Studying Executives' Green Behaviors:
An Environmental Theory
of Planned Behavior

Research-in-Progress

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Abstract

Global concern about climate change has markedly increased in recent years (Pew Research Center, 2007). Unfortunately, without cohesive national or global initiatives to ameliorate or even counteract the footprint of human activities on nature, it becomes essential to encourage businesses to adopt sustainable, environmentally-friendly practices. Executives and managers, primary decision-makers in business, are to be studied to better understand the appearance of pro-environment attitudes, and the link between these attitudes and the implementation of sustainable business practices. Our study-in-progress develops, validates, and evaluates an Environmental Theory of Planned Behavior model aimed at predicting green (i.e., environmentally-friendly) behavioral intentions using a large multinational sample (n=162). An additional executive sample (n=50) has been collected and will be used to examine preservation and utilization attitudes and behaviors in organizational settings.

Keywords

Theory of Planned Behavior, TPB, executives, environment.

Introduction

Global concern about climate change has markedly increased in recent years (Pew Research Center, 2007), yet nations like the United States, China and Russia have fallen behind other leading nations like Japan, France, and Germany on their concern about environmental issues (Pew Research Center, 2009), only recently starting to close the gap (e.g., Pew Research Center, 2013). Without cohesive national or global initiatives to ameliorate or even counteract the footprint of human activities on nature, it becomes essential to encourage businesses to adopt sustainable, environmentally-friendly practices.

Executives and managers, primary decision-makers in business, are to be studied to better understand the appearance of pro-environment attitudes, and the link between their attitudes and the implementation of sustainable business practices. For modern technology businesses, pro-environment practices take the form of vigilant use of resources, waste reduction, adequate waste disposal, and adoption of renewable factors of production (e.g., renewable energy), among others. Although a vast array of studies tells us environmentally-aware attitudes and environmentally-conscious behaviors are only weakly associated (Kaiser, Wolfing & Fuhrer, 1999), many efforts have been made to accurately pinpoint these relationships. According to the theory of planned behavior (TPB) behavioral, normative, and control beliefs affect an

individual's behavioral intention (Fishbein & Ajzen, 1975; Ajzen, 1991). Ajzen tested these three beliefs by using questionnaires addressing individual's attitude towards the behavior at hand, the importance placed on subjective norms, and their perception on behavioral control. The TPB model has been applied to a variety of areas of interest, for example exercise and other health-related behaviors (e.g., Terry and O'Leary, 1995; Godin & Kok, 1996). Our study evaluates a modified version of the TPB model, using a newly proposed instrument to predict green (i.e., environmentally-friendly) behavioral intentions. This research-in-progress presents the instrument development and validation stages, and preliminary results on a large multinational sample. An additional executive sample (n=50) has been collected and will be used to examine preservation and utilization (i.e., pro-environment) attitudes and behaviors in organizational settings.

Environmental Theory of Planned Behavior

While TPB can be applied to understanding a broad range of human behaviors, a growing body of work has been extended to environmental choices and policy in everyday life and in the workplace (Heath & Gifford, 2002; Mannetti, Pierro & Livi, 2004; Nigbur, Lyons & Uzzell, 2010; Oreg & Katz-Gerro, 2006). Prototypical research targets local community concerns like transportation use (De Groot & Steg, 2007; Heath & Gifford, 2002), workplace behaviors (Greaves, Zibarras & Stride, 2013) or recycling (Chan, 1998; Nigbur et al., 2010), recognizing that the environmental theory of planned behavior's (ETPB) applications and findings may also be relevant world-wide (Oreg & Katz-Gerro, 2006). Since human behavior is a large contributor to environmental challenges (De Groot & Steg, 2007; Oskamp 2000, 2010; IPCC, 2007; Smith, 2013), focusing on human activities is a good place to begin, if environmental sustainability is a goal. Only in recent decades have concerns about environmental quality and protection emerged as a factor influencing decision-making and policy (Stern, 2000). Throughout most of human history, environmental issues were associated with survival and adjustment; now environmentally significant behaviors are increasingly oriented towards intentions to improve or protect the environment and ultimately, change behavior. Stern (2000) noted that intention may independently contribute to behavior or it may be moderated or negated by people's beliefs about their choices and decisions.

Bamberg and Schmidt (2003), Chan (1998) and Trumbo and O'Keefe (2001) investigated intentions toward the environment at home and in the neighborhood, while Laudenslager et al. (2004) and Fielding et al. (2006) looked at environmentally-oriented behavior at work. More recently, Greaves, Zibarras and Stride (2013) used multiple stages and samples to develop a questionnaire to assess beliefs and intentions concerning workplace behaviors. They developed three work environment scenarios (concerning recycling, non-travel communication, energy saving) that required will and action from respondents. Greaves et al.'s (2013) study was completed by 449 employees, of which the majority were in management. Greaves et al. (2013) hypothesized that TPB attitudes, subject norms, and perceived control would predict behavioral intentions at the workplace. They also predicted that beliefs would be mediated by attitudes, normative beliefs would be mediated by subjective norms and that control beliefs would be mediated by perceived behavioral control. Their path analytic model explained 55-68% of variances in intention regarding three environmentally focused behaviors that an outside expert previously indicated would have real, positive environmental impact. Greaves et al.'s (2013) well-planned design contributed to outcomes that were translated into several organizational improvements.

Armitage and Connor's (2001) meta-analyses identified dozens of other published TPB studies and research continues to accrue demonstrating the utility of TPB in explaining environmental intentions and sometimes behaviors. For example, Cordano and Frieze (2000) used the TPB model to look at manager preferences regarding pollution initiatives. Because managerial responsibilities directly influence their companies' manufacturing and environmental performances, better understanding the relationship between managerial attitudes, decision making, and track record with previous environmentally-sustainability endeavors would likely impact interest in pollution reduction. They found pollution prevention attitudes, perceived norms for environmental regulation, previous company environmental activity, and perceived behavioral control predicted pollution reduction. Curiously, and contrary to most findings, perceived control negatively predicted behavior, probably reflecting managers' perceptions of limited authority and frustration at inability to affect broader change.

In spite of the general efficacy of environmental theory of behavior in predicting intentions and behavior, subjective norms have been identified as the weakest predictor of behavioral intention (Armitage &

Connor, 2001). Terry, Hogg and White (1999) suggest that TPB may be too focused on the individual's behavior, with insufficient attention to identity as well as inadequate operationalization of the function of norms. Nigbur et al. (2010) note that subjective norms are deeply impacted by idiosyncrasies of evaluators. Social norms may be moderated by identification with group and self-categorization. Indeed Cialdini et al. (1991) separates this distinction by differentiating between injunctive norms, which are socially sanctioned rules of group conduct, and descriptive norms, based on others' visible behaviors, which are tied to location. This identification with others also may require balancing with one's self-involvement and habit. Here, Stryker's identity theory (Stryker & Burke, 2000) provides a theoretical basis for self-representation, which has been added to ETPB (Conner & Armitage, 1998; Mannetti et al., 2004; Terry et al., 1999). Stryker focuses on the links between social structures and identities in the meanings drawn from the multiple roles people play. Self-identity incorporates the many roles owned by an individual that affect actions and behavior that may contribute to expectation and norms.

Our research builds on previous literature, developing and validating an instrument to capture environmental attitudes, green (i.e., environmental) subjective norms, green perceived behavioral control, and green behavioral intention (see Appendix A). In addition, the full study includes vignettes to explore the decision-making process when consequences for the environment exist (not reported on this manuscript).

Hypothesis

In Ajzen model of TPB he hypothesizes that positive attitudes, positive subjective norms, and high PBC will lead to a stronger intention of behavior. We are proposing the same hypothesis, but in this study positive attitudes are associated with a higher preservation attitude in the Environmental Attitudes Inventory. For subjective norms and PBC the same concept applies, but it is being applied to green (environmental) normative and control beliefs.

Instrument Development and Validation

Sample

The sample consisted of 162 participants from two regions of the world. The American sample was composed of 77 undergraduate students (36 male, 41 female) from Trinity University who were recruited to voluntarily participate in the study in exchange of course credit. The rest of the sample, a total of 85 participants (50 male, 35 female) were from India and had comparable educational backgrounds.

Measures

Attitudes towards environmentalism were evaluated using the brief 24-item version of Milfont and Duckitt's (2010) 120-item Environmental Attitudes Inventory (EAI). This attitude questionnaire measures an individual's attitude towards a range of environmental beliefs and activities, with factor analyses identifying the broad dimensions of preservation and utilization. Preservation items assess attitudes toward protecting and conserving the environment, while utilization items evaluate beliefs about humans' superiority to nature and humankind's right to alter nature according to its needs (Milfont & Duckitt, 2010). All items are answered on a 7-point Likert-type scale (ranging from 1: strongly disagree to 7: strongly agree). Normative beliefs were measured through an environmentally focused subjective norms (green SN) questionnaire consisting of 8 items measured with Likert scales (ranging from 1: strongly disagree to 7: strongly agree). The individual's control beliefs over environmental behaviors were evaluated through the green perceived behavioral control (green PBC) questionnaire, consisting of 10 items measured with Likert scales (ranging from 1: not at all true to 4: exactly true). Finally, the intention to complete the green behavior (i.e., green behavioral intention) was evaluated by 3 items using a Likert-type scale (ranging from 1: extremely unlikely to 7: extremely likely).

Initial Assessment

Structural equation modeling partial least squares (SEM-PLS) was used to validate the model and explore the relationships between the constructs (green environmental attitude, green SN, green PBC, and green behavioral intention). The proposed environmental theory of planned behavior (ETPB) model was

inputted into SmartPLS (Ringle, Wende, & Will, 2005) for analysis, capturing the reflective nature of the four latent variables. The PLS parameters were chosen following directions provided in Hair, Sarstedt, Ringle, and Mena (2012). The constructs explained 54% of the variance of green behavioral intention. Although these results are acceptable, in accordance to previous TPB studies, item loadings for some of these latent variables were not adequate. Items with loadings below .7 on their respective constructs (Henseler, Ringle, & Sinkovics, 2009) were considered for rewording or elimination.

Indicators were trimmed attending to their loadings, using the threshold of 0.7 recommended in the literature (Hair et al., 2012). Only four items of the environmental attitude scale were kept, but the remaining items capture the important facets of environmental attitude. For green SN, 1 of the original 8 questions was removed. Green PBC was trimmed to 6 items from the original 10 items. As for green behavioral intention, none of the items were removed because they all had loadings greater than 0.9. The final instrument is presented in Appendix A.

Validation Results

The validity and reliability of the measurement model were assessed using the individual items loadings and composite reliability (CR). Convergent validity was evaluated using the average variance extracted (AVE), a relative measure of the variance of the indicators captured by the construct (Fornell & Larcker, 1981). As shown in Table 1, the internal consistency of the constructs was confirmed by the composite reliability scores, which were well above the recommended threshold value of 0.7, suggesting that they explained more than 50% of the variance in the construct (Hair et al., 2012). Convergent validity was confirmed by average variance extracted (AVE) scores, which were greater than the criterion score of 0.50, suggesting that the amount of variance in the items attributable to errors was less than the amount attributable to the construct (Fornell & Larcker, 1981).

Construct	Composite Reliability	Cronbach's alpha
Behavioral Intention	.96	.93
Perceived Behavioral Control	.90	.86
Attitudes	.81	.70
Subjective Norms	.94	.92

Table 1. Convergent validity analysis

Discriminant validity was confirmed by verifying that the square root of AVE for a construct is larger than its correlation with other constructs, and also by verifying item loadings (Fornell & Larcker, 1981; Hair et al., 2012). Individual item loadings in the PLS model were equal or larger than 0.70 for most items (Hair et al., 2012), except for an item for environmental attitude with a loading of approximate 0.60 (still above the reference threshold of 0.4 proposed for exploratory research Hair et al. 2012). All the constructs in our study fulfilled this criterion and, thus, demonstrated adequate discriminant validity. Table 2 presents the calculated AVE, their square root (in the diagonal), and the correlations between constructs.

	AVE	Green Behavioral Intentions	Green Perceived Behavioral Control	Green Attitudes	Green Subjective Norm
Green Behavioral Intentions	.88	**.94**			
Green Perceived Behavioral Control	.59	.61	**.77**		
Green Attitudes	.52	.65	.56	**.71**	
Green Subjective Norm	.68	.57	.56	.59	**.82**

Table 2. Construct correlations with the square root of AVE along the diagonals

The coefficient of determination for Behavioral Intention was 0.530. SmartPLS does not offer a model fit metric. The goodness-of-fit metric (GoF) of the model was calculated using the approach described in Tenenhaus, Vinzi, Chatelin and Lauro (2005). GoF is the geometric mean of the average communality and the average R^2 (R^2 of Green Behavioral Intention in our model with a single endogenous variable).

Attending to the categorizations of small (.10), medium (.25) and large (.36) offered by Schepers, Wetzels, and de Ruyter (2005), the overall fit of the model is identified as large (0.60).

Preliminary Results and Proposed Study

The theoretical model was evaluated using the validation sample described above (n=162). Bootstrapping was used to assess the significance of path parameters in the model. A total of 1,000 bootstrap samples were selected, and the number of observations in each bootstrap sample was equal to the number of observations (Hair et al., 2012). Results are presented on Figure 1.
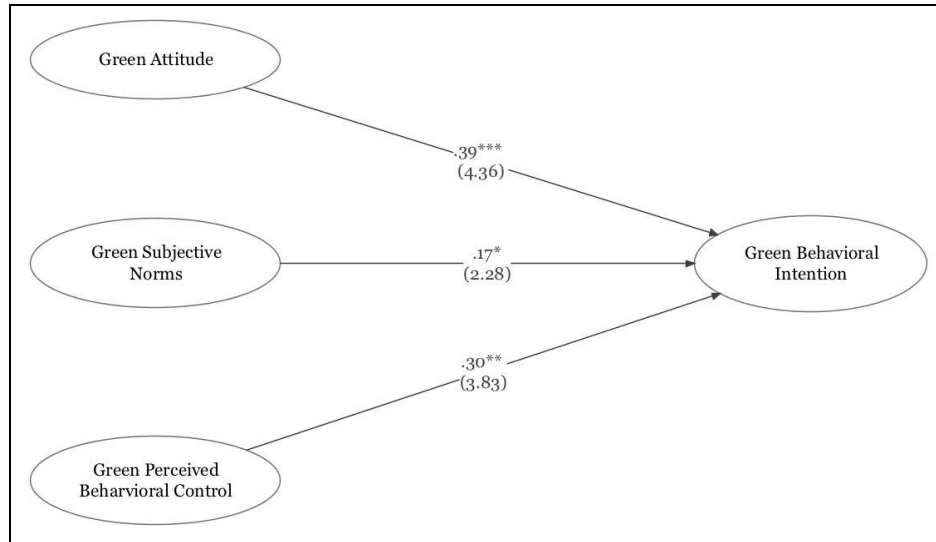

Figure 1. ETPB Model with path coefficients (associated t-statistics are in parenthesis; reported p-values are for two-tailed tests). *Indicates significance at the .05 level, **indicates significance at the .001 level, and ***indicates significance at the .0001 level

The three path coefficients in the model were significant. The path between preservation attitude and green behavioral intention was highly significant (t=4.36, p<.0001), followed by green PBC (t=3.83, p<.001), and green SN (t=2.28, p<.05). Preservation attitudes, green SN, and green PBC explained 53% of the variance for green behavioral intention.

While attitudes towards the environment were most predictive of what environmental actions people intended, having a sense about one's competency to complete pro-environment actions was almost as important. How others, in particular those who matter to us, perceived the pro-environment behaviors also contributed to one's green behavioral intentions. This theoretical model enriches our understanding of human action when environmental consequences are present, with particular application to businesses' green practices, potentially offering guidance in the development of cohesive national and global environmental initiatives.

Although this sample contained two different world regions, culture was not evaluated as a possible variable. A broader sample is currently being collected using Amazon's Mechanical Turk workforce, which is available to a larger range of participants. It gives us the opportunity to further extend the survey by evaluating people of different ages and cultures. In future studies we would like to evaluate the differences between environmental behavioral intentions and cultural factors. Cultural differences can have an impact on how attitudes towards the behavior are viewed, the importance an individual places on subjective norms, and the personal competency respondents perceive over the completion of the behavior.

We have also collected a sample of business executives (n=50) because we will further apply the proposed ETPB model to the study of green business development.

The executive sample can give us a better understanding into the decision-making factors of green behavioral intentions. As modern society further understands the importance of positive environmental action, we are starting to see the growth and impact of environmentally conscious businesses.

Appendix A

Green Attitude
Responses on a 7-point Likert scale, ranging from 1: Strongly disagree to 7: Strongly agree.

I would like to join and actively participate in an environmentalist group.
Protecting the environment is more important than protecting peoples' jobs.
Whenever possible, I try to save natural resources
I would NOT get involved in an environmentalist organization. (R)

Green Subjective Norms (SN)
Responses on a 7-point Likert scale, ranging from 1: strongly disagree to 7: strongly agree.

Most people who are important to me think I should protect the environment.
Most people who are important to me want me to be environmentally friendly.
Most people whose opinion I value think that it is important to reduce waste.
Most people who I respect and admire engage in environmentally friendly behaviors.
Most people who are important to me protect the environment.
It is expected of me to be environmentally friendly.
Most people who I admire engage in the protection of the environment.

Green Perceived Behavioral Control (PBC)
Responses on a 4-point Likert scale, ranging from 1: not at all true to 4: exactly true.

I find it easy to be friendly with the environment.
I am confident that I can protect the environment.
I am fully capable of protecting the environment.
Thanks to my resourcefulness, I always find a way to be friendly with the environment.
I am in full control of my actions to protect the environment.
I am good at leading a green lifestyle.

Green Behavioral Intention
Responses on a 7-point Likert scale, ranging from 1: extremely unlikely to 7: extremely likely.

I will try to reduce my carbon footprint in the forthcoming month.
I intend to engage in environmentally-friendly behavior in the forthcoming month.
I plan to stop wasting natural resources in the forthcoming month.

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