type each significantly explained differences in social justice beliefs ($F(1, 1161) = 6.635$, $p = 0.000$, $\eta_p^2 = 0.006$; $F(4, 1161) = 4.836$, $p = 0.001$, $\eta_p^2 = 0.016$). Female respondents indicated stronger social justice beliefs than male respondents. Furthermore, respondents that indicated living in dwellings like boats, recreational vehicles or vans expressed significantly weaker social justice beliefs than those in all other household dwelling categories (i.e. single detached and attached households, apartment complexes, and mobile homes). Race had a significant effect only on ecological citizenship beliefs ($F(4, 1161) = 4.743$, $p = 0.001$, $\eta_p^2 = 0.016$), which shows that Black respondents indicated significantly weaker ecological citizenship beliefs than White non-Hispanic, Other non-Hispanic and Hispanic respondents with regard to dismantling the distinction between private and public consumption consequences. A key finding in these demographic MANOVA results shows that both self-identification of party and political ideology predicted significant differences in environmental self-identity ($F(3, 1161) = 3.112$, $p = 0.026$, $\eta_p^2 = 0.008$; $F(7, 1161) = 3.408$, $p = 0.001$, $\eta_p^2 = 0.020$), social justice beliefs ($F(3, 1161) = 13.350$, $p = 0.000$, $\eta_p^2 = 0.033$; $F(7, 1161) = 14.904$, $p = 0.000$, $\eta_p^2 = 0.082$) and ecological citizenship beliefs ($F(3, 1161) = 15.164$, $p = 0.000$, $\eta_p^2 = 0.038$; $F(7, 1161) = 17.171$, $p = 0.000$, $\eta_p^2 = 0.094$). Altogether, these data show that those respondents that self-identify as democrats or those with liberal or moderate political ideologies have stronger environmental self-identities, stronger social justice beliefs and stronger ecological citizenship beliefs than those who self-identify as republicans or those with conservative political ideologies.

Several demographic factors influence differences in the personal norm based on each of the three attributes of the personal norm construct, one's sense of moral obligation and appeal based on guilt and pride. These general predictors are age ($F(9, 2833) = 2.209$, $p = 0.019$; $\Lambda = 0.983$, $\eta_p^2 = 0.006$), race ($F(12, 3080) = 1.929$, $p = 0.027$; $\Lambda = 0.980$, $\eta_p^2 =$

0.007), gender (F(3, 1164) = 14.911, p = 0.000; Λ = 0.963, η_p^2 = 0.037), and political affiliation (F(21, 3343) = 2.616, p = 0.000; Λ = 0.954, η_p^2 = 0.015). Age was a modest predictor of moral obligation and guilt (F(3, 1166) = 5.136, p = 0.002, η_p^2 = 0.013; F(3, 1166) = 4.324, p = 0.005, η_p^2 = 0.011), but a weak predictor of pride (F(3, 1166) = 2.658, p = 0.047, η_p^2 = 0.007). These results specifically show that the oldest cohort of respondents have a stronger sense of moral obligation and predisposition for household resource conservation through guilt than all other age cohorts. Race produced statistically significant differences in moral obligation (F(4, 1166) = 4.113, p = 0.003, η_p^2 = 0.014), guilt (F(4, 1166) = 3.302, p = 0.011, η_p^2 = 0.011) and pride (F(4, 1166) = 3.203, p = 0.013, η_p^2 = 0.011). Across each of these personal norm subconstructs of the personal norm measure used in the national survey, White respondents had statistically significantly weaker moral obligation, pride and guilt scores with regard to household FEW conservation than Black non-Hispanic, Other non-Hispanic, and Hispanic respondents. Gender and political affiliation were the strongest demographic attributes to predict significant differences in the personal norm. Men reported statistically significantly weaker normative beliefs than women with regard to moral obligation (F(1, 1166) = 9.524, p = 0.002, η_p^2 = 0.008) and appeal to sense of guilt (F(1, 1166) = 14.804, p = 0.000, η_p^2 = 0.013) and pride (F(1, 1166) = 35.779, p = 0.000, η_p^2 = 0.030) to conserve household FEW resources. Statistically significant differences in personal normative beliefs are also linked to political affiliation for moral obligation (F(7, 1166) = 2.506, p = 0.015, η_p^2 = 0.015), guilt (F(7, 1166) = 5.759, p = 0.000, η_p^2 = 0.033), and pride subconstructs (F(7, 1166) = 3.131, p = 0.003, η_p^2 = 0.018). These data reveal that self-identified liberals broadly have stronger personal normative beliefs to conserve household FEW resources than self-identified conservatives.

MANOVA of background characteristics on household FEW conservation

Prior to any meaningful analysis to identify those general antecedents that significantly influence household FEW conservation, its useful to begin by looking at which background characteristics influence conservation measures since. Tables 4, 5 and 6 from Appendix D1 show these results organized by household food, energy and water conservation. No common factors within each resource consumption domain (i.e. food, energy, or water related resource conservation) can be determined from these data except for the statistically significant differences in food conservation based on self-identified gender binary identification; each conservation measure has a unique mixture of significant influential demographic attributes.

Significant differences in the food domain were mainly explained by age (F(9, 2870) = 2.847, p = 0.002; Λ = 0.979, η_p^2 = 0.007), race (F(12, 3120) = 2.469, p = 0.003; Λ = 0.975, η_p^2 = 0.008) and gender (F(3, 1179) = 9.226, p = 0.000; Λ = 0.977, η_p^2 = 0.023). There were statistically significant differences reported in composite dairy reduction and meat reduction based on race (F(4, 1181) = 5.161, p = 0.000, η_p^2 = 0.017; F(4, 1181) = 2.939, p = 0.020, η_p^2 = 0.010) and gender (F(1, 1181) = 9.447, p = 0.002, η_p^2 = 0.008; F(1, 1181) = 22.350, p = 0.000, η_p^2 = 0.019). Gender also had a significant effect on composite food waste reduction (F(1, 1181) = 8.971, p = 0.003, η_p^2 = 0.008), as did age (F(3, 1181) = 6.559, p = 0.000, η_p^2 = 0.016). Race, however, did not. Female respondents reported stronger household food conservation than male respondents generally. Furthermore, White respondents reported significantly weaker levels of dairy reduction than Black and Hispanic respondents, and weaker levels of meat reduction compared to Other non-Hispanic and Hispanic respondents based on reducing meat reduction in the home. All age groups except for those aged 60+ years old scored similarly on self-reported foodwaste reduction in the home, however the oldest cohort of respondents 60 and older scored significantly higher on food waste reduction in the home compared to all other age groups. This shows that older respondents are more eager to lower the proportion of food that ends up in their garbage and ultimately the landfill.

Several background factors explained significant differences in the energy domain of FEW household conservation including age($F(6, 2360) = 5.204$, $p = 0.000$; $\Lambda = 0.974$, $\eta_p^2 = 0.013$), race($F(6, 2360) = 3.600$, $p = 0.000$; $\Lambda = 0.976$, $\eta_p^2 = 0.012$), type of household structure or dwelling ($F(6, 2360) = 2.327$, $p = 0.017$; $\Lambda = 0.984$, $\eta_p^2 = 0.008$), education ($F(6, 2360) = 5.611$, $p = 0.000$; $\Lambda = 0.972$, $\eta_p^2 = 0.014$), and marital status ($F(10, 2360) = 2.351$, $p = 0.009$; $\Lambda = 0.980$, $\eta_p^2 = 0.010$). Statistically significant differences in regularly monitoring, identifying and rectifying household heat and cool air loss were explained based on age ($F(3, 1181) = 8.881$, $p = 0.000$, $\eta_p^2 = 0.022$), race ($F(4, 1181) = 3.501$, $p = 0.008$, $\eta_p^2 = 0.012$), and the type of home ($F(4, 1181) = 3.564$, $p = 0.007$, $\eta_p^2 = 0.012$). The youngest respondents aged 18 to 29 years old expressed weaker levels of heat and cool air loss conservation than all other age categories. Black and Hispanic respondents reported statistically significantly stronger levels of heat and cool air loss conservation than White and Other non-Hispanic respondents that reported more moderate to lower levels of conservation. Seeing control over heating, cooling and air ventilation activity is intrinsically different based on the type of living structure, significant differences in heat and cool air loss conservation can be found based on housing type, showing that those in mobile homes or apartment complexes expressed weaker levels of household air loss monitoring than those living in single family residential units. Two background factors emerged that explain differences in exterior and interior light efficiency that have previously not surfaced: education ($F(3, 1181) = 6.208$, $p = 0.000$, $\eta_p^2 = 0.016$) and marital status ($F(5, 1181) = 4.254$, $p = 0.001$, $\eta_p^2 = 0.018$). In terms of light efficiency conservation practicalities in the home such as turning the lights off when they are not in use, those respondents that completed high school, or some college or received Bachelor’s degrees or higher had statistically significantly stronger levels of practicing household light efficiency than those respondents who have less than high school education. For marital status, those respondents that have never been married indicated significantly weaker household light efficiency scores than all other marital status categories including those that are married, separated, divorced, widowed, or living with a partner. This shows that those that have never or have yet to be married are much less likely to adopt practical household lighting efficiency.

Places for reducing household water consumption such as in shower use and frequency, the washer in terms of reducing loads of laundry, and finding ways to reduce overall household hot water use were mainly explained by age ($F(9, 2870) = 2.018$, $p = 0.034$; $\Lambda = 0.985$, $\eta_p^2 = 0.005$), gender ($F(3, 1179) = 8.105$, $p = 0.000$; $\Lambda = 0.980$, $\eta_p^2 = 0.020$), and marital status ($F(15, 3255) = 2.330$, $p = 0.003$; $\Lambda = 0.971$, $\eta_p^2 = 0.010$). Statistically significant differences in composite hot water reduction were explained mainly by age (F(3, 1181) = 5.121, p = 0.000, η_p^2 = 0.013) and marital status (F(5, 1181) = 3.252, p = 0.006, η_p^2 = 0.014), while only marital status had a significant effect on shower use (F(5, 1181) = 3.351, p = 0.005, η_p^2 = 0.014). Finally, there were statistically significant differences in reducing loads of laundry based on marital status (F(5, 1181) = 2.409, p = 0.035, η_p^2 = 0.010) and gender (F(1, 1181) = 23.949, p = 0.000, η_p^2 = 0.020), showing that female respondents (compared to male respondents) or respondents who are widows or divorcees (compared to those who are married) have stronger levels of household water anti-consumption through reducing the number of loads of laundry generally. The effect of marital status on reducing loads of laundry is similar to reducing household hot water use, including how age significantly effects hot water use. Specifically, the oldest cohort of respondents 60+ years old showed stronger levels of household hot water reduction than all other age groups. Especially toward some energy and water related household anti-consumption activities, these results show the importance of other influential interpersonal demographics on reducing greenhouse gases through practical anti-consumption measures. Besides some key demographics such as race and gender, marital status as well as number of children, size (i.e. occupancy) and head of household status are explored further using hierarchical linear modelling later.

APPENDIX D2
Complete supplementary analysis of variance for various exogenous and endogenous model variables and FEW measures

Section 1
Multivariate analysis of variance (MANOVA) of CPS 2018 demographics on values

Table 1
MANOVA of demographic variables on biospheric values (R^2 *= 0.235; adj.* R^2 *= 0.159*)

Source	Type III sum of squares	df	Mean square	F	Sig.	η_p^2
Corrected model	10990.883	107	102.719	3.118	.000	.235
Intercept	680.135	1	680.135	20.643	.000	.019
age7	618.491	6	103.082	3.129	.005	.017
educ	591.094	13	45.469	1.380	.162	.016
race	415.004	4	103.751	3.149	.014	.011
gender	428.226	1	428.226	12.997	.000	.012
hhhead	.889	1	0.889	.027	.870	.000
hhsize	56.875	6	9.479	.288	.943	.002
house	142.054	4	35.513	.369	.899	.002
income	512.971	20	25.649	.778	.742	.014
mar	307.495	5	61.499	1.867	.097	.009
metro	127.950	1	127.950	3.884	.049	.004
own	2.796	2	1.398	.042	.958	.000
children	69.250	6	11.542	.350	.910	.002
child01	10.540	3	3.513	.107	.956	.000
child25	0.998	2	.499	.015	.985	.000
child612	41.331	2	20.665	.627	.534	.001
child1317	39.029	2	19.515	.592	.553	.001
child18ov	247.672	6	41.279	1.253	.277	.007
work	149.638	6	24.940	.757	.604	.004
political	1010.471	7	144.353	4.381	.000	.027
party	668.486	3	222.829	6.763	.000	.018
Error	35846.290	1088	32.947			
Total	327795.000	1196				
Corrected total	46837.173	1195				

Notes: η_p^2 = partial eta squared. Data for the variable biospherism (BV) are normal (i.e. population variances are equal). We fail to reject the null hypothesis that the population variances of comparison groups are equal ($F(1190,5) = 0.478$, $p = 0.936 > 0.05$).

Table 2
MANOVA of demographic variables on social-altruistic values (R^2 *= 0.250; adj.* R^2 *= 0.176*)

Source	Type III sum of squares	df	Mean square	F	Sig.	η_p^2
Corrected model	10633.681	107	99.380	3.390	.000	.250
Intercept	564.735	1	564.735	19.264	.000	.017
age7	307.500	6	51.250	1.748	.107	.010
educ	621.458	13	47.804	1.631	.071	.019
race	192.189	4	48.047	1.639	.162	.006
gender	790.541	1	790.541	26.967	.000	.024
hhhead	11.573	1	11.573	.395	.530	.000
hhsize	64.914	6	10.819	.369	.899	.002
house	139.218	4	34.805	1.187	.315	.004
income	735.334	20	36.767	1.254	.201	.023
mar	128.127	5	25.625	.874	.498	.004
metro	117.138	1	117.138	3.996	.046	.004
own	35.617	2	17.808	.607	.545	.001

children	125.021	6	20.837	.711	.641	.004
child01	41.005	3	13.668	.466	.706	.001
child25	17.503	2	8.752	.299	.742	.001
child612	15.845	2	7.922	.270	.763	.000
child1317	75.053	2	37.526	1.280	.278	.002
child18ov	145.371	6	24.229	.826	.549	.005
work	322.936	6	53.823	1.836	.089	.010
political	638.241	7	91.177	3.110	.003	.020
party	1186.146	3	395.382	13.487	.000	.036
Error	31895.112	1088	29.315			
Total	347490.000	1196				
Corrected total	42528.793	1195				

Notes: η_p^2 = partial eta squared. Data for the variable social-altruism (AV) are normal (i.e. population variances are equal). We fail to reject the null hypothesis that the population variances of comparison groups are equal ($F(1190,5) = 0.635$, $p = 0.836 > 0.05$).

Table 3
MANOVA of demographic variables on egoistic values (*$R^2 = 0.185$; adj. $R^2 = 0.105$*)

Source	Type III sum of squares	df	Mean square	F	Sig.	η_p^2
Corrected model	6701.625	107	62.632	2.305	.000	.185
Intercept	415.776	1	415.776	15.301	.000	.014
age7	181.858	6	30.310	1.115	.351	.006
educ	427.592	13	32.892	1.210	.266	.014
race	1290.901	4	322.725	11.876	.000	.042
gender	52.136	1	52.136	1.919	.166	.002
hhhead	9.925	1	9.925	.365	.546	.000
hhsize	128.566	6	21.428	.789	.579	.004
house	94.838	4	23.709	.873	.480	.003
income	1119.275	20	55.964	2.059	.004	.036
mar	28.518	5	5.704	.210	.958	.001
metro	101.155	1	101.155	3.722	.054	.003
own	147.956	2	73.978	2.722	.066	.005
children	176.041	6	29.340	1.080	.373	.006
child01	81.516	3	27.172	1.000	.392	.003
child25	5.213	2	2.606	.096	.909	.000
child612	10.959	2	5.480	.202	.817	.000
child1317	201.175	2	100.587	3.702	.025	.007
child18ov	108.477	6	18.080	.665	.678	.004
work	561.558	6	93.593	3.444	.002	.019
political	481.406	7	68.772	2.531	.014	.016
party	90.119	3	30.040	1.105	.346	.003
Error	29565.211	1088	27.174			
Total	119812.000	1196				
Corrected total	36266.836	1195				

Notes: η_p^2 = partial eta squared. Data for the variable egoism (EV) are normal (i.e. population variances are equal). We fail to reject the null hypothesis that the population variances of comparison groups are equal ($F(1190,5) = 3.304$, $p = 0.089 > 0.05$).

Table 4
MANOVA of demographic variables on hedonic values (*$R^2 = 0.121$; adj. $R^2 = 0.034$*)

Source	Type III sum of squares	df	Mean square	F	Sig.	η_p^2
Corrected model	3913.486	107	36.575	1.396	.007	.121
Intercept	350.721	1	350.721	13.390	.000	.012
age7	311.554	6	51.926	1.982	.065	.011
educ	594.433	13	45.726	1.746	.047	.020
race	191.179	4	47.795	1.825	.122	.007
gender	31.228	1	31.228	1.192	.275	.001
hhhead	26.158	1	26.158	.999	.318	.001

hhsize	37.314	6	6.219	.237	.964	.001
house	94.597	4	23.649	.903	.462	.003
income	987.741	20	49.387	1.886	.011	.033
mar	115.894	5	23.179	.885	.490	.004
metro	4.692	1	4.692	.179	.672	.000
own	6.228	2	3.114	.119	.888	.000
children	46.629	6	7.772	.297	.939	.002
child01	44.302	3	14.767	.564	.639	.002
child25	37.100	2	18.550	.708	.493	.001
child612	8.587	2	4.294	.164	.849	.000
child1317	184.526	2	92.263	3.522	.030	.006
child18ov	76.592	6	12.765	.487	.818	.003
work	148.431	6	24.739	.944	.462	.005
political	129.545	7	18.506	.707	.667	.005
party	154.172	3	51.391	1.962	.118	.005
Error	28497.818	1088	26.193			
Total	314136.000	1196				
Corrected total	32411.304	1195				

Notes: η_p^2 = partial eta squared. Data for the variable hedonism (HV) are not normal (i.e. population variances are not equal). We reject the null hypothesis that the population variances of comparison groups are equal ($F(1190,5) = 7.427$, $p = 0.016 < 0.05$).

Section 2
Multivariate analysis of variance (MANOVA) of CPS 2018 demographics on environmental self-identity, social justice, and citizenship measures

Table 5
MANOVA of demographic variables on environmental self-identity (*$R^2 = 0.189$; adj. $R^2 = 0.110$*)

Source	Type III sum of squares	df	Mean square	F	Sig.	η_p^2
Corrected model	4823.605	107	45.080	2.377	.000	.189
Intercept	685.560	1	685.560	36.153	.000	.032
age7	653.766	6	108.961	5.746	.000	.031
educ	276.678	13	21.283	1.122	.335	.013
race	156.870	4	39.217	2.068	.083	.008
gender	9.840	1	9.840	.519	.471	.000
hhhead	3.401	1	3.401	.179	.672	.000
hhsize	75.072	6	12.512	.660	.682	.004
house	249.510	4	62.378	3.289	.011	.012
income	471.295	20	23.565	1.243	.210	.022
mar	101.004	5	20.201	1.065	.378	.005
metro	67.399	1	67.399	3.554	.060	.003
own	39.645	2	19.823	1.045	.352	.002
children	71.159	6	11.860	.625	.710	.003
child01	13.871	3	4.624	.244	.866	.001
child25	3.045	2	1.523	.080	.923	.000
child612	97.231	2	48.615	2.564	.077	.005
child1317	61.194	2	30.597	1.614	.200	.003
child18ov	56.137	6	9.356	.493	.814	.003
work	52.869	6	8.812	.465	.835	.003
political	404.587	7	57.798	3.048	.004	.019
party	195.931	3	65.310	3.444	.016	.009
Error	20688.300	1091	18.963			
Total	264170.000	1199				
Corrected total	25511.905	1198				

Notes: η_p^2 = partial eta squared. Data for the variable environmental self-identity (ESI) are normal (i.e. population variances are equal). We fail to reject the null hypothesis that the population variances of comparison groups are equal ($F(1193,5) = 0.479$, $p = 0.935 > 0.05$).

Table 6

MANOVA of demographic variables on social justice ($R^2 = 0.317$; adj. $R^2 = 0.250$)

Source	Type III sum of squares	df	Mean square	F	Sig.	η_p^2
Corrected model	39140.670	107	365.801	4.722	.000	.317
Intercept	2518.289	1	2518.289	32.510	.000	.029
age7	259.547	6	43.258	.558	.764	.003
educ	2116.420	13	162.802	2.102	.012	.024
race	207.044	4	51.761	.668	.614	.002
gender	300.188	1	300.188	3.875	.049	.004
hhhead	205.958	1	205.958	2.659	.103	.002
hhsize	552.320	6	92.053	1.188	.310	.006
house	1327.300	4	331.825	4.284	.002	.015
income	1559.123	20	77.956	1.006	.451	.018
mar	405.743	5	81.149	1.048	.388	.005
metro	15.771	1	15.771	.204	.652	.000
own	70.040	2	35.020	.452	.636	.001
children	227.783	6	37.964	.490	.816	.003
child01	192.727	3	64.242	.829	.478	.002
child25	69.112	2	34.556	.446	.640	.001
child612	142.280	2	71.140	.918	.399	.002
child1317	89.528	2	44.764	.578	.561	.001
child18ov	516.462	6	86.077	1.111	.354	.006
work	449.025	6	74.837	.966	.447	.005
political	6614.224	7	944.889	12.198	.000	.073
party	3128.534	3	1042.845	13.463	.000	.036
Error	84509.722	1091	77.461			
Total	2035496.000	1199				
Corrected total	123650.392	1198				

Notes: η_p^2 = partial eta squared. Data for the variable social justice (SJ) are normal (i.e. population variances are equal). We fail to reject the null hypothesis that the population variances of comparison groups are equal ($F(1193,5) = 0.548$, $p = 0.895 > 0.05$).

Table 7

MANOVA of demographic variables on ecological citizenship ($R^2 = 0.334$; adj. $R^2 = 0.268$)

Source	Type III sum of squares	df	Mean square	F	Sig.	η_p^2
Corrected model	13995.136	107	130.796	5.108	.000	.334
Intercept	1039.002	1	1039.002	40.577	.000	.036
age7	354.725	6	59.121	2.309	.032	.013
educ	850.477	13	65.421	2.555	.002	.030
race	499.856	4	124.964	4.880	.001	.018
gender	12.935	1	12.935	.505	.477	.000
hhhead	36.836	1	36.836	1.439	.231	.001
hhsize	183.771	6	30.629	1.196	.306	.007
house	255.414	4	63.853	2.494	.041	.009
income	400.995	20	20.050	.783	.736	.014
mar	171.527	5	34.305	1.340	.245	.006
metro	53.180	1	53.180	2.077	.150	.002
own	14.335	2	7.168	.280	.756	.001
children	134.164	6	22.361	.873	.514	.005
child01	91.870	3	30.623	1.196	.310	.003
child25	36.827	2	18.413	.719	.487	.001
child612	83.630	2	41.815	1.633	.196	.003
child1317	96.745	2	48.372	1.889	.152	.003
child18ov	77.750	6	12.958	.506	.804	.003
work	192.138	6	32.023	1.251	.278	.007
political	2897.454	7	413.922	16.165	.000	.094
party	1100.000	3	366.667	14.320	.000	.038
Error	27935.687	1091	25.606			
Total	404780.000	1199				
Corrected total	41930.822	1198				

Notes: η_p^2 = partial eta squared. Data for the variable ecological citizenship (DPPD) are normal (i.e. population variances are equal). We fail to reject the null hypothesis that the population variances of comparison groups are equal ($F(1193,5) = 1.467$, $p = 0.362 > 0.05$).

Section 3
Multivariate analysis of variance (MANOVA) of CPS 2018 demographics on personal norm measures

Table 8
MANOVA of demographic variables on moral obligation appeal (PN_moral) (*$R^2 = 0.181$; adj. $R^2 = 0.101$*)

Source	Type III sum of squares	df	Mean square	F	Sig.	η_p^2
Corrected model	5375.791	107	50.241	2.258	.000	.181
Intercept	475.497	1	475.497	21.368	.000	.019
age7	394.739	6	65.790	2.957	.007	.016
educ	474.504	13	36.500	1.640	.069	.019
race	361.595	4	90.399	4.062	.003	.015
gender	189.584	1	189.584	8.520	.004	.008
hhhead	11.121	1	11.121	.500	.480	.000
hhsize	139.904	6	23.317	1.048	.393	.006
house	340.838	4	85.209	3.829	.004	.014
income	582.411	20	29.121	1.309	.163	.023
mar	65.754	5	13.151	.591	.707	.003
metro	185.739	1	185.739	8.347	.004	.008
own	67.645	2	33.823	1.520	.219	.003
children	174.871	6	29.145	1.310	.250	.007
child01	9.220	3	3.073	.138	.937	.000
child25	.162	2	.081	.004	.996	.000
child612	57.679	2	28.840	1.296	.274	.002
child1317	69.743	2	34.871	1.567	.209	.003
child18ov	33.575	6	5.596	.251	.959	.001
work	47.121	6	7.854	.353	.908	.002
political	343.032	7	49.005	2.202	.032	.014
party	118.290	3	39.430	1.772	.151	.005
Error	24388.648	1096	22.252			
Total	283660.000	1204				
Corrected total	29764.439	1203				

Notes: η_p^2 = partial eta squared. Data for the variable personal norm moral obligation (PN_moral) are normal (i.e. population variances are equal). We fail to reject the null hypothesis that the population variances of comparison groups are equal ($F(1198,5) = 1.194$, $p = 0.477 > 0.05$).

Table 9
MANOVA of demographic variables on appeal to sense of guilt or shame (PN_guilt) (*$R^2 = 0.218$; adj. $R^2 = 0.142$*)

Source	Type III sum of squares	df	Mean square	F	Sig.	η_p^2
Corrected model	7209.240	107	67.376	2.862	.000	.218
Intercept	406.871	1	406.871	17.283	.000	.016
age7	558.805	6	93.134	3.956	.001	.021
educ	506.868	13	38.990	1.656	.065	.019
race	313.620	4	78.405	3.330	.010	.012
gender	300.569	1	300.569	12.767	.000	.012
hhhead	.371	1	.371	.016	.900	.000
hhsize	104.700	6	17.450	.741	.617	.004
house	141.929	4	35.482	1.507	.198	.005
income	567.017	20	28.351	1.204	.242	.022
mar	47.058	5	9.412	.400	.849	.002
metro	168.352	1	168.352	7.151	.008	.006
own	66.411	2	33.205	1.410	.244	.003
children	81.321	6	13.553	.576	.750	.003
child01	18.652	3	6.217	.264	.851	.001

child25	17.337	2	8.668	.368	.692	.001
child612	168.573	2	84.287	3.580	.028	.006
child1317	173.450	2	86.725	3.684	.025	.007
child18ov	92.809	6	15.468	.657	.684	.004
work	67.793	6	11.299	.480	.824	.003
political	873.987	7	124.855	5.303	.000	.033
party	259.963	3	86.654	3.681	.012	.010
Error	25802.341	1096	23.542			
Total	239410.000	1204				
Corrected total	33011.581	1203				

Notes: η_p^2 = partial eta squared. Data for the personal norm guilt (PN_guilt) are normal (i.e. population variances are equal). We fail to reject the null hypothesis that the population variances of comparison groups are equal ($F(1198,5) = 1.994$, $p = 0.225 > 0.05$).

Table 10

MANOVA of demographic variables on appeal to sense of pride (PN_pride) (*$R^2 = 0.195$; adj. $R^2 = 0.116$*)

Source	Type III sum of squares	df	Mean square	F	Sig.	η_p^2
Corrected model	5232.962	107	48.906	2.482	.000	.195
Intercept	590.118	1	590.118	29.951	.000	.027
age7	307.944	6	51.324	2.605	.016	.014
educ	442.178	13	34.014	1.726	.050	.020
race	225.035	4	56.259	2.855	.023	.010
gender	628.956	1	628.956	31.922	.000	.028
hhhead	1.314E-5	1	1.314E-5	.000	.999	.000
hhsize	102.143	6	17.024	.864	.521	.005
house	256.498	4	64.124	3.255	.012	.012
income	377.267	20	18.863	.957	.513	.017
mar	7.987	5	1.597	.081	.995	.000
metro	135.384	1	135.384	6.871	.009	.006
own	18.791	2	9.395	.477	.621	.001
children	102.848	6	17.141	.870	.516	.005
child01	15.363	3	5.121	.260	.854	.001
child25	.889	2	.444	.023	.978	.000
child612	22.477	2	11.239	.570	.565	.001
child1317	60.630	2	30.315	1.539	.215	.003
child18ov	27.824	6	4.637	.235	.965	.001
work	119.170	6	19.862	1.008	.418	.005
political	269.985	7	38.569	1.958	.058	.012
party	153.338	3	51.113	2.594	.051	.007
Error	21594.241	1096	19.703			
Total	311088.000	1204				
Corrected total	26827.203	1203				

Notes: η_p^2 = partial eta squared. Data for the variable personal norm pride (PN_pride) are normal (i.e. population variances are equal). We fail to reject the null hypothesis that the population variances of comparison groups are equal ($F(1198,5) = 0.789$, $p = 0.725 > 0.05$).

Section 4
Multivariate analysis of variance (MANOVA) of CPS 2018 demographics on household FEW conservation and curtailment scores

Table 11

MANOVA of demographic variables on dairy reduction (*$R^2 = 0.119$; adj. $R^2 = 0.034$*)

Source	Type III sum of squares	df	Mean square	F	Sig.	η_p^2
Corrected model	802.692	107	7.502	1.402	.006	.119
Intercept	1.019	1	1.019	.190	.663	.000
age7	18.084	6	3.014	.563	.760	.003
educ	86.770	6	14.462	1.877	.082	.010

race	109.467	4	27.367	5.115	.000	.018
gender	55.496	1	55.496	10.372	.001	.009
hhhead	1.896	1	1.896	.354	.552	.000
hhsize	39.223	6	6.537	1.222	.292	.007
house	22.615	4	5.654	1.057	.377	.004
income	92.656	20	4.633	.866	.632	.015
mar	16.475	5	3.295	.616	.688	.003
metro	20.321	1	20.321	3.798	.052	.003
own	.490	2	.245	.046	.955	.000
children	22.885	6	3.814	.713	.639	.004
child01	5.331	3	1.777	.332	.802	.001
child25	27.158	2	13.579	2.538	.080	.005
child612	1.331	2	.665	.124	.883	.000
child1317	.112	2	.056	.010	.990	.000
child18ov	5.846	6	.974	.182	.982	.001
work	68.711	6	11.452	2.140	.046	.011
political	55.559	7	7.937	1.483	.169	.009
party	63.614	3	21.205	3.963	.008	.011
Error	5944.608	1111	5.351			
Total	8598.000	1219				
Corrected total	6747.299	1218				

Notes: η_p^2 = partial eta squared. Data for the variable dairy are normal (i.e. population variances are equal). We fail to reject the null hypothesis that the population variances of comparison groups are equal ($F(1213,5) = 0.302$, $p = 0.994 > 0.05$).

Table 12
MANOVA of demographic variables on meat reduction (*$R^2 = 0.163$; adj. $R^2 = 0.083$*)

Source	Type III sum of squares	df	Mean square	F	Sig.	η_p^2
Corrected model	1022.170	107	9.553	2.026	.000	.163
Intercept	4.559	1	4.559	.967	.326	.001
age7	26.355	6	4.392	.931	.471	.005
educ	122.499	13	9.423	1.998	.018	.023
race	58.577	4	14.644	3.105	.015	.011
gender	103.060	1	103.060	21.853	.000	.019
hhhead	9.059	1	9.059	1.921	.166	.002
hhsize	28.953	6	4.826	1.023	.408	.005
house	13.650	4	3.412	.724	.576	.003
income	88.143	20	4.407	.935	.542	.017
mar	66.304	5	13.261	2.812	.016	.012
metro	20.971	1	20.971	4.447	.035	.004
own	1.140	2	.570	.121	.886	.000
children	25.810	6	4.302	.912	.485	.005
child01	4.020	3	1.340	.284	.837	.001
child25	17.527	2	8.763	1.858	.156	.003
child612	3.817	2	1.908	.405	.667	.001
child1317	8.452	2	4.226	.896	.408	.002
child18ov	6.996	6	1.166	.247	.960	.001
work	67.888	6	11.315	2.399	.026	.013
political	68.892	7	9.842	2.087	.042	.013
party	6.707	3	2.236	.474	.700	.001
Error	5239.514	1111	4.716			
Total	8172.000	1219				
Corrected total	6261.683	1218				

Notes: η_p^2 = partial eta squared. Data for the variable meat are normal (i.e. population variances are equal). We fail to reject the null hypothesis that the population variances of comparison groups are equal ($F(1213,5) = 0.920$, $p = 0.630 > 0.05$).

Table 13
MANOVA of demographic variables on food waste reduction (*$R^2 = 0.139$; adj. $R^2 = 0.056$*)

Source	Type III sum of squares	df	Mean square	F	Sig.	η_p^2
Corrected model	1274.988	107	11.916	1.673	.000	.139
Intercept	58.408	1	58.408	8.202	.004	.007
age7	124.588	6	20.765	2.916	.008	.016
educ	85.625	13	6.587	.925	.526	.011
race	28.881	4	7.220	1.014	.399	.004
gender	51.903	1	51.903	7.289	.007	.007
hhhead	1.103	1	1.103	.155	.694	.000
hhsize	18.830	6	3.138	.441	.852	.002
house	8.867	4	2.217	.311	.871	.001
income	148.372	20	7.419	1.042	.408	.018
mar	38.702	5	7.740	1.087	.366	.005
metro	.636	1	.636	.089	.765	.000
own	33.775	2	16.888	2.371	.094	.004
children	34.949	6	5.825	.818	.556	.004
child01	1.746	3	.582	.082	.970	.000
child25	20.633	2	10.316	1.449	.235	.003
child612	2.696	2	1.348	.189	.828	.000
child1317	10.248	2	5.124	.720	.487	.001
child18ov	43.928	6	7.321	1.028	.405	.006
work	52.983	6	8.831	1.240	.283	.007
political	50.397	7	7.200	1.011	.422	.006
party	35.865	3	11.955	1.679	.170	.005
Error	7911.537	1111	7.121			
Total	27085.000	1219				
Corrected total	9186.525	1218				

Notes: η_p^2 = partial eta squared. Data for the variable foodwaste are normal (i.e. population variances are equal). We fail to reject the null hypothesis that the population variances of comparison groups are equal (F(1213,5) = 0.853, p = 0.679 > 0.05).

Table 14
MANOVA of demographic variables on identifying and monitoring household heat or cool air loss and using weather stripping (*R^2 = 0.152; adj. R^2 = 0.070*)

Source	Type III sum of squares	df	Mean square	F	Sig.	η_p^2
Corrected model	1423.873	107	13.307	1.861	.000	.152
Intercept	34.258	1	34.258	4.791	.029	.004
age7	226.869	6	37.811	5.288	.000	.028
educ	105.151	13	8.089	1.131	.328	.013
race	107.805	4	26.951	3.769	.005	.013
gender	.080	1	.080	.011	.916	.000
hhhead	.456	1	.456	.064	.801	.000
hhsize	34.399	6	5.733	.802	.568	.004
house	79.673	4	19.918	2.786	.025	.010
income	58.628	20	2.931	.410	.990	.007
mar	5.391	5	1.078	.151	.980	.001
metro	17.089	1	17.089	2.390	.122	.002
own	10.227	2	5.114	.715	.489	.001
children	72.896	6	12.149	1.699	.118	.009
child01	17.282	3	5.761	.806	.491	.002
child25	59.519	2	29.760	4.162	.016	.007
child612	8.260	2	4.130	.578	.561	.001
child1317	46.524	2	23.262	3.253	.039	.006
child18ov	15.967	6	2.661	.372	.897	.002
work	55.532	6	9.255	1.294	.257	.007
political	17.627	7	2.518	.352	.929	.002
party	4.781	3	1.594	.223	.881	.001
Error	7943.531	1111	7.150			
Total	18150.000	1219				
Corrected total	9367.404	1218				

Notes: η_p^2 = partial eta squared. Data for the variable hvac are normal (i.e. population variances are equal). We fail to reject the null hypothesis that the population variances of comparison groups are equal (F(1213,5) = 0.504, p = 0.922 > 0.05).

Table 15
MANOVA of demographic variables on monitoring and turning off exterior and interior lights (*R^2 = 0.142; adj. R^2 = 0.060*)

Source	Type III sum of squares	df	Mean square	F	Sig.	η_p^2
Corrected model	926.525	107	8.659	1.721	.000	.142
Intercept	7.375	1	7.375	1.465	.226	.001
age7	21.205	6	3.534	.702	.648	.004
educ	140.514	13	10.809	2.148	.010	.025
race	59.664	4	14.916	2.964	.019	.011
gender	10.508	1	10.508	2.088	.149	.002
hhhead	17.078	1	17.078	3.394	.066	.003
hhsize	23.853	6	3.976	.790	.578	.004
house	23.409	4	5.852	1.163	.326	.004
income	109.365	20	5.468	1.087	.357	.019
mar	51.820	5	10.364	2.060	.068	.009
metro	2.016	1	2.016	.401	.527	.000
own	.354	2	.177	.035	.965	.000
children	38.135	6	6.356	1.263	.272	.007
child01	41.434	3	13.811	2.745	.042	.007
child25	26.479	2	13.239	2.631	.072	.005
child612	.051	2	.025	.005	.995	.000
child1317	.103	2	.051	.010	.990	.000
child18ov	14.190	6	2.365	.470	.831	.003
work	37.260	6	6.210	1.234	.286	.007
political	28.587	7	4.084	.812	.578	.005
party	16.926	3	5.642	1.121	.339	.003
Error	5590.921	1111	5.032			
Total	42230.000	1219				
Corrected total	6517.445	1218				

Notes: η_p^2 = partial eta squared. Data for the variable lights are normal (i.e. population variances are equal). We fail to reject the null hypothesis that the population variances of comparison groups are equal (F(1213,5) = 0.702, p = 0.787 > 0.05).

Table 16
MANOVA of demographic variables on monitoring and limiting hot water use (*R^2 = 0.158; adj. R^2 = 0.077*)

Source	Type III sum of squares	df	Mean square	F	Sig.	η_p^2
Corrected model	1468.953	107	13.729	1.954	.000	.158
Intercept	16.134	1	16.134	2.297	.130	.002
age7	100.271	6	16.712	2.379	.027	.013
educ	83.378	13	6.414	.913	.539	.011
race	80.126	4	20.031	2.852	.023	.010
gender	10.537	1	10.537	1.500	.221	.001
hhhead	4.185	1	4.185	.596	.440	.001
hhsize	40.398	6	6.733	.959	.452	.005
house	85.072	4	21.268	3.028	.017	.011
income	362.017	20	18.101	2.577	.000	.044
mar	68.905	5	13.781	1.962	.082	.009
metro	33.099	1	33.099	4.712	.030	.004
own	30.596	2	15.298	2.178	.114	.004
children	54.974	6	9.162	1.304	.252	.007
child01	13.410	3	4.470	.636	.592	.002
child25	35.118	2	17.559	2.500	.083	.004
child612	6.753	2	3.376	.481	.619	.001
child1317	7.506	2	3.753	.534	.586	.001
child18ov	25.204	6	4.201	.598	.732	.003

work	49.433	6	8.239	1.173	.318	.006
political	78.515	7	11.216	1.597	.132	.010
party	14.267	3	4.756	.677	.566	.002
Error	7804.128	1111	7.024			
Total	15130.000	1219				
Corrected total	9273.081	1218				

Notes: η_p^2 = partial eta squared. Data for the variable hotwater are not normal (i.e. population variances are not equal). We reject the null hypothesis that the population variances of comparison groups are equal (F(1213,5) = 2238.582, p = 0.000 < 0.05).

Table 17
MANOVA of demographic variables on reducing loads of laundry (*R^2 = 0.151; adj. R^2 = 0.069*)

Source	Type III sum of squares	df	Mean square	F	Sig.	η_p^2
Corrected model	1502.076	107	14.038	1.848	.000	.151
Intercept	50.013	1	50.013	6.584	.010	.006
age7	46.130	6	7.688	1.012	.416	.005
educ	84.413	13	6.493	.855	.601	.010
race	44.982	4	11.245	1.480	.206	.005
gender	159.839	1	159.839	21.041	.000	.019
hhhead	.648	1	.648	.085	.770	.000
hhsize	118.922	6	19.820	2.609	.016	.014
house	17.257	4	4.314	.568	.686	.002
income	233.308	20	11.665	1.536	.062	.027
mar	40.691	5	8.138	1.071	.375	.005
metro	44.355	1	44.355	5.839	.016	.005
own	29.347	2	14.673	1.932	.145	.003
children	108.520	6	18.087	2.381	.027	.013
child01	9.862	3	3.287	.433	.730	.001
child25	8.780	2	4.390	.578	.561	.001
child612	5.010	2	2.505	.330	.719	.001
child1317	9.045	2	4.523	.595	.552	.001
child18ov	52.927	6	8.821	1.161	.325	.006
work	103.785	6	17.297	2.277	.034	.012
political	139.642	7	19.949	2.626	.011	.016
party	14.404	3	4.801	.632	.594	.002
Error	8439.866	1111	7.597			
Total	18687.000	1219				
Corrected total	9941.943	1218				

Notes: η_p^2 = partial eta squared. Data for the variable laundry are normal (i.e. population variances are equal). We fail to reject the null hypothesis that the population variances of comparison groups are equal (F(1213,5) = 2.602, p = 0.140 > 0.05).

Table 18
MANOVA of demographic variables on taking shorter or fewer showers (*R^2 = 0.125; adj. R^2 = 0.041)*

Source	Type III sum of squares	df	Mean square	F	Sig.	η_p^2
Corrected model	1222.050	107	11.421	1.482	.002	.125
Intercept	.163	1	.163	.021	.884	.000
age7	86.770	6	14.462	1.877	.082	.010
educ	93.119	13	7.163	.930	.521	.011
race	3.445	4	.861	.112	.978	.000
gender	16.161	1	16.161	2.098	.148	.002
hhhead	13.359	1	13.359	1.734	.188	.002
hhsize	34.991	6	5.832	.757	.604	.004
house	69.484	4	17.371	2.255	.061	.008
income	299.656	20	14.983	1.945	.008	.034
mar	83.235	5	16.647	2.161	.056	.010
metro	88.245	1	88.245	11.454	.001	.010
own	36.839	2	18.420	2.391	.092	.004

children	27.218	6	4.536	.589	.739	.003
child01	9.610	3	3.203	.416	.742	.001
child25	4.690	2	2.345	.304	.738	.001
child612	33.410	2	16.705	2.168	.115	.004
child1317	4.609	2	2.305	.299	.742	.001
child18ov	21.091	6	3.515	.456	.841	.002
work	11.244	6	1.874	.243	.962	.001
political	128.435	7	18.348	2.382	.020	.015
party	3.263	3	1.088	.141	.935	.000
Error	8559.075	1111	7.704			
Total	17179.000	1219				
Corrected total	9781.126	1218				

Notes: η_p^2 = partial eta squared. Data for the variable showers are normal (i.e. population variances are equal). We fail to reject the null hypothesis that the population variances of comparison groups are equal ($F(1213,5) = 1.789$, $p = 0.268 > 0.05$).

APPENDIX E
Pearson's bivariate correlations

Table 1
Pearson's bivariate correlations for values measures

Items	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1) bio1	1.00														
2) bio2	.74	1.00													
3) bio3	.73	.66	1.00												
4) bio4	.74	.66	.76	1.00											
5) alt1	.52	.45	.50	.53	1.00										
6) alt2	.57	.45	.56	.58	.52	1.00									
7) alt3	.59	.54	.56	.57	.59	.59	1.00								
8) alt4	.46	.41	.45	.49	.49	.49	.61	1.00							
9) ego1	.08	.14	.08	.10	**.05**	.08	.12	.12	1.00						
10) ego2	.08	.08	.09	.07	.08	.11	.08	**.04**	.41	1.00					
11) ego3	.17	.20	.12	.15	.13	.13	.18	.20	.52	.36	1.00				
12) ego4	.37	.32	.32	.34	.29	.28	.41	.49	.37	.28	.50	1.00			
13) hed1	.28	.22	.25	.26	.30	.28	.29	.32	.09	.24	.33	.36	1.00		
14) hed2	.32	.32	.29	.27	.32	.27	.29	.22	.20	.39	31	34	31	1.00	
15) hed3	.34	.32	.31	.32	.33	.35	.28	.21	.07	.34	.17	.21	.39	.60	1.00
16) hed4	.28	.24	.26	.24	.24	.30	.25	.18	.24	.39	.28	.29	.24	.60	.53

Notes: Values in bold not significant at the p < .05 level.

Table 2
Pearson's bivariate correlations for social justice measures

Items	1	2	3	4	5	6	7	8
1) sof1	1.00							
2) sof2	.55	1.00						
3) aef1	.38	.37	1.00					
4) aef2	.32	.29	.48	1.00				
5) aef3	.18	.22	.31	.23	1.00			
6) aef4	.38	.37	.63	.45	.28	1.00		
7) orm1	.41	.39	.34	.34	.20	.35	1.00	
8) orm2	.37	.31	.35	.28	**.05**	.31	.38	1.00
9) orm3	.43	.37	.44	.37	.16	.36	.43	.39

Notes: Values in bold not significant at the p < .05 level.

Table 3
Pearson's bivariate correlations for ecological citizenship measures

Items	1	2	3	4
1) dppd1	1.00			
2) dppd2	.43	1.00		
3) dppd3	.23	.16	1.00	
4) dppd4	.19	.16	.70	1.00
5) dppd5	.47	.26	.42	.36

Table 4
Pearson's bivariate correlations for environmental self-identity measures

Items	1	2
1) esi1	1.00	
2) esi2	.83	1.00
3) esi3	.83	.88

Table 5
Pearson's bivariate correlations for personal norm measures

Items	1	2	3	4	5	6	7	8
1) pn1	1.00							
2) pn2	.64	1.00						

3) pn3	.72	.66	1.00					
4) pn4	.76	.71	.70	1.00				
5) pn5	.68	.78	.66	.81	1.00			
6) pn6	.67	.65	.80	.75	.72	1.00		
7) pn7	.75	.72	.69	.84	.76	.72	1.00	
8) pn8	.66	.82	.66	.74	.81	.68	.77	1.00
9) pn9	.67	.67	.78	.74	.73	.80	.76	.72

Table 6
Pearson's bivariate correlations for environmental beliefs (New ecological paradigm) and non-environmental measures (Quality of life)

Items	1	2	3	4	5	6	7	8	9	10
1) nep1	1.00									
2) nep2	.69	1.00								
3) nep3	.56	.58	1.00							
4) nep4	.50	.45	.45	1.00						
5) nep5	.51	.61	.47	.41	1.00					
6) qol1	.29	.29	.30	.31	.21	1.00				
7) qol2	.20	.21	.17	.15	.14	.36	1.00			
8) qol3	.35	.34	.31	.37	.26	.50	.45	1.00		
9) qol4	.37	.38	.32	.40	.27	.54	.39	.80	1.00	
10) qol5	.34	.32	.29	.35	.26	.66	.42	.58	.61	1.00
11) qol6	.30	.29	.28	.22	.21	.57	.45	.44	.44	.54

Table 7
Pearson's bivariate correlations for perceived behavior control measures

Items	1	2
1) pbc1	1.00	
2) pbc2	.55	1.00
3) pbc3	.53	.62

Table 8
Pearson's bivariate correlations for awareness of consequences measures

Items	1	2
1) ac1	1.00	
2) ac2	.46	1.00
3) ac3	.48	.58

Table 9
Pearson's bivariate correlations for household food, energy and water behaviors

Items	1	2	3	4	5	6	7
1) dairy	1.00						
2) meat	.43	1.00					
3) waste	.20	.22	1.00				
4) hvac	.19	.17	.31	1.00			
5) lights	.10	.14	.34	.26	1.00		
6) hotwater	.20	.25	.36	.35	.27	1.00	
7) laundry	.21	.21	.39	.25	.28	.48	1.00
8) showers	.15	.19	.35	.23	.24	.47	.45

APPENDIX F
Reliability, validity and goodness of fit metrics in exploratory and confirmatory factor analysis

Table 1
Reliability measures in an EFA setup

Validity indices	Description	Source(s)	Threshold value
Cronbach's alpha (α)	Known as a measure of a latent construct's internal consistency reliability (the degree of consistency or the item interrelatedness), Cronbach's alpha also characerizes and assesses homogeneity (i.e. unidimensionality) in the sample. That is, a limitation of coefficient alpha is that adding measurement items increases levels of internal consistency, but there is error attached to item correlations with regard to the sampling of items. Furthermore, the precision of alpha reflects high communalities and low uniquness. Internally consistent measures does not always mean unidimensionality or homogeneity, which is why alpha is often considered a "lower bound of reliability."	(Cortina, 1993; Hair et al., 2019; Kline, 2015)	>0.70 >0.60 (exploratory studies only)
EFA loadings (λ)	Whereas confirmatory factor anlayiss links a latent construct to a specific set of indicators – loadings qua exploratory factor analysis – exploratory factor analysis techniques are a data reduction method. All variables specified in the analysis load on every factor producing estimates (positive of negative) for each latent factor. Essentially, loadings are the correlations between the observed and latent scores; this essentially states to what extent or degree the underlying factor appears in the individual observed variables, or what degree a latent construct''s individual indicator contributes to the latent factor.	(Hair et al., 2019; Kline, 2015)	numerical values
Communalities (h^2)	A communality is the proportion of variance that an item shares with all other variables in the factor analysis. Communalities are the sum of the squared factor loadings added across each factor extracted.	(Hair et al., 2019; Kline, 2015)	numerical values
Uniqueness (u^2)	Unique variance or "uniquness" is denoted as the proportion of total variance that a variable does not share in common with other variables in the exploratory factor analysis. Unique variance is made up of two parts. First is specific variance, or the amount of sytematic variance that is not associated (correlationally) with other variables or factors in the analysis (i.e. unique). Second is error variance which represents collection and measurment errors associated with that particular variable.	(Hair et al., 2019; Kline, 2015)	numerical values
Kaiser-Meyer-Olkin (KMO)	A commonly accepted measure of sampling adequacy, the KMO value of an exploratory factor analysis falls between 0 and 1. Small values represent lack of suitability for factor analytic methods for specified latent factors and prescribd items due to poor intercorrelation. High intercorrelations indicate data suitability, warranting factor analysis. Measures of sampling adequacy improve when sample sizes or number of variables grow, number of factors decreases, or when average correlations increase.	(Dragan and Topolšek, 2014; Kaiser, 1974; StataCorp, 2019b)	0.9-1 exemplary 0.8-0.9 excellent 0.7-0.8 modest 0.6-0.7 acceptable 0.5-0.6 poor 0-0.5 unacceptable
Bartlett's test of sphericity	The Bartlett test is usually reported alongside the KMO estimate as a determinant of exploratory factor analysis by analyzing the entire correlation matrix. Presence of significant correlations among some variables warrants factor analysis, but increases in sample size increases the sensitivity or likelihood of Bartlett's test to estimate significant correlations.	(Adil and Hamid, 2017; Kline, 2015)	$p<0.05$
Chi-square (χ^2); likelihood ratio test (LR test)	The chi-square test assumes that a saturated model, or a model that constitutes as many parameter estimates as degrees of freedom used in which case there are no degrees of freedom, specifies the most un-parsimonious configuration. The chi-square test tests the null hypothesis that the researcher's model does not perform worse than the saturated model. More concretely, the chi-square test is the difference between the observed sample and estimated SEM covriance matrices (i.e. residuals).	(Bentler and Bonett, 1980; Byrne, 2010; Hair et al., 2019, Hoyle, 2012)	Low value associated with degrees of freedom; insignificant p-value > 0.05

Table 2
Validity indices in a CFA modelling setup

Validity indices	Description	Source(s)	Threshold value
Convergent validity			
Composite reliability (CR)	Unlike Cronbach's alpha which tends to under or overestimate construct reliability, composite reliability – sometimes referred to as coefficient Ω (i.e. omega) or the factor rho coefficient – weights each individual indicator's loading on its respective latent construct and is therefore a preferrable estimate of construct reliability. Simply put, CR is the ratio of explained variance over total variance. Values greater than 0.90 are desirable, however values higher than this could be symptomatic of redundant measures that are too similar, meaning the scale should be revised.	(Dragan and Topolšek, 2014; Fomell and Larcker, 1981; Gaskin, 2016; Hair et al., 2019; Kline, 2015)	>0.70 >AVE
Average variance extracted (AVE)	AVE estimates convergent validity by taking the average of the squared loadings (i.e. standardized pattern coefficients) of all indicators linked to a specific latent construct measured with reflective items. AVEs could be expressed as a decimal or a percentage, characterizing the average amount of variance extracted (i.e. variance explained) among all the latent factor's items.	(Dragan and Topolšek, 2014; Fomell and Larcker, 1981; Gaskin, 2016; Hair et al., 2019; Kline, 2015)	>0.50
Discriminant validity			
Maximum shared variance (MSV)	MSV is helpful in estimating discriminant validity by assessing the level of uniqueness that individuals represent their respective latent construct (within construct shared variance) compared to the correlation that latent construct has with other latent constructs in the researcher's specified model (between construct shared variance. MSV is an ideal validity index specifically for models with reflective measures, rather than formative measures.	(Dragan and Topolšek, 2014; Fomell and Larcker, 1981; Gaskin, 2016)	<AVE
Construct reliability			
Standardized loadings (L_{ij})	Transforming a variable to standardized format (i.e. the process of centering) involves subtracting the variable's mean vale from each respective observation and then dividing the difference by the variable's standard deviation. From a confirmatory factor analysis perspective, these loadings pertain only to those indicators linked to underlying – theoretically derived – factor solutions captured by the data *a priori* to analysis.	(Dragan and Topolšek, 2014; Fomell and Larcker, 1981; Hair et al., 2019)	>0.9 exemplary >0.7 good >0.5 acceptable
Correlations (γ or β)	Correlation coefficients can be extracted as unstandardized or standardized path coefficients (or regression weights) from exogenous to endogenous factors (i.e. γ) or from endogenous factors to other endogenous factors (i.e. β). Correlations can be standardized making them directly comparable in terms of explanatory power of one variable's relationship to another.	(Dragan and Topolšek, 2014; Fomell and Larcker, 1981; Hair et al., 2019)	numerical values
Covariance (φ_{ij}=COV(f_i, f_j))	Covariances (phi) are sometimes expressed as correlational matrices between different pairs of latent factors. Expressed as double headed arrows in structural equation modelling, covariances estimate how two random variables vary together.	(Dragan and Topolšek, 2014; Hair et al., 2019)	numerical values ($p<0.05$)
McDonald's construct reliability (MaxR(H))	Coefficient H (i.e. MaxR(H)) is a reliability measures of individual indicators for a single manifest variable. MaxR(H) is calculated by squaring the loadings values, meaning McDonald's CR is invariant to loading signs. The power of coefficient H mainly depends on a properly specified latent construct.	(Adil and Hamid, 2017; Hancock and Mueller, 2001)	unspecified, minimum 0.70 or 0.80

Table 3
Descriptive details on select goodness-of-fit indices

Validity indices	Description	Source(s)	Threshold value
	Absolute fit indices		
Minimum discrepancy per degree of freedom (CMIN/df)	Denoted as the relative chi-square of the discrepancy, the CMIN/df improves on the chi-square LR test by penalizing model complexity. In other words, whereas the LR test can improve appreciably by adding additional parameters, the CMIN/df can get worse with model complexity since adding additional variables reduces a model's degrees of freedom.	(Byrne, 2010; Dragan and Topolšek, 2014; Hoyle, 2012)	<5 acceptable
Root mean square error of approximation (RMSEA)	An absolute fit index, the RMSEA is understood as a "badness-of-fit" index that makes an improvement on earlier indices by penalizeing complex models by subtracting degrees of freedom from its chi-square value. For this reason, stable model quality conclusions can be made since the RMSEA value is sensitive to model degrees of freedom and therefore model misspecification, and	(Hair et al., 2019, Hoyle, 2012; Kline, 2015)	0 exact fit <0.05 close fit 0.05-0.08 modest fit 0.08-0.10 suspect fit >0.10 negligible/poor fit
Standardized root mean square residual (SRMR)	Standardized version of the Root Mean square Residual (RMR), SRMR is an absolute fit index understood as a "badness-of-fit" index. SRMR is calculated by taking the square root of the average square covariance residual.	(Hair et al., 2019; Hu and Bentler, 1999; Hoyle, 2012; Kline, 2015)	No statistical thresholds available. Lower values = better fit and higher values = worse fit >0.10 poor fit
	Incremental fit indices		
Comparative fit index (CFI)	Bentler's CFI is both an incremental fit and goodness-of-fit index. Because it's a normed fit index values are between 0 and 1, with values close to 1 indicating satisfactory to exemplary fit. CFI is calculated by subtracting the dividend between the difference of the chi-square value and degrees of freedom of the researcher's specified model (the numerator), and the difference of the chi-square value and degrees of freedom of the null or independence(baseline) model, from 1.	(Bentler and Bonett, 1980; Hair et al., 2019; Hoyle, 2012; Hu and Bentler, 1999; Kline, 2015)	>0.95 good >0.90 acceptable
Incremental fit index (IFI)	The IFI is an attempt to improve the performance of the NFI. Like the NFI, the numerator preserves the difference of chi-square values of the null and specified fitted models, but the denominator subtracts the degrees of freedom of the fitted model from the chi-square value of the null model.	(Bollen, 1989; Hoyle, 2012)	>0.90 good
Tucker-Lewis index (TLI)	TLI is also referred to as the non-normed fit index or NNFI. TLI compares the normed chi-square values of both null and specified values, but is not a normed index, meaning values can fall below 0 or above 1.	(Bentler and Bonett, 1980; Hair et al., 2019; Hoyle, 2012; Hu and Bentler, 1999; Tucker and Lewis, 1973)	1=perfect fit >0.95 good >0.80 acceptable
Normed-fit index (NFI)	The NFI is a ratio whose values range from 0 to 1. NFI is calculated by dividing the difference between the chi-square value of the fitted model and null model by the chi-square value of the null model. However, a disadvantage is that generally more complex models will approach one, artifically inflating model fit.	(Bentler and Bonett, 1980; Hair et al., 2019; Hoyle, 2012)	1=perfect fit >0.95 good >0.90 acceptable

APPENDIX G
Exploratory factor analysis results

Section 1
EFA descriptive data, loadings and communalities

Table 1
Descriptive statisitcs, loadings, communalities and reliability of values measures

Item	*N*	*M*	*S.D.*	*λ*	h^2	u^2
Values exploratory factory analysis (Bartlett's test of sphericity=8888.05, df=120, p=0.000; KMO=0.897)						
Factor 1: biospheric values (BV) α=.72; mean inter-item correlation=.91	1,199	15.33	6.26	-	-	-
Respecting the earth: harmony with other species (bio1)	1,186	3.978	1.75	.84	.75	.25
Unity with nature: fitting in with nature (bio2)	1.,184	3.42	1.90	.82	.64	.36
Protecting the environment: preserving nature (bio3)	1,187	4.07	1.73	.84	.72	.28
Preventing pollution: protecting natural resources (bio4)	1,186	4.03	1.69	.82	.74	.26
Factor 2: social-altruistic values (AV) α=.83; mean inter-item correlation =.55	1,198	15.94	5.99	-	-	-
Equality: equal opportunity for all (alt1)	1,184	4.36	1.77	.47	.50	.50
A world at peace: free of war and conflict (alt2)	1,187	4.42	1.74	.38	.53	.47
Social justice: correcting injustice, care for the weak (alt3)	1,187	3.68	1.93	.55	.63	.37
Helpful: working for the welfare of others (alt4)	1,184	3.65	1.81	.65	.55	.45
Factor 3: egositic values (EV) α=.73; mean inter-item correlation=.41	1,219	8.21	5.56	-	-	-
Social power: control over others, dominance (ego1)	1,186	0.81	1.80	.67	.43	.56
Wealth: material possessions, money (ego2)	1,187	2.61	1.80	.38	.40	.60
Authority: the right to lead or command (ego3)	1,183	2.12	1.94	.67	.51	.49
Influential: having an impact on people and events (ego4)	1,191	2.89	1.90	.50	.53	.47
Factor 4: hedonic values (HV) α=.76; mean inter-item correlation=.44	1,219	15.10	5.51	-	-	-
Ambitious: hardworking, aspiring (hed1)	1,187	4.25	1.61	.25	.29	.71
Pleasure: joy, gratification of desires (hed2)	1,188	3.63	1.73	.71	.59	.41
Enjoying life: enjoying food, sex, leisure, etc. (hed3)	1,188	4.35	1.58	.73	.56	.44
Self-indulgent: doing pleasant things (hed4)	1,184	3.28	1.84	.66	.50	.50

Notes: LR test independent versus saturated model: chi2(120) = 8896.10, prob. > chi2 = 0.000. Extraction method: Principal
Axis Factoring. Rotation method: Promax with Kaiser Normalization. 4 factors specified to be retained prior to analysis.
N=number of observations; *M* = mean; *S.D.* = standard deviation; *λ* (lambda) = loading; h^2 = communality = 1 – unique vairance/"uniquness" (u^2).

Table 2
Descriptive statisitcs, loadings, communalities and reliabilities of beliefs measures

Item	*N*	*M*	*S.D.*	*λ*	h^2	u^2
Beliefs exploratory factor analysis (Bartlett's test of sphericity=8868.62, df=136, p=0.000; KMO=0.883)						
Factor 5: environmental beliefs (NEP) α=.85; mean inter-item correlation=.52	1,202	26.40	6.77	-	-	-
When humans interfere with nature it often produces disastrous consequences (nep1)	1,195	5.25	1.62	.78	.61	.39
Humans are severely abusing the environment (nep2)	1,195	5.30	1.68	.78	.69	.31
Plants and animals have as much right as humans to exist (nep3)	1,195	5.28	1.84	.66	.48	.52
Despite our special abilities humans are still subject to the laws of nature (nep4)	1,189	5.88	1.34	.61	.42	.58

The earth is like a spaceship with very limited room and resources (nep5)	1,194	4.88	1.86	.64	.45	.55
Factor 6: quality of life beliefs (QoL) α=.87; mean inter-item correlation=.52	1,201	30.66	7.33	-	-	-
It's important for me to have control over the resources I need to survive (qol1)	1,194	5.29	1.49	.75	.54	.46
Being connected to people in the community around me is important to me (qol2)	1,199	4.32	1.76	.55	.36	.64
I would change my purchasing decisions if I thought it would benefit the health of my family (qol3)	1,197	5.71	1.39	.75	.65	.35
I would change my purchasing decisions if I thought it would benefit the safety of my family (qol4)	1,200	5.72	1.39	.76	.67	.33
Participation in decision making about the resources I need to survive is important to me (qol5)	1,194	5.23	1.58	.76	.61	.39
It is important to me that I produce at least some of the resources I need to survive (qol6)	1,196	4.49	1.79	.64	.43	.57
Factor 7: behavioral control beliefs (PBC) α=.79; mean inter-item correlation=.56	1,206	16.28	3.90	-	-	-
It is easy for me to control the types of food my household eats (pbc1)	1,203	5.24	1.68	.67	.45	.55
I have the ability to reduce my household's level of electricity usage (pbc2)	1,204	5.46	1.52	.76	.55	.45
I have the skills and knowledge to use water wisely in my home (pbc3)	1,203	5.62	1.38	.71	.57	.43
Factor 8: awareness of consequences (AC) α=.76; mean inter-item correlation=.51	1,197	10.94	4.36	-	-	-
The price of water is too low, it does not take into account the full environmental costs of its multiple uses (ac1)	1,193	2.96	1.73	.63	.38	.62
It worries me that global disparities in affordable and accessible food, energy, and water are linked to poverty and warfare (ac2)	1,193	4.29	1.84	.60	.57	.43
It doesn't make sense how food, energy and water are produced and delivered without meaningful input from a diverse group of stakeholders (ac3)	1,189	3.74	1.73	.67	.49	.51

Notes: LR test independent versus saturated model: chi2(136) = 8876.34, prob. > chi2 = 0.000. Extraction method: Principal
Axis Factoring. Rotation method: Promax with Kaiser Normalization. 4 factors specified to be retained prior to analysis.
N=number of observations; *M* = mean; *S.D.* = standard deviation; *λ* (lambda) = loading; h^2 = communality = 1 – unique vairance/"uniquness" (u^2).

Table 3
Descriptive statisitcs, loadings, communalities and reliability of identity, social justice, and citizenship measures

Item	*N*	*M*	*S.D.*	*λ*	h^2	u^2
Identity, social justice and citizenship exploratory factor analysis (Bartlett's test of sphericity=9553.83, df=136, p=0.000; KMO=0.873)						
Factor 9: Enviromental self-identity (ESI) α =.94; mean inter-item correlation =.85	1,205	14.09	4.61	-	-	-
Acting environmentally friendly is an important part of who I am (esi1)	1,201	4.54	1.72	.84	.79	.21
I am the type of person who acts environmentally friendly (esi2)	1,199	4.77	1.57	.92	.86	.14
I see myself as an environmentally friendly person (esi3)	1,202	4.84	1.55	.92	.84	.16
Factor 10: Social justice scale (SJ) α =.83; mean inter-item correlation =.35	1,201	39.87	10.25	-	-	-
Each person should not consume more of the world's resources than what allows all people to have their basic needs met (sof1)	1,190	4.33	1.78	.60	.42	.58
Resources should be distributed equally among all people of the world (sof2)	1,185	4.09	1.92	.60	.39	.61

Many products consumed in the United States affect the environment in other countries negatively (aef1)	1,187	4.37	1.75	.74	.53	.47
When we consume products in the United States, wd often consume resources from other coutnries (aef2)	1,188	5.15	1.50	.65	.37	.63
The concern that American consumption harms the environment elsewhere is exaggerated (aef3)	1,190	4.08	1.86	.21	.39	.61
A great deal of hazardous waste produced by Americans ends up in poor countries (aef4)	1,187	4.31	1.77	.70	.48	.52
Environmentally friendly products have less negative environmental impact (orm1)	1,187	4.86	1.56	.53	.40	.60
Environmentally friendly products are better for individuals who produce the products (orm2)	1,189	4.46	1.61	.53	.28	.72
The development of environmentally friendly products affects the developnent of society (orm3)	1,188	4.67	1.58	.58	.41	.59
Factor 11: Dismantling public-private distinction (DPPD) α =.72; mean inter-item correlation =.34	1,199	17.40	5.92	-	-	-
Politicians and authorities should not concern themselves with whether or not people act environmentally friendly (dppd1)	1,194	4.75	1.93	.47	.31	.69
It is good that politicians and authorities try to make people act more environmentally friendly (dppd2)	1,190	458	1.84	.16	.56	.44
If I choose to drive a car, it is my private business (dppd3)	1,191	2.31	1.47	.77	.55	.45
If I choose to eat meat, it is my private business (dppd4)	1,193	2.11	1.43	.73	.49	.51
Everybody has the right to consume freely without anybody butting it (dppd5)	1,188	3.76	1.89	.65	.43	.57

Notes: LR test independent versus saturated model: chi2(136) = 9562.30, prob. > chi2 = 0.000. Extraction method: Principal
Axis Factoring. Rotation method: Promax with Kaiser Normalization. 3 factors specified to be retained prior to analysis.
N=number of observations; *M* = mean; *S.D.* = standard deviation; λ (lambda) = loading; h^2 = communality = 1 – unique vairance/"uniquness" (u^2).

Table 4
Descriptive statisitcs, loadings, communalities and reliability of personal norm measures

Item	*N*	*M*	*S.D.*	*λ*	h^2	u^2
Personal norm factor anlaysis (Bartlett's test of sphericity=11186.68, df=36, p=0.000; KMO=0.936)						
Factor 12: Moral oblication (PN_moral) α=.92; mean inter-item correlation=.78	1,205	14.52	4.98	-	-	-
I feel morally obligated to not waste food (pn1)	1,199	4.97	1.77	.53	.69	.31
I feel morally obligated to not waste water (pn4)	1,199	4.79	1.82	.59	.83	.17
I feel morally obligated to not waste energy (pn7)	1,201	4.82	1.79	.55	.81	.19
Factor 13: Appeal to guilt (PN_guilt) α=.92; mean inter-item correlation=.80	1,206	13.08	5.24	-	-	-
I would feel guilty if I did not take actions to reduce the environmental impacts of the food I buy (pn2)	1,203	4.16	1.87	.75	.76	.24
I would feel guilty if I did not conserve water (pn5)	1,202	4.53	1.87	.59	.80	.20
I would feel guilty if I did not take actions to reduce the environmental impacts of my energy use (pn8)	1,197	4.45	1.87	.76	.82	.18
Factor 14: Appeal to pride (PN_pride) α=.92; mean inter-item correlation=.80	1,204	15.37	4.72	-	-	-
I would feel proud to not waste food and reduce impacts of the food I buy (pn3)	1,202	5.10	1.69	.76	.78	.22
I would feel proud to conserve and not waste water (pn6)	1,200	5.19	1.69	.70	.79	.21
I would feel proud to not waste energy and reduce the impacts of the energy I use (pn9)	1,202	5.11	1.67	.65	.79	.21

Notes: LR test independent versus saturated model: chi2(36) = 11,000, prob. > chi2 = 0.000. Extraction method: Principal Axis
Factoring. Rotation method: Promax with Kaiser Normalization. 3 factors specified to be retained prior to analysis.
N=number

of observations; *M* = mean; *S.D.* = standard deviation; λ (lambda) = loading; h^2 = communality = 1 – unique vairance/"uniquness"
(u^2).

Table 5
Descriptive statisitcs, loadings, communalities and reliability of household EOA

Item	*N*	*M*	*S.D.*	*λ*	h^2	u^2
Household environmentally oriented consumption factor analysis (Bartlett's test of sphericity=1867.89, df=26, p=0.000; KMO=0.810)						
Factor 15: Diet anti-consumption (Diet) α=.60; mean inter-item correlation=.43	1,219	2.48	3.91	-	-	-
Reduce or eliminate dairy from your diet? (dairy)	1,219	1.23	2.35	.57	.32	.68
Reduce or eliminate meat from your diet? (meat)	1,219	1.25	2.27	.56	.33	.67
Factor 16: Practical household efficiencies (Efficiency) α=.57; mean inter-item correlation=.31	1,219	11.93	5.75	-	-	-
Reduce your household food waste? (waste)	1,219	3.83	2.75	.39	.36	.64
Regularly identify sources of household heat or cool air loss and fix them by installing weather stripping around doors and windows? (hvac)	1,219	2.68	2.77	.39	.24	.76
Monitor and turn off your home's exterior and interior lights when they are not needed (lights)	1,219	5.41	2.31	.44	.24	.76
Factor 17: Water conservation (Watercons) α=.72; mean inter-item correlation=.47	1,219	7.33	6.78	-	-	-
Monitor and limit you're your household hot water use? (hotwater)	1,219	2.19	2.76	.57	.46	.54
Reduce the number of loads of laundry that you wash? (laundry)	1,219	2.68	2.86	.59	.43	.57
Take shorter or fewer showers? (showers)	1,219	2.46	2.83	.63	.39	.61

Notes: LR test independent versus saturated model: chi2(28)) = 1869.43, prob. > chi2 = 0.000. Extraction method: Principal Axis Factoring. Rotation method: Promax with Kaiser Normalization. 3 factors specified to be retained prior to analysis. N=number of observations; M = mean; S.D. = standard deviation; λ (lambda) = loading; h2 = communality = 1 – unique variance/"uniqueness" (u2).

Section 2
Latent factor constructions and interpretations

Constructing models of household FEW conservation

Several factor structures were constructed and assessed by conducting exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) to establish construct unidimensionality and overall fit. The EFA results shown in the tables below are organized into five separate analyses in order to extract and distinguish latent factors based on observed variables. These observed variables are organized into five analyses that pertain to five categories of data: (1) values, (2) beliefs, (3) identity, social justice and ecological citizenship measures, (4) personal norm measures, and (5) FEW household EOA measures. EFA results below report several different validity indices to establish homogeneity between observed and latent variables and appraise the reliability or internal consistency of each factor. Each of these metrics is described in detail in Appendix F. Factors were extracted in each of the factor analyses iteratively through principal axis factoring (PAF) and were rotated using promax rotation with Kaiser Normalization allowing the possibility of correlated factors and disallowing maintaining factor independence (Hair et al., 2019). Pearson's bivariate correlations are reported in all observed indicator variables from the national survey in Appendix E to provide an initial glimpse at the associations between theoretically distinct constructs. Significant correlations were strongest for those indicators grouped by latent construct based on a priori theory while other correlations between distinct construct were weakly/negligibly correlated, indicating strong and distinct associations between each of the values, beliefs, theory antecedents and household FEW antic-consumption measures designed in the national survey. EFA results of each factor depict suitable and suitable correlations reported by each observed variable upon its respective latent construct. Those items with loading at or below widely recognized cutoff values are subsequently not retained in the CFA analyses that follow.

Table 1 in Appendix G begins by appraising biospheric, altruistic, egoistic and hedonic values dimensions for reliability and internal consistency. Satisfactory sampling adequacy and correlation matrix assessments were met with values above standard cutoff values for Kaiser-Meyer-Olkin (KMO; > 0.50) and Bartlett's Test of Sphericity ($p < 0.05$) (Kaiser, 1974; Kline, 2015). All latent values constructs reported modest to high internal consistency (Cronbach's $\alpha > 0.70$), though some loadings values in the altruistic, egoistic, and hedonic values constructs showed poor correlations with their respective latent factor scores. Namely alt2, ego2 and hed1 reported poor loadings ($\lambda < 0.40$). These items were omitted from further CFA analysis. This explains why the biospheric values construct had higher internal consistency than the rest of the latent values constructs ($\alpha_{factor\ 1} = 0.72 > \alpha_{factor\ 2} = 0.83 >>> \alpha_{factor\ 4} = 0.44 > \alpha_{factor\ 3} = 0.41$) because the biospheric values dimensions represent greater convergence of a single biospheric values concept.

Beliefs measures are organized into four distinct construct that represent distinct types of internal beliefs systems that have varying degrees of performance and determination of pro-environmental behavior. Shown in Table 2 in Appendix G, these beliefs include broad or general environmental beliefs as expressed in the new ecological paradigm or NEP, non-environmental beliefs linked to concerns over quality of life (QoL), control beliefs that assess the extent to which individuals feel they possess the cognitive abilities to navigate and successfully perform a specific behavior, and beliefs that evaluate the level of concern an individual possesses toward the food, energy and water resources accessibility and availability around the globe. The results in Table 9 show exemplary measures of internal consistency and modest to satisfactory dimensional loadings that converge appreciably on their respective latent constructs.

Table 3 in Appendix G shows descriptive statistics on three factors pertaining to VIP theory (environmental self-identity) and EC theory (social justice scale and dismantling public-private distinction/ecological citizenship scale). These results showed desirable indicators for sampling adequacy and suitability for factor analysis (KMO = 0.873, Bartlett's test of sphericity = 9553.83, $p = 0.000$). Though each of the three VIP and EC antecedent latent factors indicated modest to excellent levels of internal consistency ($\alpha_{factor\ 9} = 0.94 > \alpha_{factor\ 10} = 0.83 >>> \alpha_{factor\ 11} = 0.72$), some dimensions failed to converge significantly on their respective latent factor as indicated by poor loadings. Factor 9: environmental self-identity indicated strong internal consistency with each of the environmental self-identity dimensions loading appreciably on the ESI latent factor ($\lambda > 0.80$). The social justice construct was first replicated by combining measurements used by Jagers et al. (2016) that evaluated three concepts: sense of fairness which measures the extent that individuals value an equitable balance in terms of how resources are distributed, awareness of ecological footprints which measures the extent that individual's perceive the lopsided levels of resource consumption between the United

States and other countries, and other regarding motivations which measures the extent that individual's believe environmentally friendly systems of production can benefit others besides the consumer such as the environment, other individuals, and society generally. All dimensions except for aef1, aef2 and aef4 were subsequently omitted from CFA analysis because of poor loadings (λ < aef2 = 0.65). This means that the social justice construct based on these data is constrained to the explanatory limits of the awareness of ecological footprint concept. Furthermore, it also reveals the first limitation in the social justice concept and the ecological citizenship theory generally, opening the possibility that new measures ought to be explored that explain individual sense of fairness and other regarding motivations with respect to social justice beliefs. A similar issue can also be seen with Factor 11: Dismantling public-private distinction. Though some item loadings confirm modest to excellent desirability in terms of converging on the DPPD concept such as dppd3, dppd4 and dppd5 (λ > dppd5 = 0.65), the dimensions in dppd1 and dppd2 indicated poor correlations ($\lambda < 0.50$). This shows that measures that evaluate that extent that individuals believe actions in private have public or social consequences cannot be accurately explained by beliefs toward political authorities which could be measures a separate and distinctly unrelated concept to ecological citizenship.

The personal norm factor analysis in Table 4 in Appendix G shows the unidimensionality of several dimensions based on three interrelated concepts of the personal norm construct: a sense of moral obligation, appeal to act out of an individual sense of guilt, and an appeal to act out of an individual sense of pride. Each of these are denoted in factors 12, 13 and 14. Exemplary metric values indicated sampling adequacy and factor analysis suitability of the personal norm data (KMO = 0.936; Bartlett's test of sphericity = 11186.68, p = 0.000). High Cronbach's α for the moral obligation, guilt and pride latent factors indicated excelled internal consistency of their respective personal norm dimensions. Only the moral obligation indicators exhibited questionable convergence on a common factor since loading values were weaker (λ 0.60) than those found in the personal appeal to guilt and pride (i.e. Factor 13 and Factor 14). Because the personal norm is the common construct that unites VBN, VIP and EC theories and that the values do not far exceed acceptable correlation levels – what is referred to as practical significance of present structure based on cutoff values of 0.50 under large sample sizes (Hair et al., 2019) nor do they indicate zero relationships between each observed dimension and the latent factor (Bollen, 1989) – the moral obligation concept denoted in Factor 12 and its respective FEW dimensions are retained for further analysis.

Table 5 in Appendix G is the last factor analysis conducted to better understand the extent of unidimensionality of all household FEW anti-consumption variables. Data from these self-reported dependent variable responses met satisfactory sampling adequacy and factor analysis suitability requirements (KMO = 0.810, Bartlett's test of sphericity = 1867.89, p = 0.000). This EFA forces a three-factor solution to group FEW household EOA activities by domain, however no stable solution was found. A stable three factor solution is presented in Table 11 that group's each household conservation behavior a bit differently besides domain. Factor 17 retained the three water related behaviors but reducing household food waste was instead incorporated in Factor 16 instead of Factor 15, implying that the items eliminating food and dairy shared more in common with each other than with reducing household food waste. Factor's 15 and 16 were therefore labeled outside of their intuitive domain category and interpreted as diet anti-consumption and practical household efficiencies respectively. The water conservation latent construct indicated the highest level of internal consistency of the three factors extracted ($\alpha_{\text{factor 17}}$ = 0.72 > $\alpha_{\text{factor 15}}$ = 0.60 > $\alpha_{\text{factor 4}}$ = 0.44 > $\alpha_{\text{factor 16}}$ = 0.57). In addition, weaker correlations between practical household efficiencies measures point to a weak level of convergence on a common latent concept, although the dairy meat reduction expressed appreciably better loadings by comparison ($\lambda > 0.50$). These results show limited evidence of a stable factor solution that groups similar EOA behaviors together. These latent factors are retained for further analysis below, however only individual behaviors are explained by a priori theory antecedents in the HLM procedure later.

APPENDIX H
Hierarchical linear regresion results

Table 1
Hierarchical linear regression of respondent household FEW conservation and curtailment on the value-belief-norm model

Value-belief-norm antecedents										
Measures	*β*	*t*	R^2	*Adj.* R^2	95% CI R^2	90% CI R^2	*F*	*dfs*	f^2	*N*
DV: Env. beliefs			.38	.38	[.34, .42]	[.35, .41]	245.39***	3, 1190	.62	1194
Biospheric values	**.54**	**16.92*** **								
Altruistic values	**.12**	**3.54*** **								
Egoistic values	**-.05**	**-2.17* **								
(Constant)		34.60***								
DV: PN_moral			.42	.42	[.38, .46]	[.39, .45]	216.70***	4, 1188	.73	1193
Env. beliefs	**.14**	**4.92*** **								
Biospheric values	**.40**	**11.50*** **								
Altruistic values	**.19**	**5.90*** **								
Egoistic values	.03	1.33								
(Constant)		8.98***								
DV: PN_guilt			.44	.43	[.40, .47]	[.41, .47]	234.06***	4, 1189	.79	1194
Env. beliefs	**.19**	**6.83*** **								
Biospheric values	**.39**	**11.55*** **								
Altruistic values	**.15**	**4.86*** **								
Egoistic values	**.06**	**2.84** **								
(Constant)		3.09**								
DV: PN_pride			.48	.48	[.44, .51]	[.45, 51]	276.52***	4, 1188	.93	1193
Env. beliefs	**.20**	**7.36*** **								
Biospheric values	**.38**	**11.62*** **								
Altruistic values	**.20**	**6.82*** **								
Egoistic values	.04	1.96								
(Constant)		10.38***								

Household FEW environmentally orietend anti-consumption																	
Domain		*Household food conservation*						*Household energy conservation*				*Household water conservation*					
Behavior		1) dairy		2) meat		3) waste		4) hvac		5) lights		6) hotwater		7) laundry		8) showers	
(Model R^2)		.08		.13		.19		.12		.13		.20		.17		.14	
Model estimates		*β*	*t*	*β*	*t*	*β*	*t*	*β*	*t*	*β*	*t*	*β*	*t*	*β*	*t*	*β*	*t*
PN_moral		-.06	-1.00	.01	.14	**.19**	**3.39** **	.09	1.50	**.16**	**2.79** **	**.21**	**3.74*** **	**.19**	**3.45** **	**.20**	**3.53*** **
PN_guilt		**.19**	**3.46** **	**.26**	**4.91*** **	.05	.87	.08	1.42	**-.17**	**-3.01** **	**.21**	**4.06*** **	.07	1.38	.06	1.10
PN_pride		.01	.14	-.08	-1.39	.04	.68	.02	.36	**.12**	**2.20* **	-.04	-.76	.05	.99	.01	.23
Env. beliefs		.07	1.86	.06	1.70	.02	.61	.00	.08	.03	.84	.02	.48	.04	1.08	.02	.64
Biospheric values		.03	.71	**.09**	**2.03* **	**.12**	**2.57* **	**.12**	**2.55* **	**.13**	**2.86** **	.03	.69	.08	1.70	**.13**	**2.77** **
Altruistic values		-.03	-.78	-.03	-.72	.07	1.77	-.08	-1.86	.07	1.62	-.05	-1.15	-.02	-.56	-.03	-.85
Egoistic values		.04	1.22	-.03	-.84	-.05	-1.74	.06	1.85	-.04	-1.18	**.10**	**3.63*** **	.01	.41	-.02	-.69
Age		-.07	-1.90	.01	.13	**.10**	**2.83** **	**.20**	**5.42*** **	-.05	-1.32	**.11**	**3.31** **	-.01	-.28	.05	1.40
Gender		.05	1.83	**.11**	**3.75*** **	.02	.79	-.04	-1.35	-.01	-.23	.02	.58	**.09**	**3.36** **	.01	.30
hhhead		.04	1.09	.05	1.50	.01	.38	.00	.12	**.08**	**2.47* **	.03	.83	-.01	-.40	-.03	-1.07
hhsize		-.07	-.49	-.03	-.20	-.11	-.85	-.03	-.21	-.00	-.02	.17	1.30	.11	.82	-.16	-1.22
Children		.02	.18	.02	.19	.17	1.39	.05	.42	.04	.31	-.17	-1.39	-.11	-.85	.21	1.63
Race	White	-.02	-.36	-.02	-.48	.01	.25	**.11**	**2.15* **	**.11**	**2.26** **	.01	.16	-.03	-.55	.02	.30
dummy	Black	**.09**	**2.15* **	.04	.98	-.00	-.07	**.11**	**2.72** **	-.06	-1.53	.00	.11	.01	.14	-.01	-.29
	Hispanic	.03	.79	.03	.61	.02	.61	**.10**	**2.49* **	-.01	-.30	.02	.59	-.01	-.24	-.00	-.03
Marital	Married	.01	.18	-.11	-1.68	-.07	-1.03	.00	.00	.04	.57	-.06	-.90	.02	.34	-.12	-1.85
dummy	Widowed	.03	.65	-.01	-.23	.01	.17	.01	.11	.02	.40	.05	1.31	.05	1.29	-.00	-.10
	Diorced	.04	.80	-.00	-.07	-.02	-.38	-.01	-.25	-.00	-.05	.01	.20	.09	1.85	-.02	-.30
	Separated	-.02	-.48	-.05	-1.46	-.03	-.90	-.02	-.50	.02	.61	-.04	-1.36	.02	.780	.02	.62
	Never married	-.01	-.17	-.04	-.66	-.07	-1.25	-.03	-.56	-.09	-1.61	.00	.05	.02	.37	-.09	-1.67
	(Constant)		-.03		-1.13		-.93		-2.27*		4.84***		-3.15**		-1.42		-.78

Notes: Significant values in **bold**. * p < .05; ** p < .01; *** p < .001.

Table 2
Hierarchical linear regression of respondent household FEW conservation and curtailment on the value-identity-personal norm model

	Value-identity-personal norm antecedents									
Measures	*β*	*t*	R^2	*Adj.* R^2	95% CI R^2	90% CI R^2	*F*	*dfs*	f^2	*N*
DV: ESI			.49	.49	[.45, .52]	[.46, .52]	1149.61***	1, 1197	.96	1199
Biospheric values	**.70**	**33.91*** **								
(Constant)		24.62***								
DV: PN_moral			.44	.44	[.40, .47]	[.41, .47]	467.22***	2, 1195	.78	1198
ESI	**.33**	**10.76*** **								
Biospheric values	**.39**	**12.90*** **								
(Constant)		13.84***								
DV: PN_guilt			.46	.46	[.42, .50]	[.43, .49]	513.04***	2, 1196	.86	1199
ESI	**.36**	**12.02*** **								
Biospheric values	**.38**	**12.79*** **								
(Constant)		6.98***								
DV: PN_pride			.47	.46	[.43, .50]	[.43, .49]	519.58***	2, 1195	.87	1198
ESI	**.28**	**9.51*** **								
Biospheric values	**.45**	**15.34*** **								
(Constant)		18.72***								

		Household FEW environemtnally oriented anti-consumption															
Domain		*Household food conservation*						*Household energy conservation*				*Household water conservation*					
Behavior		1) dairy		2) meat		3) waste		4) hvac		5) lights		6) hotwater		7) laundry		8) showers	
(Model R^2)		.08		.13		.20		.12		.13		.20		.17		.14	
Model estimates		*β*	*t*	*β*	*t*	*β*	*t*	*β*	*t*	*β*	*t*	*β*	*t*	*β*	*t*	*β*	*t*
PN_moral		-.07	-1.15	.00	.01	**.18**	**3.30** **	.07	1.23	**.16**	**2.72** **	**.20**	**3.57*** **	**.19**	**3.34** **	**.20**	**3.46** **
PN_guilt		**.19**	**3.42** **	**.25**	**4.59*** **	-.00	-.06	.05	.97	**-.17**	**-3.26** **	**.20**	**3.79*** **	.07	1.29	.04	.77
PN_pride		.02	.40	-.06	-1.21	.04	.78	-.00	-.05	**.12**	**2.27***	-.04	-.68	.06	1.12	.01	.26
ESI		.06	1.46	.07	1.74	**.20**	**4.89*** **	**.17**	**4.01*** **	**.08**	**2.02***	**.10**	**2.62** **	.05	1.13	.07	1.68
Biospheric values		.01	.27	.06	1.34	.06	1.37	.01	.11	.14	3.18	-.03	-.69	.06	1.39	.08	1.80
Age		**-.08**	**-2.22***	.00	.10	**.09**	**2.52***	**.17**	**4.88*** **	-.05	-1.33	**.08**	**2.41** **	-.02	-.52	.05	1.28
Gender		.06	1.88	**.11**	**3.87*** **	.04	1.45	-.03	-1.16	.01	.23	.01	.52	**.09**	**3.31** **	.01	.36
hhhead		.03	1.05	.05	1.45	.01	.19	.01	.17	**.07**	**2.40***	.02	.80	-.01	-.42	-.03	-1.06
hhsize		-.08	-.58	-.04	-.26	-.14	-1.07	-.04	-.27	-.02	-.11	.15	1.15	.09	.69	-.17	-1.29
Children		.04	.26	.03	.23	.20	1.61	.06	.49	.05	.39	-.15	-1.20	-.09	-.72	.22	1.71
Race	White	-.03	-.57	-.03	-.58	.02	.34	**.10**	**2.02***	**.11**	**2.35***	-.01	-.10	-.03	-.66	.01	.28
dummy	Black	**.08**	**2..07***	.03	.66	.00	.01	**.10**	**2.53***	-.06	-1.42	.01	.25	.01	.23	-.03	-.54
	Hispanic	.04	.90	.03	.66	.04	.92	**.12**	**2.86** **	-.01	-.18	.04	.89	-.01	-.18	.00	.04
Marital	Married	.01	.07	-.12	-1.84	-.06	-.97	-.00	-.03	.04	.58	-.05	-.82	.02	.35	-.13	-1.92
dummy	Widowed	.03	.62	-.01	-.37	.00	.10	.01	.13	.01	.32	.06	1.50	.05	1.30	-.01	-.16
	Diorced	.04	.70	-.01	-.19	-.02	-.42	-.02	-.35	-.00	-.09	.01	.18	.09	1.82	-.02	-.36
	Separated	-.02	-.60	-.05	-1.59	-.03	-1.03	-.02	-.73	.02	.59	-.05	-1.51	.02	.70	.02	.52
	Never married	-.02	-.29	-.05	-.85	-.08	-1.53	-.03	-.63	-.09	-1.67	-.00	-.06	.01	.25	-.10	-1.81
	(Constant)		.68		-.95		-1.52		-2.90**		5.32***		-3.11**		-1.26		-1.04

Notes: Significant values in **bold**. * p < .05; ** p < .01; *** p < .001.

Table 3
Hierarchical linear regression of respondent household FEW conservation and curtailment on the ecological citizenship model

	Ecological citizenship antecedents									
Measures	*β*	*t*	R^2	*Adj.* R^2	95% CI R^2	90% CI R^2	*F*	*dfs*	f^2	*N*
DV: Ecocitizenship			.25	.25	[.21, .28]	[.21, .28]	388.94***	1, 1197	.32	1199
Social justice	**.50**	**19.27*** **								
(Constant)		9.76***								
DV: PN_moral			.29	.29	[.25, .33]	[.26, .32]	245.06***	2, 1195	.41	1198
Ecocitizenship	**.07**	**2.31***								
Social justice	**.50**	**18.00*** **								
(Constant)		7.21***								
DV: PN_guilt			.38	.38	[.34, .41]	[.34, .41]	363.14***	2, 1196	.61	1199
Ecocitizenship	**.12**	**4.52*** **								
Social justice	**.55**	**20.84*** **								
(Constant)		-.01								
DV: PN_pride			.33	.32	[.28, .36]	[.29, .36]	287.59***	2, 1195	.48	1198
Ecocitizenship	.00	.008								
Social justice	**.57**	**20.85*** **								
(Constant)		10.01***								

		Household FEW environemtnally oriented anti-consumption															
Domain		*Household food conservation*						*Household energy conservation*						*Household water conservation*			
Behavior		1) dairy		2) meat		3) waste		4) hvac		5) lights		6) hotwater		7) laundry		8) showers	
(Model R^2)		.08		.13		.19		.12		.11		.19		.17		.14	
Model estimates		*β*	*t*	*β*	*t*	*β*	*t*	*β*	*t*	*β*	*t*	*β*	*t*	*β*	*t*	*β*	*t*
PN_moral		-.06	-.99	.01	.23	**.21**	**3.76*** **	.09	1.52	**.18**	**3.11** **	**.21**	**3.73*** **	**.20**	**3.59*** **	**.21**	**3.75*** **
PN_guilt		**.19**	**3.41** **	**.20**	**3.77*** **	.04	.79	**.16**	**2.92** **	**-.12**	**-2.16***	**.22**	**4.24*** **	.087	1.63	.04	.81
PN_pride		.03	.56	-.03	-.50	.10	1.87	.05	.96	**.18**	**3.37** **	-.03	-.51	.09	1.73	.04	.81
Ecocitizenship		.01	.30	**.16**	**5.00*** **	.02	.75	-.06	-1.82	-.02	-.70	-.02	-.57	.01	.22	.03	.94
Social justice		.04	1.07	.03	.85	.05	1.35	-.07	-1.72	.03	.79	.01	.37	.01	.21	.06	1.54
Age		-.07	-1.95	.02	.67	**.12**	**3.44** **	**.19**	**5.20*** **	-.03	-.91	**.09**	**2.73** **	-.01	-.32	.06	1.78
Gender		.05	1.74	**.11**	**3.81*** **	.03	1.22	-.04	-1.35	.01	.39	.01	.37	**.09**	**3.42** **	.01	.36
hhhead		.04	1.18	.05	1.75	.01	.36	.01	.21	**.08**	**2.61** **	.03	.92	-.01	-.30	-.03	-.85
hhsize		-.07	-.54	-.03	-.25	-.11	-.83	-.02	-.14	.00	.03	.16	1.26	.10	.78	-.15	-1.18
Children		.03	.22	.03	.23	.17	1.33	.04	.27	.02	.16	-.17	-1.35	-.11	-.85	.20	1.55
Race	White	-.03	-.53	-.03	-.53	-.00	-.02	.09	1.93	**.11**	**2.22***	-.00	-.03	-.03	-.61	.02	.31
dummy	Black	**.09**	**2.14***	.04	.97	-.01	-.30	**.10**	**2.54***	-.07	-1.60	.01	.35	.01	.18	-.02	-.46
	Hispanic	.04	.87	.03	.61	.43	.43	**.11**	**2.59***	-.01	-.21	.03	.82	-.01	-.12	.00	.08
Marital	Married	.00	.01	-.12	-1.82	-1.31	-1.31	-.03	-.38	.01	.13	-.06	-.93	.01	.13	**-.14**	**-2.13** **
dummy	Widowed	.02	.59	-.02	-.43	-.18	-.18	-.01	-.13	-.00	-.03	.05	1.44	.04	1.14	-.01	-.34
	Diorced	.03	.69	-.00	-.09	-.56	-.56	-.03	-.51	-.02	-.31	.01	.16	.08	1.74	-.02	-.45
	Separated	-.02	-.51	-.04	-1.12	-.78	-.78	-.02	-.71	.02	.65	-.04	-1.43	.02	.77	.02	.67
	Never married	-.01	-.22	-.03	-.57	-1.43	-1.43	-.04	-.76	-.10	-1.80	.00	.01	.01	.23	-.10	-1.75
	(Constant)		.31		-2.52*		-1.13		-.61		5.44***		-2.43*		-1.01		-1.43

Notes: Significant values in **bold**. * p < .05; ** p < .01; *** p < .001.