Exploring Salient Attributes and Status Perception of Proenvironmental Behavior

THESIS

Presented in Partial Fulfillment of the Requirements for the Degree Master of Environmental and Natural Resources in the Graduate School of The Ohio State University

By

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2016

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Abstract

This thesis includes two studies that examine perceptions of proenvironmental behaviors and whether members of different social groups differ in their perceptions. The first study explores which attributes of behaviors are perceived to be salient. Proenvironmental behaviors encompass a broad range of behaviors with distinctive characteristics. However, relatively little work has been done to sort environmental behaviors into classes that are psychologically meaningful to individuals. This is important because behavioral spillover is more likely when behaviors are conceptually linked. To explore this, we used a sample of 71 participants, containing 30 environmental participants and 41 business participants. We used a repertory grid technique to explore the attributes of behaviors that are most salient to members of distinct social groups by having respondents consider the similarities and differences among a set of behaviors. The results of this first study suggest that individuals are more likely to co-perform behaviors with similar non-social external and descriptive attributes (e.g. outcomes, salient place/domain, etc.) than behaviors involving similar internal decision-making processes and social influences for engagement in that behavior (e.g. deliberation, social norms, etc.). The two participant groups differed little in their perceptions regarding the salience of different behavioral attributes. These findings can be used to inform behaviorally oriented policies and interventions on how to create classifications of behaviors that are
meaningful to the public and that capitalize on potential spillover effects from one behavior to the next. The second study explores how proenvironmental behaviors related to social status. Perceived status can affect the diffusion of proenvironmental behaviors and sustainable consumption. However, the status of different forms of sustainable consumption has not been adequately explored. Previous studies suggest that curtailment behaviors are associated with low or neutral status while green consumption is associated with high status. However, these studies have generally examined a small number of behaviors and have rarely considered whether perceptions differ between social groups. We use mixed methods and the same sample of respondents to explore whether and why a suite of proenvironmental behaviors is perceived to be high or low status, the perceived motivation for those behaviors, and whether perceptions depend on the environmental orientation of research participants. Using a variety of quantitative and qualitative analytical approaches, we find that green consumption (i.e. efficiency) is rated higher in status than curtailment and that this rating is largely based on monetary considerations. Green consumption is also perceived to be more motivated by environmental concern than curtailment and interpretations of the motivation for adopting behaviors contributes to status perceptions of those behaviors. The two participant groups differed little in their perceptions. Our results suggest that those who argue that curtailment will be necessary for long-term sustainability must address status perceptions because it is likely that they hinder the diffusion of such behaviors. For now, it may be more effective to use social and/or economic mechanisms to increase green consumption. Overall, this thesis offers valuables insights that can inform behavior change strategies and interventions aimed at
overcoming the social and psychological obstacles that hinder the spread of proenvironmental behaviors.
Acknowledgments

I would first like to express my appreciation and thanks to my advisor Dr. Jeremy Brooks for his thoughtful guidance, encouragement, and genuine devotion as a mentor. I would like to acknowledge Charlie Wilson and Sonja Klinsky for their training and constructive feedback. I would like to thank Huong Nguyen who provided me with critical statistical advice. I would also like to recognize Ellen Eilers, Hugh Walpole, and James Ryan for assisting with the data collection. In addition, I would like to give a special thanks to my colleagues and to the faculty and staff of The School of Environmental and Natural Resources for their direct and indirect contributions to my graduate achievements. Lastly, I would like to express my sincere gratitude to my parents, Mauricio and Elizabeth De Nardo, for their unconditional support and care throughout my life.
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Fields of Study

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Chapter 1: Introduction

Many of the most important causes of environmental degradation are ultimately rooted in human behavior and consumption patterns. For example, by combining emissions related to the direct and indirect consumption of energy - including energy used for transportation by household residents and the embodied energy in all non-energy goods and services consumed - people are accountable for approximately 70% of US carbon emissions (Shammin & Bullard, 2009). By these estimates, US households account for about 14% of global carbon dioxide emissions. Furthermore, global emissions, and related environmental impacts, are likely to grow due to increases in consumption by the growing global middle class (Myers and Kent, 2004).

There are many possible approaches to reducing environmental impacts, the most common of which are technical. Technical approaches rely on technological advances to address environmental issues. The invention of fuel-efficient vehicles, solar panels, and energy-efficient appliances are all examples of technical improvements that reduce environmental impact. These inventions reach consumers and enable them to engage in green consumption (also known as efficiency) behaviors. Green consumption refers to the use of a product (e.g. hybrid vehicle) that provides the same good or service (mobility) as a more common product (e.g. standard vehicle), but with lower environmental impact.
These behaviors generally involve technological improvements rather than behavior change, and may involve increased monetary costs (e.g. cost of purchasing a more fuel-efficient vehicle). However, these types of approaches can be problematic as concerns about rebound and substitution effects suggest that the efficiency gains associated with new technologies may be insufficient for reaching long-term sustainability goals (Jackson, 2009; Meadows et al., 2004). Additionally, many technical approaches rely on large-scale policy and infrastructure changes, which are costly and can take decades to complete. Moreover, technological advances in energy efficiency and carbon reduction will face many technical, economical, and institutional obstacles before they are successfully implemented or adopted.

However, behavior change approaches can be used to complement technical approaches in reducing environmental impact. Instead of relying on technological improvements, behavior change can minimize environmental impacts by transforming or modifying the human actions that directly or indirectly cause environmental harm. For example, a behavior change approach to addressing environmental issues would focus on behaviors such as riding a bike or taking public transportation instead of driving, taking shorter showers, or eating a vegetarian diet. These behaviors are examples of curtailment, which refers to behavioral changes that provide either less of a good or service, or a qualitatively different good or service, with lower environmental impact. Curtailment behaviors often have no, or low, monetary costs but potentially substantial non-monetary costs of time, knowledge, effort, or inconvenience (Jansson et al., 2010; Karlin et al., 2010; 2012; 2013).
Given the environmental impacts of individual decision-making and consumer behavior, behavior change approaches possess great potential for reducing global environmental impacts. One study estimated that U.S. carbon emissions could be decreased by more than 7.4% by targeting behavioral changes in personal travel and residential energy use, creating a potential “behavioral wedge” (Dietz et al., 2009). Additionally, policies and interventions that target behavioral change face fewer obstacles and require less time and financial investment to implement than technical approaches (Dietz et al., 2009).

As a result, this potential behavioral wedge can be used to reduce environmental impact in the short term and buy time to develop new technical approaches to achieve longer-term reductions. Furthermore, the reduced impacts provided by behavior change approaches are not limited to the short term. Some researchers suggest that these strategies may be more important than technical approaches for reducing our environmental impact in the long term since behavior change approaches do not rely on the continued consumption of energy-efficient products (i.e. green consumption) to reduce our impact (Jackson, 2009; Meadows et al., 2004). Instead, behavior change approaches attempt to minimize impacts by directly cutting back consumption (i.e. curtailment).

Although behavioral approaches may face fewer barriers to implementation than technical approaches (i.e. requiring less time, financial investment, and policy or
infrastructure changes), effectively instilling behavioral change is not a simple task. Human behavior is complex and interactions between individual behavior, social dynamics, and the physical environment have made the shift towards social sustainability challenging. Additionally, social dynamics can differ greatly between social groups, which can have significant implications for how behaviors are perceived. Given the complexity of human behavior, my thesis seeks to address two major challenges for understanding the adoption of proenvironmental behaviors and more sustainable forms of consumption.

A major challenge to promoting proenvironmental behavior is understanding how individuals perceive different behaviors and how they conceptualize the relationships between behaviors. This thesis attempts to address these challenges by exploring which attributes of behaviors are perceived to be important and how proenvironmental behaviors relate to social status. Understanding how people conceptualize relationships among behaviors provides insights into what attributes of behaviors are salient to individuals, which can be used to better shape policies and strategies to encourage the adoption of more sustainable behaviors (Gatersleben et al., 2002; Truelove et al., 2014). Additionally, status is widely viewed by anthropologists, psychologists, sociologists, and economists as an important social force that can motivate behaviors and influence individual decisions (Delgado et al., 2015; Eastman and Eastman, 2011; Griskevicius, Tybur, & Van, 2010; Hamilton and Tilman, 1983; Henrich and Gil-White, 2001; Vigneron and Johnson, 1999). Additionally, both theory (Henrich and Gil-White, 2001;
Richerson and Boyd, 2005) and empirical research (Cohen and Prinstein, 2006; Van den Bulte and Stremersch, 2004) suggest that the behaviors of higher status individuals are more likely to be adopted and spread. However, how easily a behavior is adopted and spread may also hinge on the perceptions held by different groups within the population.

Another major obstacle to promoting proenvironmental behaviors is understanding differences in social dynamics between groups. This thesis attempts to tackle this issue by exploring perceptions from two distinct social groups. This is important because humans evolved in groups and still exhibit group-centric behaviors (Bergstrom, 2002; Richerson and Boyd, 2008). As a result, social norms and practices can be distinct between social groups (Henrich and Boyd, 1998; McAuliffe and Dunham, 2016; Willer, 2009). This is most obvious in the differences between individuals who identify with different political parties in the US. Additionally, behaviors may have different meanings and send different social signals depending on group membership (Ariely et al., 2009; Cronk, 2005; Willer, 2009). As a result, the costs and benefits of behaviors may also differ between social groups, which can lead to significantly different perceptions of behaviors. To use status as an example, individuals who are environmentally-conscious about their actions, more knowledgeable about curtailment, and who interact frequently with others also practicing curtailment may perceive riding the bus as an intentional and status-worthy behavior. On the other hand, an individual with little concern about environmental issues or no experience with or desire to reduce consumption may assume that riding the bus would only be adopted out of necessity. Therefore, understanding these differences in
perceptions of proenvironmental behaviors will assist in the creation of adapted models of behavior change for particular social groups and will make approaches more appealing and psychologically meaningful to targeted audiences.

Overall, this thesis includes two studies that examine perceptions of proenvironmental behaviors. The first study explores which attributes of behaviors are most salient to members of distinct social groups by having respondents consider the similarities and differences among a set of behaviors. The second study examines differences in how members of these social groups perceive the social status associated with a suite of proenvironmental behaviors to understand the characteristics of behaviors that may be important for signaling high status. Both studies provide insights that can help scholars and policy makers design strategies to overcome the social and psychological obstacles that may hinder the spread of proenvironmental behaviors.
Chapter 2: Spillover Effects and Behavioral Classifications: Exploring Salient Attributes of Proenvironmental Behaviors

Introduction

The most common method of categorizing proenvironmental behaviors is to distinguish between curtailment and efficiency behaviors (Abrahamse et al., 2005; Barr et al., 2005; Boudet et al., 2016; Gardner and Stern, 2008; Karlin et al., 2014; Poortinga et al., 2003; Schultz, 2010; Steg, 2008; Urban and Scasny, 2014). Curtailment refers to behavior changes that provide less of a good or service, or a qualitatively different good or service, with lower environmental impact (Jansson et al., 2010; Karlin et al., 2014). Examples of curtailment behaviors include riding the bus instead of driving a car, taking shorter showers, or using reusable bags when shopping. In contrast, efficiency (also known as green consumption) refers to the use of a product that provides the same good or service as a more common product, but with lower environmental impact (Jansson et al., 2010; Karlin et al., 2014). Thus, efficiency behaviors generally involve technological improvements rather than behavioral change, and may involve increased monetary costs. Examples of efficiency behaviors include installing solar panels on your roof, buying a fuel-efficient car, or installing energy-efficient lightbulbs. Although both curtailment and efficiency behaviors reduce environmental impact, efficiency behaviors are considered to have longer-lasting energy conservation effects (Karlin et al., 2014). However, the
The curtailment versus efficiency distinction is limited and can lead to issues of two-dimensionality (e.g. high-cost vs low-cost, high impact vs. low impact, etc.), ad hoc classifications, and the omission of other potential proenvironmental behavior classifications (Boudet et al., 2016). Aside from the curtailment/efficiency dichotomy, the literature on classifications of proenvironmental behaviors does not clearly address whether distinct classifications of behaviors exist or what set of behavioral attributes are most important in distinguishing between behaviors (Boudet et al., 2016; Urban and Scasny, 2014).

The central issue this paper seeks to address is that widely used categorizations of proenvironmental behaviors, and the behavioral change strategies derived from these categorizations, may not capture important similarities and differences between behaviors. As a result, behavior change strategies are missing opportunities to capitalize on positive spillover effects from one proenvironmental behavior to the next. Using a sample of environmentally-oriented individuals (hereafter-referred to as environmental participants/group) and a sample of non-environmentally-oriented individuals (hereafter referred to as business participants/group), we address this issue by exploring what attributes of behaviors are most salient for individuals and whether these attributes differ between environmental and business participants.

Methods
We use a mixed methods approach and data that was collected as part of a larger study designed to explore how individuals perceive the similarities and differences among proenvironmental behaviors. Researchers conducted interactive interviews that included hands-on activities. Interviews were conducted with individuals in sessions that lasted between 45 and 90 minutes and participants were paid $15 at the conclusion of the session. Four researchers conducted interviews with a total of 71 participants between summer 2013 and fall 2015. All researchers were trained in the research protocol in spring 2013.

Sample
We used a convenience sample of seventy-one participants from in and around urban centers in central and northeastern Ohio, USA. To examine the implications of environmental orientation on how individuals make linkages between proenvironmental behaviors, our sample consists of two types of participants. Thirty “environmental” participants were recruited with an email distributed to a local voluntary simplicity group, a local environmental NGO, and through emails and personal connections to employees of local chapters of two national environmental/conservation NGOs.

Forty-one “business” participants were identified by contacting employees in large businesses that do not have clear environmental missions (e.g. banks and financial service providers, utility companies, and manufacturing companies). Employees were contacted using personal connections and asked to solicit willing participants from their companies.
In addition, the study was advertised with signs placed in cafes and restaurants located near high concentrations of such businesses. Eleven participants (three environmental and eight business) were identified through snowball sampling as participants referred researchers to colleagues. These rough categories of participants were used as proxies to capture membership in social groups that vary in terms of attentiveness to environmental sustainability and awareness of opportunities and actions through which individuals can reduce their environmental impacts.

**Repertory Grid Exercise**

The primary data collection method used in this study was structured around a repertory grid technique. Repertory grids use elements and constructs to elicit the personal concepts that individuals use to interpret the social world (Jupp, 2006). Specifically, this technique elicits constructs by asking participants to consider the similarities and differences between a number of elements (Jupp, 2006). In this study, the elements are ten proenvironmental behaviors (see Table 1) and the constructs are attributes that respondents use to describe the behaviors along opposite polls (e.g. easy vs difficult, frequent vs infrequent, etc.). As a result, the repertory grid technique is well-suited to help us explore how individuals conceptualize the similarities and differences among proenvironmental behaviors, which we then use to infer the attributes that are most salient for individuals. The ten behaviors used in this study were chosen to ensure even spread across high to low-cost behaviors, and high to low-frequency behaviors.
In the repertory grid exercise, respondents generated attributes to characterize similarities and differences between three proenvironmental behaviors drawn at random from a set of ten behaviors. In this activity, ten cards, each containing a short description of a proenvironmental behavior (see Table 1), were placed face-down on a table. Respondents were asked to randomly choose three out of the ten cards (behaviors) and turn them face-up. For example, a respondent might randomly select buy fuel efficient car, install solar panels on roof, and maintain car tires at correct pressure from the set of ten behaviors (see Table 1). Participants were then asked to choose the two behaviors they thought were most similar and which one was different. In an attempt to reduce availability bias, participants were asked to think about the behaviors in general terms and avoid relating them to their own experience. Next, participants were asked to provide the reason(s) for their selection (these reasons represent the relevant attributes elicited by the participants). Participants were encouraged to provide as many reasons as they could think of. The researcher then recorded each reason along with the behaviors with which they are associated.

The main role of the researcher in this activity was to facilitate conversation with the participant about the reasons for their selection. The purpose of the conversation was to distil one or more simple, discrete attributes that can be expressed as a binary opposition. For instance, to continue with my previous example, a participant may say that buy fuel efficient car and maintain car tires at correct pressure are similar because they both
relate to cars. The researcher will record these two behaviors as ‘relate to cars’ and *installing solar panels on roof* as “does not relate to cars”.

Following this, using the same three behaviors, respondents were asked whether they could think of any other combination in which two behaviors were similar to each other and different from the remaining third behavior. If the respondent could think of another combination, respondents were again asked to provide the reason(s) for their selection. For example, a participant could say *buy fuel efficient car* and *installing solar panels on roof* both involve technology whereas *maintain car tires at correct pressure* does not. If, or when, the respondent was not able to think of any other combination of behaviors, the three cards (behaviors) were returned to the deck and the entire process was repeated until twenty-five minutes had elapsed or until the respondent could not offer any further ways of distinguishing between behaviors.

<table>
<thead>
<tr>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>repair clothes instead of buying new ones</td>
</tr>
<tr>
<td>put sheets of plastic insulation on windows</td>
</tr>
<tr>
<td>install solar panels on roof</td>
</tr>
<tr>
<td>purchase renewable energy from your energy provider</td>
</tr>
<tr>
<td>buy fuel efficient car</td>
</tr>
<tr>
<td>use bicycle instead of car for short journeys</td>
</tr>
<tr>
<td>eat vegetarian food instead of meat</td>
</tr>
<tr>
<td>install energy efficient light bulbs</td>
</tr>
<tr>
<td>maintain car tires at correct pressure</td>
</tr>
<tr>
<td>use bus instead of car for short journeys</td>
</tr>
</tbody>
</table>

Table 1. Ten Proenvironmental Behaviors Used in the Study
Coding Template

The attributes generated by respondents were coded using a template designed to match respondent-generated attributes with theory-derived attributes. The coding template included 42 codes, grouped into seven aggregate themes (Table 2). The six themes include ‘Social Dimensions’, ‘Motivations and Outcomes’, ‘Effortful Behaviors’, ‘Effortful Decisions’, ‘Daily Life’, ‘Personal Psychological Factors’, and ‘Contextual Influences’.
<table>
<thead>
<tr>
<th>Coding Theme</th>
<th>Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Dimensions</td>
<td>Visible / Observable (Private)</td>
</tr>
<tr>
<td></td>
<td>Visible / Observable (Social)</td>
</tr>
<tr>
<td></td>
<td>Symbolic / Shared Meanings</td>
</tr>
<tr>
<td></td>
<td>Identity / Signaling (Other-Directed)</td>
</tr>
<tr>
<td></td>
<td>Expectations (Social)</td>
</tr>
<tr>
<td></td>
<td>Link to Other Doers</td>
</tr>
<tr>
<td></td>
<td>Associated with Status</td>
</tr>
<tr>
<td>Motivations and Outcomes</td>
<td>Outcomes (General inc. Non-Env.)</td>
</tr>
<tr>
<td></td>
<td>Outcomes (Environmental)</td>
</tr>
<tr>
<td></td>
<td>Outcomes (Personal)</td>
</tr>
<tr>
<td></td>
<td>Outcomes (Timescale)</td>
</tr>
<tr>
<td></td>
<td>Motivations - Multiple Reasons</td>
</tr>
<tr>
<td></td>
<td>Motivations - Environmental</td>
</tr>
<tr>
<td></td>
<td>Motivations - Intrinsic (Values)</td>
</tr>
<tr>
<td></td>
<td>Motivations - Extrinsic (Money)</td>
</tr>
<tr>
<td></td>
<td>Motivations - Extrinsic (Incentives)</td>
</tr>
<tr>
<td>Effortful Decisions</td>
<td>Self-Control / Willpower</td>
</tr>
<tr>
<td></td>
<td>Information for Decision</td>
</tr>
<tr>
<td></td>
<td>Deliberation / Cognitive Effort</td>
</tr>
<tr>
<td></td>
<td>Choice Between Alternatives</td>
</tr>
<tr>
<td>Effortful Behaviors</td>
<td>Foregoing Personal Benefit</td>
</tr>
<tr>
<td></td>
<td>Change to Lifestyle</td>
</tr>
<tr>
<td></td>
<td>In-Convenience &amp; Dis-Ease</td>
</tr>
<tr>
<td></td>
<td>Time Commitment</td>
</tr>
<tr>
<td></td>
<td>Upfront Money Cost</td>
</tr>
<tr>
<td></td>
<td>Required Knowledge &amp; Skills</td>
</tr>
<tr>
<td></td>
<td>Physical Effort</td>
</tr>
<tr>
<td>Daily Life</td>
<td>Normal / Ordinary</td>
</tr>
<tr>
<td></td>
<td>Routine / Habitual</td>
</tr>
<tr>
<td></td>
<td>Frequent / Repetitive</td>
</tr>
<tr>
<td></td>
<td>Consumption / Materialism</td>
</tr>
<tr>
<td></td>
<td>Basic vs Luxury Needs</td>
</tr>
<tr>
<td>Personal Psychological Factors</td>
<td>Identity / Self-Image (Self-Directed)</td>
</tr>
<tr>
<td></td>
<td>Cognitive Dissonance</td>
</tr>
<tr>
<td></td>
<td>Emotions / Affect</td>
</tr>
<tr>
<td></td>
<td>Fairness</td>
</tr>
<tr>
<td>Contextual Influences</td>
<td>Salient Place / Domain</td>
</tr>
<tr>
<td></td>
<td>Social Marketing</td>
</tr>
<tr>
<td></td>
<td>Lack of Agency / Control</td>
</tr>
<tr>
<td></td>
<td>Systemic / Infrastructure Change</td>
</tr>
<tr>
<td></td>
<td>Salient Attribute of Technology</td>
</tr>
<tr>
<td></td>
<td>New / Modern Technology</td>
</tr>
</tbody>
</table>

Table 2. Coding Template and Six Corresponding Aggregate Themes
The coding template was created by researchers in the UK who were conducting this study in parallel with a different sample of respondents. The template began with an initial set of 67 attributes that were derived from a review of theoretical frameworks for understanding behavior (e.g. theory of planned behavior; values, beliefs, norms theory; theory of rational action, social practice theory; etc.). The theories reviewed are meant to be a representative, not exhaustive, set and were retrieved from documents and reports related to behavior change strategies focused on promoting proenvironmental behaviors (Chatterton, 2011; Jackson and Michaelis, 2003; Southerton et al., 2011). From these 67 attributes, 28 codes were created by removing repetitious or closely-related attributes and by combining highly specific attributes into more general forms. For example, ‘this behavior requires sufficient time’ and ‘this behavior requires sufficient money’ were combined into the more general attribute, ‘this behavior requires sufficient resources’.

This initial theory-derived coding template was then pilot tested using respondent generated attributes from the UK study. In the pilot test, 35 attributes were elicited from respondents, which were then double-blind coded by the researchers. Twenty-one of these 35 respondent-generated attributes overlapped with the original 28 theory-derived codes already in the coding template. However, the remaining 14 attributes were novel and were thus added to the coding template. The final coding template contained 42 codes, grouped into 7 aggregate themes (see Table 2).
In this study, three researchers, including the PI on the study, independently coded the behavioral attributes elicited from respondents in the repertory grid exercise and met to compare coding. There were no novel attributes elicited from respondents in this sample that would have required new codes to be added to the final template. When coding decisions differed, the group discussed the discrepancies and arrived at a consensus decision about the appropriate code associated with each respondent-generated attribute.

**Exit Survey**

The last phase of the interview included a short exit survey through which we collected demographic and socio-economic information, environmental attitudes, and self-reported experience with a subset of behaviors.

**Analysis and Results**

Quantitative analyses were conducted in SPSS version 23 and R statistical computing version 3.2.1. We first evaluated whether our two participant types were distinct with regards to environmental orientation and experience with proenvironmental behaviors. To measure environmental orientation, on a scale from 1 – 7 respondents were asked to agree or disagree with the following two statements: “I have a responsibility to protect the environment” and “I am concerned about the health of the environment”. An independent two-group Mann-Whitney U test suggests that environmental respondents are significantly more concerned about environmental problems (mean environmental = 6.63, mean business = 5.98, z = -4.123, p = 0.000) and feel significantly more responsible
for environmental protection (mean environmental = 6.67, mean business = 6.00, z = -4.002, p = 0.000). Regarding experience with proenvironmental behaviors, with the exception of tire pressure environmental participants reported having more experience than business participants with each of the proenvironmental behaviors included in the exit survey (see Table 1).

Furthermore, we evaluated whether both samples differed in basic demographic characteristics by testing for differences in gender, income, age, and education level. An independent two-group Mann-Whitney U test indicates that the environmental sample contains significantly more females (z = -4.763, p = 0.000) and is comprised of individuals who have a significantly lower income (z = -4.966, p = 0.000) than the business sample. There were no significant differences in age and education level between samples.

Using data collected in the repertory grid exercise, we explore which attributes of behaviors are most salient for individuals and whether these attributes differ between environmental and business participants. Respondents generated a total of 593 responses (254 from the environmental group and 339 from the business group) in the repertory grid exercise. After all responses were coded, frequency counts were conducted for each code and summed by aggregate theme (see Table 2). This analysis was conducted separately for the environmental sample and business sample to allow for group comparisons. Figure 1 shows the frequency of respondent-generated attributes, grouped
by the seven aggregate themes, for the environmental and business samples. For both samples, ‘Motivations and Outcomes' and 'Contextual Influences' were the most frequently cited themes, while ‘Social Dimensions’, ‘Effortful Decisions’, and ‘Personal Psychological Factors’ were the least frequently cited themes.

In both groups, the dominant code was 'Salient Place / Domain', which typically describes the physical context or locus for the behavior (e.g. at home, at work, on the move), but can also describe broad behavior types in very general descriptive terms (e.g. food-related, energy-related, health-related). The next most commonly cited code were 'Environmental Outcomes' and 'Salient Attribute of Technology'. The 'Salient Attribute of Technology' code describes any descriptive characteristic of a technology or material good involved in the behavior, but which is not specifically and explicitly related to its outcome or the motivation for doing it (e.g. uses electricity, aesthetically pleasing, fuel-efficient). Furthermore, the codes pertaining to the financial characteristics of behaviors, ‘Motivations – Extrinsic (Money)’ and ‘Upfront Money Cost’, were also commonly reported.

Not all coding categories were elicited from the respondents. In both samples, the codes describing incentives, cognitive dissonance, and fairness were not cited by any respondents. Additionally, none of the environmental participants noted general outcomes and self-control/will power. However, these two attributes were not commonly cited by the business group either. Only one business respondent cited general outcomes.
and three mentioned self-control or willpower. Additionally, none of the business participants cited observability, outcomes related to timescale, emotions or affect, or social marketing. For the environmental group, the number of participants citing these attributes was similarly low: one for observations, four for outcomes related to timescale, three for emotions or affect, and two for social marketing.

The most notable difference between groups was that ‘Environmental Motivations’ was cited considerably more by the business group (n= 22 or 6.5%) than by the environmental group (n = 5 or 2%). Additionally, for the environmental group, ‘Personal outcomes of behavior’ was elicited more often (n = 9 or 3.5%) than the environmental motivations of engaging in a behavior (n = 5 or 2%). The opposite is true for the business group, where environmental motivations (n = 22 or 6.5%) was cited more frequently than personal outcomes (n = 7 or 2%)\textsuperscript{1}.

\textsuperscript{1} Sample sizes are not even. The business sample consists of 37% more participants than the environmental sample. Additionally, n represents the number of elicitations for each attribute. Percentages are based on the total number of elicitations per group.
This study explores which behavioral attributes are most salient for individuals and whether these attributes differ between environmental and business participants. In general, the most salient attributes relate to non-social external factors whereas the least salient attributes correspond with internal decision-making processes and social influence (how other people influence our behavior). Furthermore, there were only minor
differences between the environmental and the business group in the attributes of behaviors that were most commonly cited. The results of the study are discussed below.

**Salient Attributes**

The results from this study provide insights into how individuals from two social groups in central and northeastern Ohio think about and perceive proenvironmental behaviors. The most salient attributes elicited from respondents generally correspond with a psychological framing of behavior, which distinguishes attitudes and other psychological attributes from external factors that may shape behaviors. Contrastingly, the least salient attributes were varied and ranged from the social components of behaviors (observability, signaling, symbolisms, expectations), to the relevant conditions and resources involved in decision-making (self-control, deliberation, information), to the personal psychological factors attributed to behaviors (cognitive dissonance, fairness, self-image, emotions).²

The clearly dominant attribute was ‘Salient Place / Domain’. This finding can be interpreted in a variety of ways. A simple interpretation would suggest that sector-based (i.e. domain-based) methods of grouping behaviors may actually be socially and psychologically meaningful to individuals. On the other hand, it is also possible that common references to this category is a reflection of exposure to similar methods of classifying behaviors by behavioral change interventions. One of the most common

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² These personal psychological factors are experienced internally making them less visible/observable than the previously mentioned salient psychological attributes, which are often expressed externally.
approaches used by behavioral change interventions is to classify groups of behaviors based on descriptive sectors (household, commercial, institutional, transportation; at home, at work, on the move, on holiday) (Barr and Gilg, 2006; Bratt, 2015; Dietz et al., 2009; Gardner and Stern, 2008). Therefore, to the extent that a sufficient portion of the public has been exposed to these interventions, it is possible that the widespread use of sector-based classification methods by behavior change interventions effectively influenced individuals to categorize proenvironmental behaviors in a similar manner.

However, a third, and more likely, explanation for the large number of elicitation of the ‘Salient Place / Domain’ attribute expressed by respondents, is the catch-all nature of the code. In other words, since the ‘Salient Place/Domain’ attribute can encompass a broad range of behavior types, it is unsurprising that this attribute was elicited more often than other attributes that can only encompass a narrow range of behavior types. This also explains the commonness of the ‘Salient Attribute of Technology’ attribute, which was another catch-all code encompassing a broad range of behaviors (i.e. any descriptive characteristic of a technology or material good involved in the behavior, but which is not specifically and explicitly related to its outcome or motivation).

Respondents also perceived the financial characteristics of behaviors as salient. This finding potentially supports a rational choice, economic perspective of consumer behavior in which proenvironmental behavior is driven by the desire to minimize expenditures or economic cost (Geller, 1989; Wilson and Dowlatabadi, 2007). From this
perspective, financial characteristics of behaviors are important for consumers to
differentiate between inexpensive behaviors (preferred) and expensive behaviors (not
preferred).

There are several possible explanations for why respondents perceived non-social
external attributes (e.g. outcomes, salient place/domain, etc.) as more salient than
attributes related to internal decision-making processes and social influence (e.g.
deliberation, social norms, etc.). For example, by presenting behaviors written on a card,
respondents may be more likely to visualize the behaviors in a superficial manner,
prompting respondents to focus more on the descriptive and external characteristics of the
behaviors rather than the internal social and psychological factors that influence our
decisions. That is, respondents may have focused more on the physical action involved in
the behavior, where the behavior takes place, and the materials required for the behavior
than on the decision-making process that may precede the action itself or the social or
psychological consequences of the behavior.

Aside from the method used to present the behaviors, the low salience of social and
personal psychological factors could also be a result of people’s tendency to
underestimate the influence of social norms on their behavioral decisions. In other words,
people do not think that other people and their behaviors have a bearing on them and their
behaviors. However, experimental studies on social norms and influence suggest
otherwise (Cialdini, 2005; Cialdini and Goldstein, 2004; Cialdini and Trost, 1998; Nolan
et al., 2008). Research in human cultural evolution offers a potential explanation for this phenomenon. As a species, we evolved to use cognitive heuristics as a more efficient approach to acquire new skills and knowledge (Boyd et al., 2011; Henrich and McElreath, 2003; Mesoudi et al., 2006; Richardson and Boyd, 2005). One of these heuristics is to selectively learn through observation or direct instruction of others and their behaviors (i.e. social learning), which provides a more efficient alternative to independent individual exploration (Boyd et al., 2011; Henrich and McElreath, 2003; Richardson and Boyd, 2005). However, social learning and other cognitive heuristics are so deeply ingrained in our cognitive processes that we are often unaware of them (Richardson and Boyd, 2005). In addition, the use of these heuristics is so ubiquitous that being actively aware of them would overwhelm our cognitive capacity (Richardson and Boyd, 2005). Therefore, it is not surprising that the respondents in this study did not heavily focus on social and psychological factors that influence decisions.

**Group Differences**

Overall, there were only minor differences in the results between the environmental and business groups. Specifically, the business sample perceived the environmental motivations of behaviors to be more salient than the environmental sample. In addition, the environmental sample perceived personal outcomes of behaviors to be more salient than environmental motivations, while the opposite was true for the business sample.
These findings seem counterintuitive since one would normally expect that environmentally-oriented individuals would be more cognizant of the environmental implications of particular behaviors. Similarly, one would expect that non-environmentally-oriented individuals would be more attentive to the personal outcomes of engaging in a behavior rather than the environmental implications. However, these findings are similar to other findings found in another part of this study (see Chapter 2), in which the business group rated *eat vegetarian food instead of meat* as higher in status than the environmental group.

The group differences noted above may be explained by differences in environmental knowledge between participant types and in perceptions of social expectations between participants and the researchers conducting the interview. Given the diversity of knowledge associated with environmental behaviors among individuals, it is expected that the way and the degree in which one perceives two behaviors as similar differs from one person to the next (Thøgersen, 2004; Truelove, 2014). In other words, individuals with more environmental knowledge may be more likely to think of behaviors as connected (e.g. *eating vegetarian food instead of meat* and *repairing clothes instead of buying new ones* both reduce environmental impact) than individuals with less environmental knowledge (Truelove, 2014). Therefore, in this study, environmental participants may have perceived all behaviors to be motivated by concern for the environment, consequently making it difficult to distinguish behaviors using this attribute. On the other hand, business participants would be less likely to perceive the
connection with environmental impacts across all behaviors. From this perspective, perhaps it is not surprising that business participants focused more on environmental motivations to distinguish between behaviors since. While environmental respondents recognized the environmental impacts or benefits of all behaviors, business respondents may have only been aware of the direct or indirect environmental implications of a subset of the behaviors presented to them. To these participants, some behaviors may clearly relate to environmental motivations or outcomes, whereas this would not be the case for other behaviors.

In addition, differences in perceptions of social expectations between participant types and the researcher also contributed to these group differences. During the interview, despite our efforts to generalize our study’s research goal in order to censor explicit affiliation with the environmental realm, business participants were aware of the researchers’ associations with the School of Environment and Natural Resources. This is likely because the informed consent document that was read by participants prior to participating in the interview explicitly mentioned the option to contact the School of Environment and Natural Resources for more information about the study. As a result, we suspected that some business participants might have provided more environmentally-oriented responses as a way to match what they perceived to be the researchers’ expectations. This is particularly the case for business participants who may have been, or perceived themselves to be, more environmentally-oriented than the relative to the average business person, which our study design did not strictly control for. On the other
hand, environmental participants did not feel the need to clarify or reinforce their environmentally-oriented identity to the researchers since they were specifically targeted because of their associations with an environmental organization or association. Therefore, given the potential effect of perceived differences in social expectations, one can understand how and why the business group perceived the environmental motivations of behaviors as considerably more salient than the environmental group.

Comparison with Boudet et al.

The literature on proenvironmental behaviors does not clearly address whether distinct classifications of behaviors exist or what set of behavioral attributes are most important in distinguishing between behaviors (Boudet et al., 2016; Urban and Scasny, 2014). Importantly, the research questions that motivated this study were the same as those underlying another, recently published study (Boudet et al. 2016). Both studies explored specific attributes that are common to behaviors instead of distinguishing between curtailment and efficiency behaviors. However, the study design and approach used to address this issue are fundamentally different.

Boudet et al. (2016) identified nine theoretically-derived attributes that pertain to proenvironmental behavior and scored 261 proenvironmental behaviors on that set of attributes. They used a cluster analysis to identify four distinct clusters of behaviors: family style (19% of behaviors), call an expert (26% of behaviors), household management (32% of behaviors), and weekend project (22% of behaviors). Their analysis
sheds light on potential classifications that are not well-represented in the literature (e.g. weekend project behaviors). However, rather than obtaining insights from the public, researchers were used to code the behaviors into attribute categories. Additionally, the attributes used for coding were derived directly from theory, rather than from the public.

Our study design differs from Boudet et al.’s (2016) study in three ways. First, although we use theory to guide our coding, we elicit attributes from respondents rather than drawing directly from theory. By doing so, we explore how salient different attributes are to participants, rather than making the assumption that all attributes are equally salient. Second, we explore these attributes by asking respondents to consider behaviors in relation to each other. This approach is important because people generally do not think about behaviors in isolation. Behaviors and consumption decisions are often linked to other actions or purchases (Darnton et al., 2011; Shove, 2010; Shove et al., 2012; Southerton et al., 2011). Third, we explore whether individuals from different social groups categorize and conceptualize relationships between behaviors differently. This is important because people from different social groups can perceive behaviors differently. For instance, evidence from chapter two suggests that non-environmental respondents consider eating vegetarian food instead of meat to be expensive and somewhat uncommon whereas environmental respondents considered it to be fairly inexpensive and much more common that it used to be.
Despite differences in approaches between our study and the study conducted by Boudet et al. (2016), each has its benefits. By scoring behaviors themselves rather than relying on participant responses, Boudet et al. were able to examine a large number of behaviors, which permitted them to conduct a robust statistical analysis. However, despite having fewer behaviors, our study is valuable in that we were able to draw relevant attributes of the behaviors from a variety of individuals. In addition, working with fewer behaviors allowed us to explore the relationships between the behaviors and not just the behaviors in isolation. This is important because by exploring how people conceptualize the relationship between behaviors, we are better able to capture potential spillover effects from one behavior to the next. Behavioral spillover is defined as the effect of an intervention on subsequent behaviors not targeted by the intervention (Poortinga et al., 2013). Spillover effects may be positive (i.e. engaging in behavior A increases the likelihood of engaging in behavior B) or negative (i.e. engaging in behavior A decreases the likelihood of engaging in behavior B) (Truelove et al., 2014). The relational component of our study provides insights into the dimensions that are salient for individuals, which may then provide an indication of the behaviors between which spillover effects may occur. This is because positive spillover is more likely to occur with behaviors within similar categories (Gatersleben et al., 2002; Truelove et al., 2014).

Implications

The results presented in this study have several important implications for improving behavior change strategies related to promoting proenvironmental behaviors. The degree
of salience associated with different attributes of behaviors as perceived by respondents offers researchers and policy-makers a first look at what attributes are meaningful to the respondents themselves. Relatively little work has been done to classify proenvironmental behaviors (Boudet et al., 2016; Truelove et al., 2014) and most of these studies rely on researcher’s to differentiate among behaviors.

We agree with Truelove et al.’s argument that the public’s, not the researchers’, perceptions of the salient attributes of behaviors is the relevant factor for determining behavioral spillover. This is because people are more likely to co-perform behaviors that are perceived to be similar (Gatersleben et al., 2002; Truelove et al., 2014). Therefore, based on the findings from this study, individuals are more likely to co-perform behaviors that have similar descriptive and external characteristics (e.g. salient place or domain) than behaviors that are influenced by similar social norms and internal decision-making processes (e.g. social signaling or shared meanings). These findings can be used to inform behaviorally oriented policies and interventions on how to create classifications of behaviors that are meaningful to the public and that capitalize on potential spillover effects from one behavior to the next.

Limitations and Ideas for Future Research

Our results are inherently limited by the behaviors, attributes, and aggregate themes used in this study. Regarding the attributes, the broad range of behaviors potentially encompassed by certain codes (i.e. ‘Salient Place / Domain’ and ‘Salient Attributes of
Technology’) complicated the interpretation of our results. Furthermore, the diverse number of attributes contained within each aggregate theme limited the interpretation of our frequency count data. Future studies should standardize the number of behaviors across all themes to provide more meaningful count data.

Furthermore, some of what we observe to be "group" differences in the results may be better explained by the differences in income and gender between the sample groups. Future studies should select samples that do not differ significantly with regards to demographic variables.

Additionally, certain elements of the study design may have inadvertently influenced participants’ responses. For example, our attempts to avoid revealing our affiliation with the environmental realm to the business respondents were insufficient. Future studies should consider better approaches to avoid revealing any associations that researchers may have with the environmental field that could lead to distorted responses from a non-environmentally-oriented sample during the interview process.

In addition, future studies should consider controlling for variations in environmental-orientation among participants by including a standard and more comprehensive method to measure environmental attitudes, such as the New Ecological Paradigm scale. This measure of environmental attitudes should be included at the end of the interview process to avoid priming participants to think in a more environmentally-oriented manner. This
measure could also serve as an additional parameter for targeting and distinguishing between samples. Similarly, efforts should be made to avoid snowball sampling and better identify individuals who are far from being environmentally-oriented.

Furthermore, the manner in which the behaviors were presented to participants could have caused certain types of attributes to be elicited more often than others. Presenting the behaviors as text on cards could have influenced a more superficial approach to thinking about behaviors, which focuses more on descriptive (e.g. salient place or domain) and external characteristics (e.g. outcomes) and less on social influences (e.g. norms) and psychological factors (self-image) that influence their decision to engage in the behavior. Future studies should present the behaviors in a way that avoids favoring any particular approach of conceptualizing the behaviors. Behaviors should be presented in a manner that allows respondents to think about their own decision-making processes regarding why they might adopt or avoid a behavior instead of merely the physical characteristics and outcomes of the behavior. Alternatively, respondents might have focused less on the social influences and internal psychological factors because of people’s tendency to underestimate the effects of these factors on our decisions. To address this issue, future studies could experiment with different methods of presenting the behaviors in a manner that stimulates respondents to think more about these factors. Lastly, although the low number of behaviors used in the study allowed us to explore perceived similarities and differences between behaviors from laypeople instead of scholars, it ultimately limited our ability to conduct a robust statistical analysis. This
differed from the Boudet et al. (2016) study, which relied on researchers to differentiate between more than 250 behaviors. However, it is possible that these differences can be reconciled through a hybrid approach between our study and Boudet et al.’s (2016) study.

We propose a hybrid study design that addresses our research limitations and combines approaches from this study and Boudet et al.’s (2016) study. This hybrid approach would be similar to our study because it would involve generating relevant attributes of behaviors from respondents instead of using a narrow set of attributes and having researchers score behaviors. Obtaining responses from the public using a crowdsourcing internet marketplace (such as Amazon Mechanical Turk) would provide a sufficiently large sample size. Each individual could score a smaller subset (approximately 50 rather than the full set of 261 employed by Boudet et al.) of behaviors along a set of pre-determined attributes. There would therefore be five clusters of 50 behaviors, each cluster of which could be scored by a large number of individuals relatively quickly.

Conclusion

Widely adopted categorizations of proenvironmental behaviors, and the behavioral change strategies derived from these categorizations, may not capture important similarities and differences between behaviors. This is important because behavioral spillover is more likely when behaviors are conceptually linked. As a result, behavior change strategies are missing opportunities to capitalize on positive spillover effects from one proenvironmental behavior to the next. Using a repertory grid technique, we address
this issue by exploring which attributes of behaviors are most salient for individuals and whether these attributes differ between environmental and business participants. This study suggests that individuals are more likely to co-perform behaviors with similar non-social external and descriptive attributes (e.g. outcomes, salient place/domain, etc.) than behaviors involving similar internal decision-making processes and social influences for engagement in that behavior (e.g. deliberation, social norms, etc.). This pattern held across both environmental participants and business participants. Ultimately, these findings can be used to inform behaviorally oriented policies and interventions on how to create classifications of behaviors that are meaningful to the public and that capitalize on potential spillover effects from one behavior to the next. Future studies should include a larger number of behaviors for respondents to score using pre-determined attributes. Data from these additional studies will allow the use of cluster analysis techniques to reveal distinct, and statistically valid, groupings of behaviors. Furthermore, future work should explore methods of presenting behaviors that enable respondents to think about their personal decision-making processes regarding why they might adopt or avoid a behavior instead of merely the physical characteristics and outcomes of the behavior.
Chapter 3: Status, Motivation, and Prosocial Behavior: Exploring Perceptions of Green Consumption and Curtailment Behaviors

Introduction

Although the environmental and social impacts of overconsumption are well known (Jackson, 2005; Kasser, 2002), the complex interactions between individual behaviors, social norms, and the physical environment have made the shift towards more sustainable consumption challenging. We address one important driver of consumption and proenvironmental behavior by exploring perceptions of the social signals associated with such behaviors. Social dynamics are important because part of the benefit we derive from consumption comes from how it is viewed by others (Axsen and Kurani, 2012; Heffetz, 2004). Consumption provides information about social identity and personal attributes, and can indicate membership in, or distinction from, social groups (Belleza et al., 2014; Berger and Heath, 2008; Sütterlin and Siegrist, 2014).

Social status is just one of the social signals communicated by consumption and behavior, but it is important for two reasons. First, the pursuit of status and social distinction has long been used to explain unsustainable consumption (e.g. Veblen, 1899). Recent studies have continued this line of research by examining the relationships between status, identity signaling, symbolism, and consumption (Belleza et al., 2014; Delgado et al.,
Second, both theory (Henrich and Gil-White, 2001; Richerson and Boyd, 2005) and empirical research (Cohen and Prinstein, 2006; Van den Bulte and Stremersch, 2004) suggest that the behaviors of higher status individuals are more likely to be adopted and spread. High status individuals are evaluated more favorably, deferred to more, have more resources allocated to them, and are more likely to be copied (Hardy and van Vugt, 2006; Henrich and Gil-White, 2001). Thus, while a variety of social, economic, psychological, and contextual factors are known to motivate consumption and proenvironmental behavior (Jackson 2005), the perceived status associated with goods or behaviors is important for understanding their diffusion.

While numerous studies have explored the relationship between status and consumption (see above), they have generally focused on a small number of behaviors that fall within particular domains (e.g. transportation, fashion). However, proenvironmental behaviors can differ in how costly they are, the types of costs incurred (monetary, convenience, effort, etc.) (Welte and Anastasio, 2010), and how big of an environmental benefit they produce (Dietz et al., 2009). This variation makes it important to explore perceptions of the status associated with a variety of products and behaviors. In addition, few studies have examined whether and how individuals from different social groups perceive the status of behaviors and consumption decisions (though see Berger and Heath (2008) and Brooks and Wilson (2015)).
Here, we use a mixed methods approach to examine the perceived status of a suite of proenvironmental behaviors, why such behaviors tend to be associated with high or low status, and whether these perceptions depend on the environmental orientation of research participants. Below we outline why understanding status signals is important for sustainable consumption, why perceptions of the motivation for adopting behaviors may be associated with status, and why individuals may differ in their perceptions of the status associated with behaviors.

Before moving ahead, however, we want to be clear about two terms. First, we define ‘sustainable consumption’ and ‘proenvironmental behavior’ broadly as actions or purchases that reduce one’s environmental impact. We use these terms interchangeably because purchasing a product can itself be a proenvironmental behavior and because the adoption of some behaviors can lead to reduced consumption levels. Second, we define status to be one’s relative standing or rank in a group that has been awarded by others based on prestige and deference. Importantly, we each belong to multiple groups, which can range in size from small peer groups to large groups like political parties, religions, and nations. In addition, behaviors may signal group identity and/or social differences. Thus, “rank or standing within a group” need not imply that our signals are only relevant for a small group of well-known peers.

*Status and Sustainable Consumption*
Conspicuous consumption (Veblen 1899) is a well-known framework for describing the relationship between consumption and status. Conspicuous consumption signals that one can afford a product with little additional functional value but greater symbolic value than a more commonplace product, which in turn signals higher status.

The link between conspicuous consumption and status can be explained by costly signaling theory in that particular behaviors or consumption patterns may act as superficial cues that accurately and reliably signal underlying traits (Bliege Bird and Smith, 2005). In the context of conspicuous consumption, the underlying trait of wealth is reliably signaled by the monetary cost of the product or behavior on display.

However, costly signaling theory may also help us understand whether and when sustainable consumption can enhance one’s status. This is because cooperative, prosocial behavior (van Vugt et al., 2007) can also signal one’s ability to absorb costs. These costs may be non-monetary and can include time, effort, convenience, or self-sacrifice. Importantly, prosocial individuals are considered to be more trustworthy, more desirable as friends and allies, and are more likely to be elected as leaders (Gintis et al., 2001; Henrich, 2009; Willer, 2009). As such, we may act prosocially to gain social approval (Ariely et al., 2009).

Understanding whether and when prosocial behavior increases one’s status is important because sustainable consumption can be considered prosocial. For instance, owning a
high efficiency vehicle could entail absorbing personal costs (less comfort and lower performance) for collective benefits (lower CO₂ emissions) and might signal that one is more concerned about contributing to the collective good than about the personal benefits gained from a higher performance vehicle. Such consumption has been found to be associated with high status. For instance, Griskevicius et al. (2010) find that being primed to think about status makes participants more likely to choose a green product over a more luxurious, non-green product of equal price.

However, there are different categories of sustainable consumption, which could have implications for perceptions of status and thus, potential diffusion. For instance, green consumption (i.e. also known as efficiency) refers to the use of a product (e.g. a Prius) that provides the same good or service (mobility) as a more common product (e.g. standard vehicle), but with lower environmental impact. Thus, green consumption generally involves technological improvements rather than behavioral change, and may involve increased monetary costs.

In contrast, ‘curtailment’ refers to behavioral changes that provide less of a good or service, or a qualitatively different good or service, with lower environmental impact (Jansson et al., 2010; Karlin et al., 2014). Curtailment often has no, or low, monetary costs but potentially substantial non-monetary costs of time, knowledge, effort, or inconvenience. There is little evidence that low-cost, curtailment behaviors (e.g. line-drying one’s clothes, taking the bus) are associated with high status (Brooks and Wilson...
Instead, reducing consumption through low-cost environmental behaviors may be associated with low status (Sadalla and Krull 1995).

The distinction between green consumption and curtailment is important because the technological advances and efficiency gains associated with the former may be insufficient for reaching long-term sustainability goals (Jackson, 2009; Meadows et al., 2004). Concerns about rebound and substitution effects (Jenkins et al., 2011) and increased consumption by the growing global middle class (Myers and Kent, 2004) have lead to calls for changes in the structures – such as social norms – underpinning overconsumption (Meadows et al., 2004; Speth, 2012). Changes in the status signals associated with different forms of sustainable consumption could ultimately lead to different social norms and consumption patterns.

**Perceived Motivation and Status**

The prosociality of a behavior may depend on the costs incurred and collective benefits provided (Willer 2009). Actions that contribute to the collective good at personal cost could be perceived to be prosocial and status worthy because they demonstrate that one is can absorb costs to help others. Curtailment may reduce environmental impacts more than green consumption and can involve personal costs including time, convenience, and physical energy (Jansson et al., 2010). However, curtailment tends to be perceived as lower status than green consumption.
One explanation for why curtailment is perceived as low status despite the personal costs and collective benefits is that it can send ambiguous status signals. Without additional information, an observer will not know whether one is choosing to reduce their consumption or is constrained by a lack of resources. For example, choosing to ride the bus to reduce one’s environmental impact could be prosocial, and thus status-worthy, but taking the bus out of financial necessity does not require personal sacrifices and so is unlikely to be considered costly or prosocial.

Similarly, different audiences may judge prosociality or social signals differently (Ariely et al., 2009; Cronk, 2005; Willer, 2009). Some signals are understood only by individuals within a particular social group and/or with a specialized knowledge base (Berger and Ward, 2010; Smaldino et al., 2015). For instance, individuals who are more concerned about environmental problems, more knowledgeable about curtailment, and who interact frequently with others also practicing curtailment may assume that such behaviors are intentional, and thus status-worthy. For example, the signal associated with a Prius is clearer and has greater value in some communities than in others (Sexton and Sexton 2011). Conversely, an individual with little concern about environmental issues or no experience with or desire to reduce consumption may assume that such behaviors would only be adopted out of necessity.

If low-cost curtailment behaviors are needed for long-term sustainability but send ambiguous signals that could hamper shifts to lower consumption, then it is important to
understand how curtailment is perceived and whether perceptions differ between groups. We address this larger issue the following specific research questions by comparing a sample of environmentally-oriented individuals (hereafter referred to as environmental participants) with a sample of non-environmentally-oriented individuals (hereafter referred to as business participants):

Q1: *What are the characteristics of behaviors that are associated with high status, and do these perceptions of important characteristics differ by participant type?*

Q2: *Which proenvironmental behaviors are perceived to be relatively higher and lower in status, why, and do these perceptions differ by participant type?*

Q3: *Is the status of a proenvironmental behavior related to whether the behavior is perceived to be motivated by environmental concern and does this differ by participant type?*

We expect that participants will consider high-cost green consumption to be higher status than low-cost curtailment behaviors; that environmental participants will rate curtailment behaviors higher in status than business participants; and that the opposite will be true for green consumption (see Figure 2). We also expect that environmental participants will be more likely to assume that curtailment behaviors are motivated by environmental concern than business participants, but that there will be no differences for green consumption.
Methods

We use a mixed methods approach and data that was collected as part of a larger study designed to explore how individuals perceive the similarities and differences among proenvironmental behaviors. Researchers conducted interactive interviews that included hands-on activities. Interviews were conducted with individuals in sessions that lasted between 45 and 90 minutes and participants were paid $15 at the conclusion of the session. The interview process is depicted in Figure 3. Four researchers conducted interviews with a total of 71 participants between the summer 2013 and fall 2015. All researchers were trained in the research protocol in spring 2013.
We used a convenience sample of seventy-one participants from in and around urban centers in central and northeastern Ohio, USA. To examine the implications of environmental orientation on status signaling, our sample consists of two types of participants. Thirty “environmental” participants were recruited with an email distributed to a local voluntary simplicity group, a local environmental NGO, and through emails and personal connections to employees of local chapters of two national environmental/conservation NGOs.

Forty-one “business” participants were identified by contacting employees in large businesses that do not have clear environmental missions (e.g. banks and financial service providers, utility companies, and manufacturing companies). Employees were contacted using personal connections and asked to solicit willing participants from their companies.
In addition, the study was advertised with signs placed in cafes and restaurants located near high concentrations of such businesses. Eleven participants (three environmental and eight business) were identified through snowball sampling as participants referred researchers to colleagues. These rough categories of participants were used as proxies to capture membership in social groups that vary in terms of attentiveness to environmental sustainability and awareness of opportunities and actions through which individuals can reduce their environmental impacts.

Nineteen proenvironmental behaviors were used in the study, although not all behaviors were used for each component of the interview. We categorized these behaviors as high-cost green consumption, low-cost curtailment, or “neutral” behaviors (see Table 3).
<table>
<thead>
<tr>
<th>Curtailment</th>
<th>Green Consumption</th>
<th>Neutral</th>
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<tbody>
<tr>
<td><strong>Repair used clothes instead of buying new ones (repair clothes)</strong>: less of a good; saves money, but requires time.</td>
<td><strong>Install solar panels on roof (solar)</strong>: provides energy more efficiently; high-cost item.</td>
<td><strong>Donate clothes no longer being used to charity (donate clothes)</strong>: no personal costs, no change in service. <strong>Participate in public protests about environmental issues (protest)</strong>: no change in service or use of a good; costs can include time and inconvenience.</td>
</tr>
<tr>
<td><strong>Eat vegetarian food instead of meat (vegetarian diet)</strong>: qualitatively different good; may save money and require additional knowledge, effort, or inconvenience</td>
<td><strong>Buy locally produced food (local food)</strong>: provides food with a smaller carbon footprint than non-local food produced in the same manner; may be more expensive than alternatives (particularly if purchased at a farmer’s market). <strong>Install energy efficient light bulbs (light bulbs)</strong>: provides lighting more efficiently; perceived to be higher cost than standard bulbs</td>
<td></td>
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<tr>
<td><strong>Turn down heating when at home during the day (turn down heat)</strong>: less of a good; saves money but may lead to discomfort</td>
<td><strong>Buy fuel-efficient car (fuel-efficient car)</strong>: provides mobility more efficiently; high-cost item.</td>
<td><strong>Participate in public protests about environmental issues (protest)</strong>: no change in service or use of a good; costs can include time and inconvenience.</td>
</tr>
<tr>
<td><strong>Take shorter showers (shower)</strong>: less of a good; saves money but may reduce enjoyment</td>
<td><strong>Purchase renewable energy from your energy provider (renewable energy)</strong>: provides energy from more environmentally-friendly sources; perceived to be more expensive than non-renewable energy</td>
<td></td>
</tr>
<tr>
<td><strong>Use bicycle instead of car for short distance journeys (bike)</strong>: qualitatively different service; saves money, but requires additional effort and time, which may lead to less overall travel.</td>
<td><strong>Maintain car tires at correct pressure (tire pressure)</strong>: provides same service more efficiently; low cost</td>
<td></td>
</tr>
<tr>
<td><strong>Wash clothes at low temperature (wash)</strong>: qualitatively different service; can save money but may reduce quality</td>
<td><strong>Put sheets of plastic insulation on windows (insulate windows)</strong>: provides same service (heating) but more efficiently; higher cost than no insulation, but cheaper than alternative solutions</td>
<td><strong>Install attic or wall insulation (wall insulation)</strong>: provides same service (heating); may entail substantial upfront costs.</td>
</tr>
<tr>
<td><strong>Use bus instead of car for short distance journeys (bus)</strong>: qualitatively different service; saves money, but requires additional time, and inconvenience, which may leading to less overall travel. <strong>Compost kitchen waste (compost)</strong>: qualitatively different service; food is broken down rather than being sent to dump. Requires additional time and inconvenience.</td>
<td><strong>Install attic or wall insulation (wall insulation)</strong>: provides same service (heating); may entail substantial upfront costs.</td>
<td></td>
</tr>
<tr>
<td><strong>Reuse bags when shopping (bags)</strong>: reduction in use of a good (plastic bags); requires effort to remember to bags</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3. Categorization of Behaviors as ‘Curtailment’, ‘Green’, or ‘Other’ with a Corresponding Justification for the Categorization Based on the Definitions Provided in the Text

a. subset of behaviors used in the environmental motivation activity.
b. participants were asked how much experience they had with this subset of behaviors in the exit survey.
**Perceived Motivation**

For this task, participants were given ten cards, each containing a short description of a proenvironmental behavior (see Table 3) and were asked to place each card on a board divided into columns arranged on a scale from 1 to 5. A score of 1 indicated that the behavior was not motivated by environmental concern and a score of 5 indicated that the behavior was strongly motivated by environmental concern (see Figure 3, perceived motivation activity). Participants could place as many or as few behaviors in a column as they wished. The number of behaviors was reduced for this activity to make sorting the behaviors more manageable. The subset of ten behaviors was chosen to ensure even spread across high to low-cost behaviors, and high to low-frequency behaviors (i.e. one-off behaviors vs. repeated behaviors).

Q-sort: conceptualizations of status, perceived status, and indicators of status

After completing a series of survey questions about proenvironmental behaviors (not used in this analysis), participants were guided through a sorting procedure based on Q methodology. In Q methodology, the subjective meanings of a particular construct are elicited by having participants sort behaviors relative to one another along a bipolar scale defined by the researcher (Goldman 1999; McKeown and Thomas, 1988). The result of this sorting activity is a Q-sort, which serves as a model of a participant’s viewpoints and can be used to uncover latent dimensions of complex constructs; in this case, social status.
Participants were presented with 19 cards (each labeled with a behavior) (Table 3) and were asked to place each in one of the 19 boxes on the Q-sort board (see Figure 3, Q-sort) based on the degree to which they felt that the behavior was associated with high status, low status, or neutral. Prior to viewing the cards, participants were asked, “What comes to mind when you think about whether a behavior might be associated with high status or not?” This question was repeated after participants reviewed the cards.

Participants then placed the cards on the board and made any adjustments to their initial card placement that they felt were necessary. When participants were satisfied with their choices, they were asked three additional questions: (i) why did you place the behaviors you did in the “high status” cells (those with values of 2 or 3), (ii) why did you place the behaviors you did in the “low status” cells (those with values of -2 or -3), (iii) which behaviors were hardest to place and why? Altogether this exercise resulted in both quantitative data (rankings of all behaviors) and qualitative data exploring the factors participants felt were indicative of status, and explanations for their rankings.

The first author coded responses to these questions using MaxQDA version 12 qualitative data analysis software. A coding scheme was developed based on participant responses in a parallel study conducted in the UK and modified based on novel responses from the current sample. Recording sheets with hand-written records of participants’ responses to each question were converted to digital text documents. Each response for a participant was broken down into distinct phrases where possible. These phrases were then
individually coded, such that a participant’s response could include multiple phrases, each of which fit different coding categories. Phrases that did not fit the initial categories were grouped into the smallest number of new categories that could be created without losing potentially important differentiation in participants’ intents (see Table 9). When there was uncertainty about coding, two of the researchers discussed the phrase and reached a conclusion about the appropriate category. A formal inter-coder reliability test was not deemed necessary given the sample size.

Exit Survey

The last phase of the interview included a short exit survey through which we collected demographic and socio-economic information, environmental attitudes, and self-reported experience with a subset of behaviors.

Analysis and Results

Quantitative analyses were conducted in SPSS version 23 and R statistical computing version 3.2.1. We first evaluated whether our two participant types were distinct. Three pieces of evidence suggest that there are important differences. First, on a scale from 1 – 7 respondents were asked to agree or disagree with the following two statements: “I have a responsibility to protect the environment” and “I am concerned about the health of the environment”. An independent two-group Mann-Whitney U test suggests that environmental respondents are significantly more concerned about environmental problems (mean environmental = 6.63, mean business = 5.98, z = -4.123, p = 0.000) and
feel significantly more responsible for environmental protection (mean environmental = 6.67, mean business = 6.00, z = -4.002, p = 0.000). Second, with the exception of tire pressure, environmental participants reported having more experience than business participants with each of the proenvironmental behaviors included in the exit survey (see Table 3). Third, discriminant function analysis was used to determine whether it is possible to distinguish between environmental and business participants based on status scores for behaviors (see SI text for details on this analysis). The discriminant function analysis indicates that the model accurately predicts participant type based on status scores. Wilk’s Lambda (0.524) is statistically significant (p < 0.05) (see Table 4) and the large distance between centroids (environment = 1.098, business = -0.804) indicates good separation between participant types. The model correctly predicted 68% of cases, which demonstrates good predictive power (see Appendix).

Furthermore, we evaluated whether both samples differed in basic demographic characteristics by testing differences in gender, income, age, and education level. An independent two-group Mann-Whitney U test indicates that the environmental sample contains significantly more females (z = -4.763, p = 0.000) and is comprised of individuals who have a significantly lower income (z = -4.966, p = 0.000) than the business sample. There were no significant differences in age and education level between samples. We have organized the remainder of the analysis and results by the three guiding questions introduced earlier.
<table>
<thead>
<tr>
<th>Independent variable</th>
<th>Discriminant loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Install solar panels on roof</td>
<td>0.319</td>
</tr>
<tr>
<td>Buy fuel-efficient car</td>
<td>0.306</td>
</tr>
<tr>
<td>Install attic or wall insulation</td>
<td>0.303</td>
</tr>
<tr>
<td>Centroid</td>
<td></td>
</tr>
<tr>
<td>Group centroid environmental</td>
<td>1.098</td>
</tr>
<tr>
<td>Group centroid business</td>
<td>-0.804</td>
</tr>
<tr>
<td>Test Statistics</td>
<td></td>
</tr>
<tr>
<td>Wilks’ Lambda</td>
<td>0.524*</td>
</tr>
<tr>
<td>Chi-square (df = 18)</td>
<td>38.772*</td>
</tr>
<tr>
<td>(Canonical correlation)^2</td>
<td>0.476</td>
</tr>
</tbody>
</table>

Table 4. Summary of Interpretive Measures and Test Statistics for Discriminant Function Analysis. Only Discriminant Loadings with Absolute Values Greater Than or Equal to 0.3 are Reported

*Question 1: What are the characteristics of behaviors that are associated with high status and do these perceptions of important characteristics differ by participant type?*

Based on responses to the first two open-ended questions posed at the beginning of the q-sort activity we explored differences in how participant types define status. The coding categories presented in Table 5 are the factors that at least 10% of participants from a given group considered to be indicative of high status.
Seventy-nine percent of participants equated status with “money, wealth, income, or economic class”. The next most common set of indicators of status was categorized as “knowledge, education, or type of job” (61% of the total sample), as illustrated by the following comments:

- “Hold[ing] a professional position of high rank.”
- “Higher levels of education.”

Participants also commented on attitudes, personality traits, or other personal characteristics that they associate with status (49% of the total sample). These traits had both positive and negative connotations and included, “high self esteem”, “competitive”, “focused”, “credibile”, “integrity”, “walks the walk”, “pretension”, “wastefulness”, “materialistic”. Status was also equated with visible possessions or markers (41% of of
total), which would include where one lives, what one drives, how one dresses, and where one went to school. In short, expensive products, services, or opportunities, and the observability of each, were considered indicative of status.

Finally, 28% of participants noted that influence and leadership are associated with status. For example, participants suggested that status was indicated by:

- “…high positions that related to responsibility and high influence in the community…”
- “…the amount of people you have an influence on…”
- “…a leadership role or natural demeanor for leadership.”

Interestingly, 10% of both environmental and business participants equated proenvironmentalism with status, and 15% of business participants (but no environmental participants) suggested that prosociality and evidence of morals are also indicative of high status.

There were only minor differences between participant types in regards to general indicators of status. Business participants more frequently noted “knowledge, education, or type of job”, and “influence and leadership” as being indicative of status, whereas environmental participants were more likely to note “money”, “attitudes or personality traits”, and “visible markers or possessions” as being indicative of status (see Table 5).
Question 2: Which proenvironmental behaviors are perceived to be relatively higher and lower in status, why, and do these perceptions differ by participant type?

While we used the standard structure of a Q-sort activity, we modified the analysis to allow for comparisons between ‘environmental’ and ‘business’ groups. Analysis of Q methodology data typically involves treating respondents as the variables, creating a correlation matrix, running a factor analysis, and calculating factor scores based on factor loadings from the factor analysis. This analysis allows for the identification of groups of respondents based on shared understandings of latent dimensions of the topic. However, in this analysis we wished to explicitly explore differences between pre-existing groups and so calculated descriptive and frequency statistics of status based on the rankings of each behavior on the high-low status scale and conducted a discriminant function analysis to test for group differences.

Mean status scores were calculated from the q-sort activity for each participant type (see Table 6). Solar, fuel-efficient car, renewable energy, and local food were ranked highest in relative status (mean status score of ≥ 1) for both groups. Similarly, repair clothes, bus, and insulate windows were ranked lowest in status and were the only behaviors with a mean status ranking of < -1 for both groups. These rankings are reflected in the percentage of participants from each group that rated each behavior as high (2, 3) or low status (-2, -3) (see Figure 4 and Figure 5).
<table>
<thead>
<tr>
<th>Environmental participants</th>
<th>Business participants</th>
<th>Full sample</th>
<th>Mann-Whitney U test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavior</td>
<td>Mean (SD)</td>
<td>Behavior</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td>solar</td>
<td>2.70 (0.53)</td>
<td>solar</td>
<td>2.22 (0.94)</td>
</tr>
<tr>
<td>fuel-efficient car</td>
<td>1.80 (0.81)</td>
<td>renewable energy</td>
<td>1.34 (1.09)</td>
</tr>
<tr>
<td>local food</td>
<td>1.37 (1.00)</td>
<td>local food</td>
<td>1.20 (1.05)</td>
</tr>
<tr>
<td>renewable energy</td>
<td>1.30 (3.17)</td>
<td>fuel-efficient car</td>
<td>1.00 (1.16)</td>
</tr>
<tr>
<td>wall insulation</td>
<td>0.53 (0.86)</td>
<td>vegetarian diet</td>
<td>0.61 (1.02)</td>
</tr>
<tr>
<td>protest</td>
<td>0.43 (1.04)</td>
<td>protest</td>
<td>0.56 (1.25)</td>
</tr>
<tr>
<td>vegetarian diet</td>
<td>0.37 (0.56)</td>
<td>donate clothes</td>
<td>0.46 (1.19)</td>
</tr>
<tr>
<td>donate clothes</td>
<td>0.23 (1.01)</td>
<td>light bulbs</td>
<td>0.41 (0.81)</td>
</tr>
<tr>
<td>light bulbs</td>
<td>0.17 (1.05)</td>
<td>compost</td>
<td>0.32 (1.08)</td>
</tr>
<tr>
<td>compost</td>
<td>0.03 (0.96)</td>
<td>bags</td>
<td>-0.02 (1.13)</td>
</tr>
<tr>
<td>bags</td>
<td>-0.13 (0.82)</td>
<td>wall insulation</td>
<td>-0.07 (1.17)</td>
</tr>
<tr>
<td>bike</td>
<td>-0.47 (1.14)</td>
<td>tire pressure</td>
<td>-0.15 (0.85)</td>
</tr>
<tr>
<td>tire pressure</td>
<td>-0.60 (0.93)</td>
<td>bike</td>
<td>-0.34 (1.00)</td>
</tr>
<tr>
<td>turn down heat</td>
<td>-0.67 (1.27)</td>
<td>turn down heat</td>
<td>-0.73 (0.98)</td>
</tr>
<tr>
<td>wash</td>
<td>-0.70 (0.88)</td>
<td>wash</td>
<td>-0.80 (0.93)</td>
</tr>
<tr>
<td>shower</td>
<td>-0.73 (0.83)</td>
<td>bus</td>
<td>-1.12 (0.98)</td>
</tr>
<tr>
<td>bus</td>
<td>-1.73 (0.94)</td>
<td>shower</td>
<td>-1.20 (0.93)</td>
</tr>
<tr>
<td>insulate windows</td>
<td>-1.77 (0.90)</td>
<td>insulate windows</td>
<td>-1.46 (1.27)</td>
</tr>
<tr>
<td>repair clothes</td>
<td>-1.93 (0.98)</td>
<td>repair clothes</td>
<td>-2.22 (1.01)</td>
</tr>
</tbody>
</table>

Table 6. Mean Status Scores for Each Behavior by Participant Type and for the Full Sample. The Rightmost Columns Contain the Results of a Mann-Whitney U Test Comparing Mean Status Scores Between Groups. Dark Grey Cells are Green Consumption Behaviors, Light Grey Cells are Curtailment, and White Cells Are Neutral.
There is a significant difference in the mean status rating between participant types for six behaviors (see Table 6). The mean scores of four of these behaviors (showers, wall insulation, solar, and fuel-efficient car) are higher for environmental participants, while the other two (tire pressure and bus) are higher for business participants. Only the scoring for wall insulation exhibits a sign difference between groups with environmental participants rating wall insulation with a score of 0.53 and business participants rating it a score of -0.07.

The discriminant function analysis was also used to explore which behaviors are important for distinguishing between environmental and business participants (Table 4). Solar, fuel-efficient car, and wall insulation show a strong (discriminant loading > 0.3) positive correlation with the discriminant function. This suggests that environmental and business participants differed most in their status ratings for these three behaviors. Both groups gave the first two behaviors a positive mean rating, but environmental participants rated them significantly higher in status.

Both participant types rated green consumption behaviors higher status than curtailment behaviors. The four highest status behaviors were green consumption and the lowest status behaviors were curtailment. In addition, only two curtailment behaviors had positive mean status scores. Both participant types rated vegetarian diet and compost as slightly high in status. Conversely, tire pressure was the only green consumption behavior with a negative mean score.
Qualitative data from the Q sort provided insight into the rationales behind participants’ ratings of status (see Table 7). “Money” was the most common explanation for why behaviors were placed in the high status columns for both types of respondents (83% of environmental and 78% of business respondents). The next most commonly elicited explanation was that behaviors are adopted to make a statement (“show-off” behaviors) (17% environmental), and require having sufficient time or flexible time (“time availability”) (17% business). Interestingly, non-monetary costs and intentionality were used to characterize high status behaviors. Both groups mentioned the importance of having time to engage in some behaviors and that choice is an important factor when gauging the status of a behavior. As one respondent noted,

- “Free time is a luxury - more money tends to equal more time. People can arrange their lives in a way they choose. Higher status things require a certain amount of free time.” (Environmental participant, Female, 61 years old, 6/11/2013)

In addition, several participants of each type noted that some behaviors require knowledge, awareness or education, which then confers status. One respondent said,

- “…very in with upper class people, the perception that locally grown is better, pesticide-free is better…requires education to feel like it makes a difference, and money to do it.” (Environmental participant, Female, 76 years old, 6/14/2013)
Finally, four business respondents stated that behaviors are considered high status if they indicate that one is acting prosocially. For instance,

- “All these behaviors…involve making a statement that you are making an important commitment to the community, the world, and to others in general, rather than just focusing on personal benefits. (Business participant, Male, 53 years old, 12/17/2013)

Similarly, “lack of financial means” was the most common explanation for why behaviors were rated low status for both participant types (83% of environmental and 80% of business respondents) (see Table 7). Other indicators of low status included “social stigma” (20% of all participants), “lack of visibility” (10% of all participants) and “little freedom of choice” (behavior adopted out of necessity) (15% of all participants). There were few differences between participant types regarding why behaviors were considered high or low status.
<table>
<thead>
<tr>
<th>Category</th>
<th>Environmental participants</th>
<th>Business participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIGH STATUS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1bi. Behavior requires wealth/money</td>
<td>83% (25)</td>
<td>78% (32)</td>
</tr>
<tr>
<td>2bii. “Show-off behaviors”</td>
<td>17% (5)</td>
<td>17% (7)</td>
</tr>
<tr>
<td>5b. Behavior requires knowledge, awareness, education, or employment</td>
<td>23% (7)</td>
<td>17% (7)</td>
</tr>
<tr>
<td>7bii. Behavior requires time</td>
<td>13% (4)</td>
<td>20% (8)</td>
</tr>
<tr>
<td>4. Behaviors is associated with certain attitudes or personality traits</td>
<td>7% (2)</td>
<td>12% (5)</td>
</tr>
<tr>
<td>7ai. Behavior indicates freedom of choice</td>
<td>0% (0)</td>
<td>12% (5)</td>
</tr>
<tr>
<td>2bi. Behavior is a statement of identity</td>
<td>0% (0)</td>
<td>10% (4)</td>
</tr>
<tr>
<td>11. Behavior indicates prosociality</td>
<td>0% (0)</td>
<td>10% (4)</td>
</tr>
<tr>
<td>2bv. Behavior indicates that one is a trendsetter</td>
<td>10% (3)</td>
<td>0% (0)</td>
</tr>
<tr>
<td>LOW STATUS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1bii. Behavior is adopted because of a lack of financial means</td>
<td>83% (25)</td>
<td>80% (33)</td>
</tr>
<tr>
<td>2c. Behavior carries a social stigma</td>
<td>20% (6)</td>
<td>20% (8)</td>
</tr>
<tr>
<td>7aii. Adoption of the behavior indicates little or no freedom of choice</td>
<td>10% (3)</td>
<td>20% (8)</td>
</tr>
<tr>
<td>2bvi. Behavior is not publically visible</td>
<td>7% (2)</td>
<td>12% (5)</td>
</tr>
</tbody>
</table>

Table 7. Explanations for Why Behaviors were Placed in High Status and Low Status Columns in the Q-Sort Activity and the Number of Each Type of Participant Whose Responses Fit Within Each Category. For Explanations of Categories, See Table 9

**Question 3: Is the status of a proenvironmental behavior related to whether the behavior is perceived to be motivated by environmental concern and does this differ by participant type?**

We first calculated average scores for the degree to which each of the ten behaviors was considered to be motivated by environmental concern (see Table 6). Solar (environmental = 4.10, business = 4.22) and renewable energy (environmental = 4.28, business = 4.17) were considered to be most motivated by environmental concern. The behaviors rated as least motivated by environmental concern differ. Environmental
participants rated *repair clothes* (2.79) and *insulate windows* (2.66) lowest while business participants rated *repair clothes* (2.15) and *insulate windows* and *vegetarian diet* (2.12 (environment = 3.34)) as least motivated by environmental concern.

Independent two-group Mann-Whitney *U* tests indicated that there were significant differences between participant types in perceived motivation for two behaviors (see Table 8). The environmental group rated *repair clothes* and *vegetarian diet* as significantly more motivated by environmental concern than the business group (Table 8).
We then fit separate bivariate linear regressions to examine the relationship between the average motivation scores and the average status scores for each participant type. The model outputs suggest that there is a positive and significant relationship between the perception that a behavior is motivated by environmental concern and perceived status of that behavior. Interestingly, the relationship appears stronger for environmental participants ($\beta = 2.49$, $t = 6.23$, $p = 0.000$) than for business participants ($\beta = 1.22$, $t = 2.65$, $p = 0.029$), suggesting that the same increase in perception that a behavior is

<table>
<thead>
<tr>
<th>Behavior</th>
<th>Mean (SD)</th>
<th>Behavior</th>
<th>Mean (SD)</th>
<th>Behavior</th>
<th>Mean (SD)</th>
<th>U</th>
<th>Z</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>renewable energy</td>
<td>4.28 (1.22)</td>
<td>solar</td>
<td>4.22 (1.33)</td>
<td>renewable energy</td>
<td>4.21 (1.39)</td>
<td>580.0</td>
<td>-0.21</td>
<td>0.83</td>
</tr>
<tr>
<td>solar</td>
<td>4.10 (1.45)</td>
<td>renewable energy</td>
<td>4.17 (1.51)</td>
<td>solar</td>
<td>4.17 (1.37)</td>
<td>570.0</td>
<td>-0.34</td>
<td>0.73</td>
</tr>
<tr>
<td>fuel-efficient car</td>
<td>3.97 (1.32)</td>
<td>fuel-efficient car</td>
<td>3.49 (1.23)</td>
<td>fuel-efficient car*</td>
<td>3.69 (1.28)</td>
<td>441.0</td>
<td>-1.90</td>
<td>0.06</td>
</tr>
<tr>
<td>vegetarian diet</td>
<td>3.34 (1.42)</td>
<td>bike</td>
<td>3.34 (1.20)</td>
<td>light bulbs</td>
<td>3.31 (1.35)</td>
<td>591.5</td>
<td>-0.04</td>
<td>0.97</td>
</tr>
<tr>
<td>light bulbs</td>
<td>3.31 (1.42)</td>
<td>light bulbs</td>
<td>3.32 (1.31)</td>
<td>bike</td>
<td>3.29 (1.21)</td>
<td>540.5</td>
<td>-0.66</td>
<td>0.51</td>
</tr>
<tr>
<td>bike</td>
<td>3.21 (1.24)</td>
<td>bus</td>
<td>3.10 (1.32)</td>
<td>bus</td>
<td>3.09 (1.28)</td>
<td>580.0</td>
<td>-0.18</td>
<td>0.86</td>
</tr>
<tr>
<td>bus</td>
<td>3.07 (1.25)</td>
<td>insulate windows</td>
<td>2.78 (1.31)</td>
<td>insulate windows</td>
<td>2.73 (1.28)</td>
<td>565.5</td>
<td>-0.36</td>
<td>0.72</td>
</tr>
<tr>
<td>tire pressure</td>
<td>2.83 (1.42)</td>
<td>tire pressure</td>
<td>2.29 (1.33)</td>
<td>vegetarian diet**</td>
<td>2.63 (1.51)</td>
<td>316.0</td>
<td>-3.42</td>
<td>0.00</td>
</tr>
<tr>
<td>repair clothes</td>
<td>2.79 (1.47)</td>
<td>repair clothes</td>
<td>2.15 (1.46)</td>
<td>tire pressure*</td>
<td>2.51 (1.38)</td>
<td>460.5</td>
<td>-1.65</td>
<td>0.10</td>
</tr>
<tr>
<td>insulate windows</td>
<td>2.66 (1.26)</td>
<td>vegetarian diet</td>
<td>2.12 (1.36)</td>
<td>repair clothes**</td>
<td>2.41 (1.49)</td>
<td>431.5</td>
<td>-2.02</td>
<td>0.04</td>
</tr>
</tbody>
</table>

* $p = 0.1$ ** $p < 0.05$ *** $p < 0.01$

Table 8. Mean Scores for the Degree to Which a Behavior is Perceived to be Motivated By Environmental Concern By Participant Type. Rightmost Columns Present Results of a Mann-Whitney U Test to Explore Significant Differences Between Participant Types. Dark Grey Cells are Green Consumption Behaviors, Light Grey Cells are Curtailment, and White Cells are Neutral.
motivated by environmental concern will lead to a higher status perception for environmental participants than for business participants.

Responses to the open-ended questions also provided insights into the relationship between motivation and status. Twenty-four (59%) business participants and 15 (50%) environmental participants mentioned behavioral motivation as an explicit factor in signaling status. For instance, when asked why behaviors were rated as high status, some participants noted that adopting such behaviors was indicative of choice:

- “…involves donating something and so it is not done out of necessity.” (Business participant, Male, 61 years old, 11/30/2013)

- “…a behavioral choice that requires an increased awareness of an issue.” (Business participant, Male, 45 years old, 12/17/2013)

Additionally, some participants had difficulty placing behaviors because of the lack of clarity about the motivation:

- “…it depends on motivation. If motivated by philosophy or lifestyle, then it is high status, if motivated by saving money, then it is low status.” (Business participant, Male, 59 years old, 08/12/2015)

- “…for these behaviors in particular, it is the motivation behind the behavior that matters. The reasoning behind what people do is a factor in people’s status. If you are doing something to save money, it’s not high
status, but doing the same thing out of concern for the environment would make it higher status.” – (Environmental participant, Male, 22 years old, 6/24/2013)

Most commonly, however, participants said that they associated behaviors with low status because they were perceived as a need rather than a choice.

- “…it’s about needs versus wants – people need to do these things.”
  (Business participant, Female, 55 years old, 1/31/2014)

- “…associated with people who don’t have a choice” (Business participant, Male, 50 years old, 08/14/2015)

- “…people do this out of necessity or to save money –not for environmental reasons” (Environmental group, Female, 48 years old, 7/8/2013)

Thus, quantitative and qualitative data suggest that the relative status of a behavior depends partly on whether it is adopted out of environmental concern or the desire to save money, and that perceptions about motivation are function of whether the behavior is a choice or a necessity.

Discussion

This study explored differences in the perceptions of green consumption and curtailment behaviors and the degree to which perceptions vary among different types of observers.
The following patterns emerged from the study: (i) status is generally considered to be associated with wealth (although education, type of employment, attitudes and personal characteristics, visible possessions, and leadership/influence were also noted as indicators of status), (ii) high-cost green consumption is associated with higher status than curtailment and is perceived to be motivated by environmental concern to a greater extent, and (iii) participants’ explanations for their status rankings tended to hinge on whether behaviors signal wealth or a lack thereof.

*Wealth, Visibility, and Status*

Perhaps the most important results were that green consumption was rated higher in status relative to curtailment and that this rating was largely based on monetary considerations. These results largely align with our expectations and support previous research suggesting that low-cost curtailment behaviors are either stigmatized (Sadalla and Krull, 1995) or are, at best, neutral on a low-to-high status scale (Brooks and Wilson, 2015; Welte and Anastasio, 2010). The results also support previous work suggesting that monetary cost is an important part of the status value of a ‘green’ product or action (Griskevicius et al., 2010b).

In addition to wealth, behavioral visibility may also be important for status signals (Griskevicius et al., 2010b). Twenty-seven participants noted that the status of behaviors is partly related to how visible they are and twenty-four participants ranked a behavior as high status because it is visible, or low status because it is not visible. Some high status
behaviors, such as purchasing a fuel-efficient car and installing solar panels, are highly visible and have been found to have high symbolic value and status effects in other studies (Dastrup et al., 2012; Delgado et al., 2015; Sexton and Sexton, 2011; Süttelin and Siegrist, 2014). However, not all behaviors rated as high status in this study - such as renewable energy or local food - are necessarily visible, although it is possible that participants had particularly visible manifestations in mind. The relationship between visibility and status is not always straightforward (Griskevicius et al. 2011) and may depend on to whom the behavior is visible (Ariely et al., 2009). It is possible that some inconspicuous behaviors may be visible and status enhancing only within one’s social group, while others are associated with high status because of their visibility to the general public (Berger and Ward, 2010). Examination of variations in visibility of behaviors and status within and across social groups remains an important area for future work.

Curtailment, Non-monetary costs, and Status

Importantly, this study provides insights into why curtailment behaviors tend to be associated with lower status even though they can entail high personal costs and provide collective benefits. Costly signaling theory suggests that the underlying intentions are important for understanding the true costs of a behavior (Bliege Bird and Smith, 2005).

In both the quantitative and qualitative data, we found a significant relationship between the degree to which a behavior was perceived to be motivated by environmental concern...
and the status ranking of that behavior. This result matches previous work suggesting that the perceived intentionality of a behavior is important for status perceptions (Belleza et al., 2014). In this study, participants perceived green consumption to signal financial means and to be more motivated by environmental concern than curtailment. This pattern held for both participant types. However, participants may have been primed to think about environmental motivations because they completed the perceived motivation activity before the Q-sort activity. Future research could randomize activity order to remove potential order effects.

The aforementioned results do not support our expectation that environmental participants would consider curtailment to be more motivated by environmental concern and do not suggest that environmental participants are more attentive to non-monetary costs (e.g. time, effort, inconvenience, and the acquisition of knowledge and/or skills). In fact, few environmental participants explained their status rankings (high or low) by specifically pointing to non-monetary costs while several business respondents noted such costs:

- *(bags)* “taking time to be cognizant of the bags, which shows you are not lazy.” (Business participant, Male, 39 years old, 12/17/2013)

- *(compost)* “Involves purchasing decisions and understanding of composting, which indicates an availability of time.” (Business participant, Male, 43 years old, 11/24/2013)
- (renewable energy) “Requires a level of sophistication/education as a consumer to be aware of this as an option, which are common traits of people of high status.” (Business participant, Female, 50 years old, 12/09/2013)

Such considerations resonate with the concept of cultural capital which includes skills, credentials, patterns of speech, or capacities that are associated with higher status (Bourdieu, 1986), suggesting that the investment of time or other non-monetary resources in behaviors also potentially signals status.

Furthermore, it is important to note that some of what we observe to be "group" differences in the results may be better explained by the differences in income and gender between the sample groups. Future studies should select samples that do not differ significantly with regards to demographic variables.

**Contextual Cues**

Perceptions of status signaling are potentially context dependent. Previous studies have demonstrated that context is an important factor when it comes to our perceptions of others (Barrett et al., 2011) and perceptions of proenvironmental actions can change significantly when contextual information is provided about the person engaged in these actions (Brooks and Wilson 2015). Recognition of the importance of context for status
signaling emerged several times in the study. For instance, in reference to bus and bike, one participant said:

- “People of any status could engage in these behaviors and they could be motivated by money savings, or for making a statement.” (Business participant, Male, 52 years old, 11/22/2013)

Similarly, when one participant was asked what kind of information they use to determine whether a behavior is motivated by environmental concern, the response was:

- “It’s people I know well and they tell me. But I can also tell from their other behaviors.” (Environmental participant, Male, 22 years old, 6/24/2013)

The first quote illustrates how ambiguity about who is engaged in the behavior impacts one’s status ranking. The second quote illustrates that one can rely on information from other behaviors adopted by the individual to clarify their judgment about whether a behavior is motivated by environmental concern, and thus worthy of higher status.

Social and physical context can also affect perceptions of status. For example, a behavior that is common in a group may lose its distinctiveness and thus no longer be perceived as high status. In addition, the costs (social, monetary, or otherwise) of a behavior may be shaped by local infrastructure. A clean, efficient, and punctual public transit system can make riding the bus more comfortable and convenient, which may reduce the perception
that only those who can’t afford other options would take the bus. One participant alluded to the importance of context by noting that bus and local food were difficult to rate because there are “nuances that depend on location”. This participant also noted that,

- “…[taking the bus] in urban settings it may just be more convenient.”

and that,

- “…in rural settings [buying local food] is just what you do, so it’s not associated with status. In urban settings, it costs you more…”.

Similarly, when noting that compost was hard to place, one respondent said that it is:

- “…not a well-known view. People get it but it’s also kind of gross. If more people did it, I would have placed it differently.”

Another participant who had difficulty placing vegetarian diet commented that it:

- “Cannot only be attributed to status, but health, religion, environmental concern, etc. The reason to engage in this behavior is highly situational.” (Business participant, Female, 45 years old, 11/01/2013)

Thus, contextual information can shape our understanding of the motivation for behaviors, and subsequently perceptions of status. Future work could compare social signals associated with behaviors among municipalities that have different infrastructure,
amenities, or different policies that may affect the costs, benefits, and commonness of behaviors.

*Group Identity Markers*

Social context was particularly relevant for perceptions of *vegetarian diet*; a behavior that exemplifies one of the few differences between participant types. Interestingly, *vegetarian diet* was one of two curtailment behaviors that had a higher status ranking than some green consumption behaviors and was one of the behaviors that business participants rated higher in status than environmental participants (though the difference was not statistically significant). Responses to the open-ended questions about the placement of this behavior are illuminating. Several business participants indicated they consider a vegetarian diet to be highly visible, more expensive, and indicative of wealth or education. For instance,

- “The person who preoccupies themselves with a particular diet must have more time, and financial and intellectual means to follow with it.”
  
  (Business participant, Female, 45 years old, 11/1/2013)

- “…it is an expensive behavior to engage in.” (Business participant, Male, 43 years old, 11/21/2013)

- “…it requires a high amount of education, money, and luxury of time.”
  
  (Business participant, Male, 55 years old, 12/16/2013)
Conversely, environmental participants more frequently noted that vegetarian diet was one of the hardest behaviors to rate. This ambivalence about vegetarianism stems from uncertainty about the costs associated with it as well as the sense that it is much more common than in the past:

- “[eating vegetarian] can be costly, but if you know how to cook it, it can be cheap.” (Environmental participant, Female, 61 years old, 6/11/213)
- “…it’s not really a sign of status – maybe it was ten years ago. Now there are more cooking shows and there’s more information available about food.” (Environmental participant, Female, 61 years old, 7/3/2013)
- “…eating vegetarian could be viewed as saving the environment or saving money… eating vegetarian used to be more high status, but now it’s more common, trendy.” (Environmental participant, Female, 39 years old, 7/3/2013)
- “…[eating vegetarian] is socially hip, but supported by saving money.” (Environmental participant, Male, 28 years old, 7/3/2013)

Thus, group affiliation can affect one’s perception of proenvironmental behaviors. When the commonness of behaviors differs between social groups, so can perceptions of the costs of the behaviors and the knowledge and skill required to adopt them.
The fact that there were few differences among participant types in perceptions of behaviors may be a function of selection bias. If business participants volunteered for the study because they are aware of and interested in environmental issues, this would reduce the variation between groups that we sought. Future research could include more distinct and well-defined social groups to capture greater group-level variation and clear differences in social norms within those groups.

Implications

The most obvious conclusion from this study is that because green consumption faces fewer social obstacles in the form of status, it may be the most effective way of reducing environmental impacts (Attari et al., 2010). However, concerns about the long-term efficacy of this approach for meeting sustainability goals remain. While green consumption can reduce environmental impacts and may be more socially acceptable, it perpetuates a society that values the acquisition of material goods. In contrast, curtailing material and energy consumption may be critical for long-term sustainability but is hindered by social, psychological, and cultural factors including the perception that such a lifestyle signifies low status. This study reinforces the idea that there can be important social obstacles to increasing the adoption of curtailment behaviors, even among individuals who are environmentally-oriented.

This study was motivated by a desire to understand such obstacles, so the commonness of a behavior is important. For environmental participants, vegetarianism lost its value as an
indicator of status as it became more common. Thus, the temptation to make proenvironmental behaviors more accessible and common might undercut their ability to signal status. Griskevicius et al. (2011) draw a similar conclusion when they suggest that making “green products cheaper, easier to buy, or more time-saving can actually undercut their utility as a signal of environmentalist/altruist dedication”, and conclude that “electric cars might be seen as more prestigious and more desirable if recharging stations are harder to find and take longer to recharge the batteries...”

However, if the goal is to increase the adoption of a behavior, it may be counter-productive to try to maintain the status signal by restricting access. Status signals are not relevant for all behaviors, for a given behavior at all points in time, or for a given behavior in all contexts. Instead, social signals evolve (Skyrms, 2010). While providing a signal of high status may initially be important for some proenvironmental behaviors, as the behavior becomes more common it may be important to allow the status signal to evolve rather than try to restrict access to the behavior. Ideally, the status-signal will shift to even more environmentally-friendly products or behaviors. For instance, if the Prius loses its value as a marker of status as a result of an increase in market share, perhaps the status signal will shift to the all-electric Tesla (Young, 2015), at least among particular social groups. Similarly, as vegetarianism loses its function as a marker of status by becoming more common, the marker of status may shift to veganism (Khomani, 2015). Thus, rather than try to maintain the status signal of a proenvironmental behavior by making it difficult to adopt, it may be better to identify and promote another, more
environmentally-friendly behavior that will then serve as the new signal of one’s prosociality. This process would represent a status race to the top (more environmentally-friendly consumption) rather than a status race to the bottom (conspicuous over-consumption).

Conclusion
This study suggests that for participants who live in and around urban centers in Ohio, green consumption behaviors are perceived to be higher status than curtailment behaviors because of the combined signal of wealth and environmental motivation. This pattern held across both environmental participants and business participants and the overall results suggest that there may be significant social barriers to the spread of low-cost curtailment behaviors. In the long term, those who argue that overall reductions in consumption will be necessary to achieve long-term sustainability goals must address this barrier. Our results suggest clarifying the motivation behind the adoption of curtailment behaviors and low consumption lifestyles could help one avoid perceptions of low status. More immediately, it may be easier to focus on economic or other mechanisms to increase green consumption, which is generally not hindered by perceptions of low status. Additional research is needed to explore whether the patterns identified here hold across a wider variety of social, cultural, economic and physical contexts. Ultimately, altering the somewhat negative perception of curtailment behaviors may require both individual and broader socio-cultural change. Individual efforts to demonstrate that curtailment behaviors are motivated by environmental concern (where appropriate) can help clarify
the signal and broader socio-cultural and economic change can help increase awareness and appreciation of the non-monetary costs and value of adopting such behaviors.
Chapter 4: Conclusion

This thesis focuses on the behavioral approaches to addressing environmental problems by examining how individuals perceive proenvironmental behaviors and how they conceptualize relationships between these behaviors. Specifically, this thesis explores two components of behavior: which attributes are perceived to be important by individuals and how these behaviors relate to social status. Additionally, both of these components were studied using distinct groups of individuals to explore the effect of social groupings. Although these studies are complementary, they each provide unique contributions to the understanding of proenvironmental action.

The first part of the thesis pertains to how individuals conceptualize relationships between behaviors. Specifically, this first study explores which attributes of proenvironmental behaviors are most salient when it comes to considering relationships among those behaviors. In this study, individuals perceived the most salient attributes of behaviors to be related to descriptive (e.g. salient place/domain) and external characteristics (e.g. motivations and outcomes), whereas the least salient attributes of behaviors generally corresponded with social influences (e.g. normative pressure?s) and internal psychological factors (e.g. maintaining? self-image and deliberation) that influence their decision to engage in the behavior. Results from this study provide
support for sector-based classification methods that have already been widely adopted by behavior change strategies. However, certain aspects of our study design may have limited our findings. For example, by presenting behaviors as text on cards, respondents may have been more likely to visualize the behaviors superficially, prompting respondents to focus more on the descriptive and external characteristics of the behaviors. Additionally, although the low number of behaviors used in the study allowed us to explore perceived similarities and differences between behaviors from laypeople instead of scholars, it ultimately limited our ability to conduct a robust statistical analysis. This differed from the Boudet et al. (2016) study, which relied on researchers to score more than 250 behaviors and then analyzed these results using a cluster analysis. Future studies should adopt approaches from both studies by using a larger number of behaviors to generate relevant attributes and scorings from respondents. Future work could also present behaviors in a manner that allows respondents to think about their own decision-making processes regarding why they might adopt or avoid a behavior instead of merely the physical characteristics and outcomes of the behavior.

Despite the first study’s limitations, by eliciting perceptions from members of the general public instead of drawing from theories or researchers, the results of this study provide researchers and policy-makers with a sense of how respondents themselves conceptualize the linkages between behaviors. This is important for capturing spillover effects from one behavior to another since people are more likely to adopt sets of behaviors that are perceived to be conceptually linked and in similar categories (Gatersleben et al., 2002;
Truelove et al., 2014). Ultimately, these findings can be used to inform behaviorally oriented policies and interventions on how to create classifications of behaviors that are meaningful to the public and that capitalize on potential spillover effects from one behavior to the next.

The second part of the thesis explores one aspect of the social dimensions of consumer behavior as it relates to the environment. Specifically, this second study examined whether and why a suite of proenvironmental behaviors is perceived to be associated with high or low status. In this study, green consumption (i.e. efficiency) behaviors were perceived to be higher status than curtailment behaviors because of the combined signal of wealth and environmental motivation. This finding indicates that status is a more important factor for some proenvironmental behaviors than for others. However, status signals evolve and change over time. Therefore, if the goal is to reduce the obstacles to proenvironmental behavior, then efforts should be made to either completely eliminate status signals and their association with proenvironmental behaviors or increase the acceptance of all types of proenvironmental behaviors to align status motives with proenvironmental behaviors instead of wasteful, environmentally damaging behavior.

Furthermore, this thesis also looked at differences in perceptions between two distinct social groups comprised of environmental participants and business participants. Ultimately, there were only minor differences between the two groups across both studies. For example, in the first study, the business sample perceived the environmental
motivations of behaviors to be an important characteristic that linked behaviors. At first glance, this difference might seem counterintuitive. However, the group differences found in this study can be explained by the discrepancies in environmental knowledge between participant types. Those with more environmental knowledge may be more likely to perceive the connections between behaviors and the environment than those with less environmental knowledge (Thøgersen, 2004; Truelove, 2014). As a result, environmental respondents, which presumably possess more environmental knowledge, may have perceived all behaviors to be environmentally motivated, consequently making it difficult to distinguish behaviors using this attribute. However, business participants may clearly relate some behaviors to environmental motivations, but not others.

Group differences from the second study were similarly minor but were also somewhat surprising. Specifically, the business group generally rated curtailment behaviors as more related to high status than the environmental group. This finding did not support our hypothesis that environmental participants would be more attentive to non-monetary costs and thus rate curtailment behaviors higher in status than business participants. However, this difference in status perception can be explained by disparities in perceptions of the commonness of proenvironmental behaviors in each group. As perceptions of the commonness of behaviors differs between social groups, so can perceptions of the costs of the behaviors and the knowledge and skill required to adopt them. For example, according to our qualitative data, business respondents consider eating a vegetarian diet to be expensive and somewhat uncommon whereas
environmental respondents considered it fairly inexpensive and much more common than it used to be. This finding suggests that although providing a signal of high status may initially be important for some proenvironmental behaviors, as the behavior becomes more common it may be important to allow the status signal to evolve rather than try to restrict access to the behavior.

The results from this thesis offer an initial look at which attributes of behaviors are perceived to be important by individuals and how these behaviors relate to social status. Additional studies in this area will be important to exploring whether these patterns hold across greater groups of people, a larger number of behaviors, and a wider range of contexts. Furthermore, this study addresses only two of many possible components of human behaviors related to how individuals perceive proenvironmental behaviors and how they conceptualize relationships between these behaviors. Ultimately, results from this thesis can help inform policy and planning efforts aimed at promoting proenvironmental behaviors in the general population. Specifically, the results related to spillover effects can assist in the creation of more effective approaches to classifying proenvironmental behaviors in behavior change interventions. Additionally, the results related to status perception can guide the focus of behavior change interventions towards proenvironmental behaviors that have fewer social barriers to adoption.
References


Explanation of Discriminant Function Analysis

A discriminant function analysis is a multivariate statistical technique used to predict group membership from a set of predictor variables represented as discriminant functions (Cui 2010). A discriminant function analysis can be used to find optimal combinations of discriminant functions to maximally separate previously defined groups and make predictions about group membership. If there are only two groups in the analysis, as is the case in this study, only one discriminant function is needed to best separate the groups.

As part of a discriminant function analysis, a statistical test, such as Wilks’s lambda, is needed to determine whether or not the discriminant function(s) significantly discriminate among groups. Wilks’s lambda is the ratio of within-group variance to total variance ranging from 0 to 1. Thus, Wilks’s lambda represents the proportion of variance in discriminant scores not explained by group membership. As a result, the closer the Wilks’s lambda is to 0, the better the function discriminates between groups. Wilks's lambda can be transformed to a statistic with a chi-square distribution to allow for a significance test. A significant Wilks's lambda indicates that the group means calculated from the discriminant analysis are significantly different.
If the discriminant function(s) is/are significant, the researcher can then calculate the relative importance of the contribution of each predictor variable to the separation of the groups. This is done by examining the discriminant coefficients, or discriminant loadings (analogous to factor loadings), for each predictor variable. The discriminant loadings represent correlations between each variable in the model and the discriminant function. In general, discriminant loadings with absolute values equal to or greater than 0.3 indicate an important contribution to the separation of the groups (Thompson 1984).

Additionally, the means of the discriminant loadings, known as the group centroids, are used to interpret whether or not the discriminant function provides clear separation of groups. Group centroids that are too close to each other indicate poor separation of groups, whereas well-spaced group centroids indicate good separation.

Group centroids are also used to make predictions of group membership for individual cases. To predict group membership, the distance between an individual’s discriminant scores and group centroids is calculated and the centroid to which the individual’s scores are closest is the group to which the case is predicted to belong (Cui 2010). When there are two groups, an optimal cutting score is derived from the weighted average of group centroids to classify the two groups. Individual discriminant scores falling below or above the cutting score dictate to which group each individual is predicted to belong.
The final predicted group classifications are then evaluated by comparing predicted group membership with actual group membership from the sample. From this comparison, the percentage of correct predictions, known as the hit ratio, can be used to evaluate the accuracy of the model. However, the hit ratio often overestimates the classification accuracy when the same sample is used to both derive the discriminant function and to test its predictive performance (Cui 2010). As a result, a “leave one out” classification, whereby each case is classified by the functions derived from all cases other than the case in question, can be used to cross-validate the group classification and derive a more accurate hit ratio.

To test the performance of the classification, the hit ratio from the cross-validation procedure is compared with both the maximum chance, the proportion of cases in the largest group, and the proportional chance, the proportion that would be correctly classified by chance. The model has good classification performance if the hit-ratio from the cross-validation procedure is greater than 1.25 times the proportional chance (Hair et al. 2010).

Results from Discriminant Function Analysis

In this study, the discriminant function analysis was used to predict environmental or business group membership based on participants’ status scores for each of the 19 behaviors. Since this study only tested two groups, only one discriminant function was need to separate the groups. The chi-square statistic (38.772) corresponding to Wilks's
lambda (0.524) for the discriminant function is statistically significant (p < 0.05), thus confirming the discriminating ability of the model.

The large distance between the environmental group centroid (1.098) and the non-environmental group centroid (-0.804) indicates good separation between groups. A cutting score of 0.294 was used to classify predicted group membership. With a canonical correlation of 0.690, the model accounts for 47.6% (square of the canonical correlation) of the variance in the sample groups. According to the discriminant loadings, install solar panels on roof, install attic or wall insulation, and buy fuel-efficient car (discriminant loading > 0.3) are the behaviors most useful in separating between groups.

The hit ratio of the model prior to cross validation is 80.3%. The model correctly classified 24 out of 30 cases for the environmental group and 33 out of 41 for the business group. After cross validation, performed using “leave one out” classification, the hit ratio is 67.6%. Here, the model correctly classified 20 out 30 cases for the environmental group and 28 and of 41 for the non-environmental group. The hit ratio of 67.6% after cross validation exceeds both the maximum (57.7%) and proportional chance (51.2%) and is greater than 1.25 times proportional chance (0.640), indicating that the model has good predictive power.
1. **Financial Status**
   a. Money – includes mentions of the extent to which money, income, or other financial metrics are markers of status
   b. Behavior as a function of money – relationship of behaviors to money (i.e. behavior as a function of monetary resources)
      i. Money as a precondition to behavior, money as a function of wealth (i.e. behavior requires wealth/money)
      ii. Behavior as a function of lack of financial means

2. **Visibility, signaling, and perception**
   a. This includes how people mark their status to others
      i. Embodied signals (i.e. loudness, posture, accents, language, manners)
      ii. Visible possessions or markers (i.e. cars, clothes, neighborhood)
      iii. Activities (i.e. hunting, travel, criminal activities)
   b. This also includes the choice to engage in certain behaviors due to their visibility/perception by others
      i. Engage in behavior with intention to be perceived
      ii. “Show-off” behaviors – doing something to make a statement
      iii. Behavior as a statement of identity
      iv. Group affiliation
      v. Trendsetting
      vi. Lack of visibility
   c. Social stigma – this includes behaviors that are perceived negatively or looked down upon by others

3. **Social pressure and momentum** – this includes the idea of fashion, trendiness, social pressure to act in a certain way within a particular ‘status (different than visibility and signaling because more focused on description of the processes by which whole social strata operate, rather than how to differentiate someone’s particular status)

4. **Attitudes or personality traits** – attitudes or personality traits - certain attitudes or personality traits were associated with either high or low status (i.e. snobbishness, open-mindedness, wisdom, open to commitment, willingness to challenge authority, intelligence, creativity)

5. **Knowledge, awareness, education, employment, or type of job**
   a. Knowledge, education, or type of job – codes in this category linked some or all of these concepts together as either leading to or symptomatic of particular status signals.
   b. Knowledge, awareness, education, or employment – when describing why a certain behavior was put in the high status or low status columns; the concept of “knowledge” was broadened to include awareness. Similarly, “type of job” was generalized to include any reference to employment.

Table 9. Coding Template for Qualitative Data continued
### 6. Influence and leadership

- all of these codes were used as markers of personal status (i.e. someone with high status is important, may be influential, is a leader)

### 7. Ability to make certain decisions (beyond financial considerations)

<table>
<thead>
<tr>
<th>a. Decision making autonomy</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. Freedom of choice – possessing decision making autonomy</td>
</tr>
<tr>
<td>ii. Little or no freedom of choice – lack of decision making autonomy</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>b. Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. Time as a luxury – includes mentions of the extent to which possessing time is a marker of status</td>
</tr>
<tr>
<td>ii. Time availability – availability of time as a function of a behavior (i.e. behavior requires time)</td>
</tr>
</tbody>
</table>

### 8. Extent to which behaviors are purposefully chosen vs ‘common sense’

| a. Done by everyone or “common sense” – for instance, behaviors seen as done by everyone and/or which are ‘just common sense’ are not associated with status |
| b. Moral decision – includes sense of behaviors chosen in order “to do good” or as a moral decision (i.e. different from doing something just because it is cheaper, even if it does good) |
| c. Lifestyle change – degree of lifestyle change implied by choice to engage in particular behaviors |

### 9. Non-status behavior and motivation

| a. Status irrelevance – nothing/little to do with status |
| b. Status ambiguity – can either be high or low status |
| i. Motivation dependent – high or low status association is dependent on the motivation behind the behavior |
| c. Motivation has something to do with environment but NOT status |

### 10. Location dependent – access or ability to engage in a particular behavior is highly dependent on location

### 11. Prosociality

- includes thoughts or actions related to benefiting, helping, or serving others or society as a whole

### 12. Pro-environmentalism

- includes thoughts or actions related to reducing one’s environmental impact
Figure 4. Behaviors Associated with High and Low Status for the Environmental Sample

Figure 5. Behaviors Associated with High and Low Status for the Non-Environmental Sample