Global Environmental Change 49 (2018) 175–185

Contents lists available at ScienceDirect

Global Environmental Change

journal homepage: www.elsevier.com/locate/gloenvcha

Perception of pro-environmental behavior

Heather Barnes Truelove[a,*], Ashley Jade Gillis[b]

[a] Department of Psychology, University of North Florida, USA
[b] Department of Psychology, Penn State University, USA

ARTICLE INFO

Keywords:
Pro-environmental behavior
Public perception
Climate change

ABSTRACT

Interventions to change individual human behavior have real promise in helping to reach sustainability goals and emissions reductions targets. However, little is known about how laypeople characterize the vast array of behaviors they perform that impact the natural environment, which has major implications for the design of successful pro-environmental behavior (PEB) interventions. Drawing on the psychometric paradigm from risk perception research, the current project involves a two-study investigation (Study 1: $n = 157$, Study 2: $n = 266$) into the attributes laypeople consider when evaluating PEBs and assesses the influence of these attributes on PEB intention using aggregated factor analysis. We find that laypeople's perceptions differ from experts' and include characterizations in terms of financial and behavioral cost, environmental impact and financial savings, external pressures, and health and safety impacts, with all factors except environmental impact and financial savings relating to PEB intention. Furthermore, our plots of behaviors on 2-dimensional attribute planes provide key information to researchers and policymakers about which factors to address in future PEB campaigns.

1. Introduction

Virtually every behavior performed by people in the developed world has environmental consequences (Gardner and Stern, 2002). Consider, for example, key elements in the morning routine of a typical worker in the suburban U.S.: wake up to an alarm set on a cell phone that has charged overnight from an electrical outlet, turn on lights powered from a coal-fired power plant, brush teeth in water running from the sink, retrieve milk from the refrigerator that runs on electricity into a cup of coffee that was farmed and shipped from somewhere else in the world, and drive to work in a car that runs on petroleum. Carbon emissions from coal-fired power plants and petroleum fuel, methane emissions from farming cows, reduction of finite water sources – as the morning routine illustrates, we are constantly performing behaviors that directly or indirectly impact the natural environment.

It is well known that widespread adoption of more environmentally friendly behaviors can have a major impact on reducing environmental impact, including mitigating climate change (Clayton et al., 2015; Dietz et al., 2009; Gardner and Stern, 2008). Yet, although environmental psychology has learned a great deal about how values, norms, and attitudes influence pro-environmental behavior (PEB) intention (Bamberg and Möser, 2007; Klöckner, 2013; Maki and Rothman, 2016; Stern, 2000), research has rarely focused on how laypeople (i.e., people who are not experts in pro-environmental behavior) think about and characterize the diverse array of PEBs. Additionally, though much research has investigated the public's perception of the environment, such as climate change perceptions (Howe and Leiserowitz, 2013; Pidgeon et al., 2008) and perceptions of environmental risks (McDaniels et al., 1995; Willis and DeKay, 2007), surprisingly little is known about laypeople's perceptions of the behaviors they perform that affect the environment. As a result, environmental policies based on experts' characterizations of PEB or assumptions about how laypeople view PEB may be ineffective because they fail to adequately account for the key PEB barriers and drivers that laypeople view as important. Thus, a deeper understanding of the layperson's nuanced perception of PEBs is required for the successful design and implementation of policies to promote PEBs. In the present project, we aim to uncover the underlying attributes laypeople view as important in considering PEBs and to assess how perceptions of PEBs in terms of these attributes relate to behavioral intention.

1.1. Existing PEB characterizations

Most existing research on PEB attributes has focused on energy experts' conceptualizations about the cost, frequency of action, and environmental impact of one class of PEBs: household behaviors that contribute to greenhouse gas emissions reductions (Dietz et al., 2009; Gardner and Stern, 2008; Laitner et al., 2009). Experts have most frequently proposed a simple dichotomous classification scheme (Barr et al., 2005; Black et al., 1985; Gardner and Stern, 2008; Inskeep and

* Corresponding author at: 1 UNF Drive, Jacksonville, FL, USA.
E-mail address: h.truelove@unf.edu (H.B. Truelove).

https://doi.org/10.1016/j.gloenvcha.2018.02.009
Received 17 July 2017; Received in revised form 12 February 2018; Accepted 20 February 2018

Attari, 2014; Karlin et al., 2012; Laitner et al., 2009): *efficiency-improving actions,* behaviors that involve efficiency upgrades such as buying a more fuel-efficient automobile or installing an energy-efficient clothes washer, and *curtailment actions*, behaviors that involve reducing use of existing energy equipment such as turning off the lights in a room at night or carpooling to work. Experts classify curtailment behaviors as low/no financial cost behaviors performed with high frequency and efficiency behaviors as high cost behaviors performed with low frequency (Karlin et al., 2012; Laitner et al., 2009). Furthermore, researchers have advocated for a focus on efficiency upgrades because of their higher environmental impact (Gardner and Stern, 2008). Although initial evidence suggests the lay public may also view energy behaviors in line with the curtailment/efficiency dichotomy (Barr et al., 2005; Karlin et al., 2012), in-depth analyses of laypeople's perceptions of PEBs is clearly needed considering they are the group who will be targeted in environmental campaigns.

A second class of literature has adopted a more layperson-driven approach to categorizing a wider set of PEBs, in addition to household energy behaviors. This approach typically involves conducting surveys of the public's self-reported PEB frequency and PEB intentions and then factor analyzing their responses to see which types of PEBs group together. Thus, the resultant behavior dimensions are usually organized around PEB frequency: PEBs that are performed with the same frequency are grouped together. Such analyses generally reveal different clusters of PEBs based on different domains of behavior (Barr et al., 2005; Gatersleben et al., 2002; Karp, 1996; Stern et al., 1999, 1998; Thøgersen and Olander, 2006; Whitmarsh and O'Neill, 2010) such as waste-reduction, recycling, domestic energy conservation, and activism (Karp, 1996; Stern, 2000; Whitmarsh and O'Neill, 2010). Similarly, card-sorting procedures (Bernard et al., 2009) and Rasch-type modeling efforts (Kaiser and Wilson, 2004) on PEBs have also revealed multiple domains of behavior such as waste-reduction, advocacy, consumer behavior, and recycling. Nevertheless, these analyses reveal little information about *why* certain PEBs are performed more or less frequently (Steg and Vlek, 2009) or *why* certain PEBs are grouped together in the layperson's mind.

Understanding how laypeople perceive PEBs is necessary in light of evidence that perceptions of PEBs influence PEB intention. For example, Truelove and Parks (2012) asked participants to rate the extent to which a list of 12 pro-environmental behaviors mitigated global warming and to state their intentions to perform these behaviors in the future, among other questions. Ratings of the mitigation potential of the behaviors positively correlated with intentions (Truelove and Parks, 2012). Similarly, Tobler and colleagues found that perceptions of the climate benefits of PEBs, as well as perceived costs of the PEB (in terms of financial costs, time, discomfort, and inconvenience) were strong predictors of willingness to engage in the PEBs (Tobler et al., 2012). Additionally, several studies have shown that self-efficacy beliefs and difficulty ratings of PEBs relate to PEB intention or performance (de Groot and Steg, 2007; Kaiser et al., 2005; Kaiser and Schultz, 2009). Finally, although people generally underestimate the extent to which social norms influence their behavior (Nolan et al., 2008), research has consistently shown that actual and perceived norms about other people's PEB influence individuals' intention to take these same actions (Göckeritz et al., 2010; Goldstein et al., 2008; Schultz et al., 2007). Although the research suggests that perceptions are important predictors of PEB, few studies have assessed perceptions of more than one or two behavioral attributes in the same study.

One layperson-focused study conducted in 1996 that did adopt a more in-depth approach, asked participants to evaluate a set of PEBs on 10 attributes (not including self-reported behavior frequency), such as environmental impact, frequency, and technology requirements (Bernard et al., 2009). Factor analysis on these judgments revealed three factors related to efficacy, collective nature of the behavior, and cost/technology (Bernard et al., 2009). Bernard et al.'s (2009) study provides some insight into why certain PEBs are clustered together in laypeople's perceptions, but additional work on a wider set of behavior attributes is needed. Additionally, although many PEBs in their list from two decades ago are still relevant, newer behaviors need to be evaluated, especially those relating to energy efficient appliance upgrades. Furthermore Bernard et al.'s (2009) results do not assess the extent to which the factors that emerged from the attribute factor analysis relate to behavior intention. As such, current probing is needed to understand the attributes that laypeople spontaneously consider when evaluating PEBs and the extent to which PEB perceptions relate to PEB performance. Knowing which PEB perceptions laypeople hold and which relate most to PEB performance will aid policymakers in designing programs that target these specific perceptions and increase the likelihood of policy success.

1.2. Psychometric paradigm

The psychometric paradigm provides a methodology by which to evaluate in-depth perceptions of objects. Although not yet applied to understand PEB, the psychometric paradigm has been widely used to assess laypeople's risk perceptions (Fischhoff et al., 1978; McDaniels et al., 1995; Slovic, 1987; Willis et al., 2005). In the traditional psychometric paradigm, participants evaluate hazards (e.g., nuclear waste, microwaves) by completing scales assessing their perceptions of the hazards on various attributes (e.g., controllability, certainty, reversibility). Sample sizes for this approach are typically between 60–125 participants (McDaniels et al., 1995; Slovic et al., 1985; Willis et al., 2005), with subsample analyses on items with as few as 11–15 responses (Slovic et al., 1985; Willis and DeKay, 2007). These responses are then aggregated across participants to obtain a mean rating for each hazard on each attribute. The aggregated attribute ratings are then factor analyzed to identify dimensions that underlie the attributes. Perceptual maps are often created to visualize how the hazards vary across multiple attribute dimensions. Finally, multiple regression analyses are conducted to assess the extent to which the attribute dimensions predict key outcomes, such as the judgment of riskiness of the hazard (Willis et al., 2005).

Applied to PEB, the psychometric paradigm would involve asking participants to evaluate a set of PEBs on various attributes (e.g., environmental benefit, difficulty, frequency of performance) and conducting an aggregated factor analysis on the attribute ratings. Regressions on these aggregated attribute ratings could then be used to predict PEB intention. Using this approach, groupings of behavior that emerge from the perceptual maps would reflect multiple PEB attributes, not just frequency of intention, which dominates current laypeople-driven categorization schemes.

1.3. Present studies

The present project combines and extends the expert-driven and participant-driven approaches to categorizing PEBs, while drawing on the psychometric paradigm of assessing laypeople's risk perceptions (Fischhoff et al., 1978; McDaniels et al., 1995; Slovic, 1987; Willis et al., 2005). We extend previous research in the area in three ways. First, we examine laypeople's perceptions about a wide array of features of PEBs in addition to those areas identified by experts as important (i.e., behavior frequency, domain, financial cost, and level of environmental impact (Dietz et al., 2009; Gardner and Stern, 2008; Inskeep and Attari, 2014; Karlin et al., 2012; Laitner et al., 2009; Whitmarsh and O'Neill, 2010)). Specifically, we assess key factors that have been shown to be important predictors of general PEB performance such as perceived difficulty (Kaiser and Schultz, 2009), inconvenience, discomfort, and time requirement (Tobler et al., 2012). Second, we include behaviors from a broad set of PEB, not just household energy behaviors. Third, we factor analyze behavioral attribute judgments and use these attribute factors to create an organization of behaviors along the attributes as well as to predict behavioral intention.