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Using Values, Beliefs, and Norms to Predict Conserving Behaviors in Organizations

INTRODUCTION

Organizations (and their employees) contribute to harmful effects to the environment (EPA, 2019) and consequently, there has been a rise in Corporate Social Responsibility (CSR) initiatives as organizations respond to this phenomenon for legitimation, competitive, and environmental reasons (Bansal & Roth, 2000). Yet, complex ecological problems remain unresolved (Cheng et al., 2019). While there is growing interest in macro-level CSR research from scholars, research at the micro-level is scant (Aguinis & Glavas, 2012; Manika et al, 2015).

Additionally, while environmental behaviors at the micro-level have been studied extensively in the home and the marketplace (Steg & Vlek, 2009; Reisch & Thøgersen, 2017), in comparison, the organizational context remains an under-researched area (Wiernik et al, 2018). This is however, changing, with increased interest in the environmental behaviors of managers (e.g. Dalvi-Esfahani et al, 2017; Papagiannakis & Lioukas, 2017) and employees (Ones & Dilchert, 2013; Lo et al, 2012; Lülfs & Hahn, 2013; Ruepert et al, 2016).

This study responds to calls for further research at the micro-level on how to design effective CSR programs aimed at promoting positive employee environmental behaviors (Ruepert et al, 2016; Wells et al, 2018; Wiernik et al, 2018) and to normalize these behaviors into the organizational culture (Dixon et al, 2014; Manika et al, 2015; Norton et al, 2015). Specifically, we focus on a subset of employee environmental behaviors, *i.e.,* conserving behaviors, such as waste recycling, repurposing/reusing materials, and saving energy (Ones & Dilchert, 2013), and aim to determine their antecedents. Conserving behaviors are highly under the control of office employees (Ruepert et al, 2016; Scherbaum et al, 2008, Zhang et al, 2013) and hence represent an appropriate object of study for CSR initiatives aimed at changing employee behaviors. Understanding the antecedents of a behavior improves CSR efforts by enhancing employee motivations to engage in environmental (in this case, conserving) behaviors (Manika

et al, 2015).

Previous studies that examined the antecedents of environmental behaviors in organizations have identified several theoretical models (Wiernik et al, 2018) such as the Values-Beliefs-Norms theory (VBN), the Theory of Planned Behavior (TPB), or the Norm Activation Model (NAM). However, many of these theories have used a convenience sample (e.g. Kaiser et al 2005) or are conducted in a single industry (Christina et al, 2014; Scherbaum et al, 2008, Yeboah & Kaplowitz, 2016). Consequently, we do not have a clear view of the antecedents of employee environmental behavior, and we lack a coherent understanding of how employees develop environmental attitudes and beliefs in the workplace (Norton et al, 2015; Wells et al, 2018). Thus, the focus of this paper is extending the VBN theory to determine the antecedents of employees' conserving behaviors in an office setting. Previous studies have found that conserving behaviors are more likely to be explained by the individual-level psychographic variables captured by the VBN, as opposed to organizational context variables such as trust in top management, employees' affective commitment to the organization, or organizational climate (Andersson et al, 2005; Ruepert et al, 2016, Zhang et al, 2013).

The VBN theory (Stern & Dietz, 1994; Stern et al, 1999) has been widely tested empirically and focuses on individual values, beliefs, and personal norms as determinants of behavior (Ruepert et al, 2016; Yeboah & Kaplowitz, 2016). It links several elements in a causal structure: values, ecological beliefs based on the new ecological paradigm (NEP), awareness of consequences (AC), ascription of responsibility (AR), personal norms (PN), and finally, environmental behavior (Stern et al, 1999). Each variable directly affects the next and additionally, indirect interaction effects exist among the five variables (see *Figure 1*). VBN theory has proven to be generalizable and as Wacker (1998) notes, "the more areas that a theory can be applied to makes the theory a better theory. […] those theories that have wider application have more importance" (p. 365). However, while some applications exist, a fuller and robust application, utilizing the full model with all its variables, is needed in the workplace setting (Young et al, 2013). Previous empirical studies applying VBN in the workplace used a truncated or adapted VBN model (Scherbaum et al, 2008; Ruepert et al, 2016), or one of its building blocks, such as the norm-activation-model (NAM) (Dalvi-Esfahani et al, 2017; Zhang et al, 2013), rather than the full model. Additionally, most VBN applications in organizations focus on a single or small subset of behaviors (Scherbaum et al, 2008; Zhang et al, 2013; Yeboah and Kaplowitz, 2016). We extend VBN to overcome these issues, by analyzing Ones & Dilchert's (2013) four distinct conserving behavior types (i.e., reducing use, reusing, repurposing, and recycling) and examine all employees, regardless of organizational position.

And finally, going beyond a single or small number of industry settings (Scherbaum et al, 2008; Christina et al, 2014; Yeboah & Kaplowitz, 2016) we analyze a large sample of 714 office employees across several industries.

To summarize, the main contributions of this study are threefold. Firstly, to our knowledge this is the first quantitative study to examine the full VBN model within an organizational context. Secondly, it is the first study to extend VBN theory by integrating employee conserving behaviors (Ones & Dilchert, 2013). Finally, it examines this extended model utilizing a large sample of office employees across a range of industries.

The remainder of the paper is organized as follows. The next section critically reviews the literature on employee conserving behaviors and organizational applications of VBN and outlines our hypotheses. Subsequently, we describe our methodology, data analysis, and findings. The remaining sections discuss these findings and outline theoretical and business implications. The final section provides limitations, conclusions, and directions for future research.

LITERATURE REVIEW

Employee Conserving Behaviors

Recent research categorized the many types of pro- and anti-environmental behaviors that employees can perform in organizations. One of the most extensive is the taxonomy of environmental behaviors in organizations (Ones & Dilchert, 2013), which was developed across 20 industries and 15 countries. In this taxonomy, employee environmental behaviors cluster into five categories: 1) *avoiding harm* (e.g., preventing pollution); 2) *conserving* (e.g., reducing use, reusing, or recycling materials); 3) *working sustainably* (e.g. creating sustainable processes); 4) *influencing others* (e.g., sustainability training); and 5) *taking initiative* (e.g., starting a new environmental program). In particular, the office employees' conserving behaviors are "low-intensity behaviors" (Ciocirlan, 2016), characterized by "low uncertainty, low organizational or individual costs, and low visibility" (p. 3). Similarly, conserving behaviors are envisaged as extensions of domestic behaviors, and fit Smith and O'Sullivan's (2012) category of 'adapting behaviors.' These behaviors are under an employee's control, can be conducted in a private manner (while at work), are not adventurous, nor controversial, and do not draw much attention from organizational members.[1]

Research suggests some theories are more suited to explaining different categories of behavior than others. For the non-conserving behaviors (*e.g.* working sustainably, influencing others, taking initiative), context and personal capabilities are likely to have more explanatory

power than attitudinal factors (Guagnano et al, 1995). Researchers note, "with salary …. on the line, employees of corporations may toss their personal values, beliefs, and norms aside at the revolving office door" (Andersson et al, 2005, p. 303). By contrast, attitudinal factors (such as values, norms, and beliefs) have a greater explanatory power for the conserving behaviors of interest here and are more affected by person-related factors rather than context-related factors (Andersson et al, 2005; Norton et al, 2015). Indeed, habit and environmental concern, reflected in employees' values, beliefs, and norms, had a significant influence upon employees' engagement in adapting behaviors (Smith and O'Sullivan, 2012). As Andersson et al (2005) note, "the VBN theory provides the best theoretical account of environmental behaviors performed by individuals acting independently" (p. 303). The next section reviews current literature on the VBN theory and its applications in organizations.

Value-belief-norm (VBN) Theory and Environmental Behavior

VBN theory posits that values are deeply rooted and established early in an individual's life. Three types of value orientation are included: egoistic (concern for own welfare), altruistic (concern for the welfare of others), and biospheric (concern for non-human aspects of the environment), which influence ecological beliefs (captured by the NEP) (de Groot & Steg, 2007). In turn, ecological beliefs lead to an awareness of consequences (AC) of human actions on the ecological system. Consequently, when people are aware of the potential negative consequences to environmental aspects that they value, and of actions they can take to reduce the negative consequences, they feel a sense of ascribed responsibility (AR) (Stern, 2000). Further, AR leads to the formation of a sense of moral responsibility toward the environment (internalized personal norm, or PN), which ultimately exerts an influence on behavior (de Groot & Steg, 2007; Stern, 2000).

VBN theory has been tested in multiple contexts, such as environmental product design (Chen, 2015), conservation (Kaiser et al, 2005), engagement in parks (van Riper & Kyle, 2014), marine behavior (Wynveen et al, 2015), household energy efficiency (Fornara et al, 2016), and acceptability of energy policies (Steg et al, 2005), amongst others. Overall, VBN variables tend to explain between 19-35 percent of the variance in environmental behaviors (Stern et al, 1999). Indirect effects have also been found. For instance, in Zhang et al's (2013) study of employee electricity-saving behaviors, AC positively influenced AR; in turn, AC, AR, and an electricity-saving organizational climate positively influenced PN; and PN positively influenced employee electricity-saving behavior. Sahin (2013) reported a positive effect of ecological worldview on PN. Additionally, a higher awareness of consequences (AC) and

ascription of responsibility (AR) were correlated with higher engagement in corporate environmental management initiatives (Papagiannakis & Lioukas, 2017). Overall, VBN is well supported by empirical studies, but its limited applications in organizations yield mixed results. *Table 1* summarizes the results of VBN applications in organizations that exist in the literature, to the authors' knowledge.

INSERT TABLE 1 HERE

Some previous applications are not comparable to our work, as they study 'high-intensity' behaviors, while we focus on 'low-intensity' behaviors as defined by Ciocirlan, (2016).[2] Moreover, some of the findings are also contradictory: while some studies found altruistic and biospheric values were important antecedents in norm activation (Ruepert et al, 2016; Yeboah & Kaplowitz, 2016), others did not (Christina et al, 2014), yet others did not include values in the model at all (Scherbaum et al, 2008; Zhang et al, 2013). Ecological beliefs (measured via NEP) had a positive influence on AC (Yeboah & Kaplowitz, 2016) and were a significant predictor of PN (Scherbaum et al, 2018). However, no significant relationship was found between ecological beliefs and conserving behaviors, or behavioral intention of employees (Andersson et al, 2005; Scherbaum et al, 2018). Ecological beliefs affected behaviors and intentions only indirectly (via PN) (Scherbaum et al, 2018) and they also mediated the relationship between altruistic values and AC (Yeboah & Kaplowitz, 2016).

None of these studies examine all of the conserving behaviors we study, although most incorporate energy-saving behaviors (Ruepert et al 2016; Scherbaum et al, 2008; Zhang et al, 2013). Additionally, only one study (Zhang et al, 2013) examined specifically the office workers that are of interest here, but it uses the NAM model, not the full VBN model. Given the lack of conclusive organizational VBN studies, their contradictory results, and different research contexts, we believe it is valuable to apply the original VBN model (adapted to organizations) to examine the antecedents of the conserving behaviors of office employees. The next section will outline our conceptual model.

Conceptual Model

We expect employees with strong altruistic and biospheric values to have positive ecological beliefs (NEP), while egoistic values would have a negative effect (de Groot & Steg, 2007), because individuals who are concerned with themselves tend to be less concerned about nature (Steg et al, 2005). Hence, we hypothesize:

H1: In the workplace, (a) Biospheric and (b) Altruistic values have a positive and significant relationship with ecological beliefs (NEP), while (c) Egoistic values have a negative relationship with ecological beliefs (NEP).

These values and beliefs in turn will lead to an awareness of consequences (AC) of human actions on the ecological system. We hypothesize not only that ecological beliefs will have a positive influence on AC (Yeboah & Kaplowitz, 2016), but also that altruistic and biospheric values will have a positive influence on AC, while egoistic values will have a negative effect on AC (Yeboah and Kaplowitz, 2016). Additionally, ecological beliefs lead to an awareness of consequences to the eco-system (Kaiser et al, 2005; Yeboah & Kaplowitz, 2016). Thus,

H2: In the workplace, (a) Biospheric and (b) Altruistic values have a positive and significant relationship with Awareness of Consequences (AC), while (c) Egoistic values have a negative relationship with Awareness of Consequences (AC).

H3: In the workplace, ecological beliefs (NEP) have a positive and significant relationship with Awareness of Consequences (AC).

Consequently, when people are aware of the negative consequences to environmental aspects that they value, and of actions they can take to reduce the negative consequences, they experience a sense of ascribed responsibility (AR) (Stern, 2000). Hence, we expect ecological beliefs (NEP) to have a positive and significant relationship with AR (Sahin, 2013) and AC to positively affect AR (Kaiser et al, 2005; Zhang et al, 2013). Hence, we hypothesize:

H4: In the workplace, ecological beliefs (NEP) have a positive and significant relationship with Ascription of Responsibility (AR).

H5: In the workplace, Awareness of Consequences (AC) has a positive and significant relationship with Ascription of Responsibility (AR).

Further, AR leads to the formation of a sense of moral responsibility, that is, an individual's own perception of how they should behave toward the environment (internalized personal norm, or PN; de Groot & Steg, 2007). By contrast, employees who do not see how their *work* behavior affects the environment (AC) and who believe their *work* actions have insignificant

effects on the environment (AR), will not experience personal norm (PN) activation. Hence, consistently with Zhang et al's (2013) findings, we hypothesize that AC and AR positively influence PN. In sum, we suggest an employee's personal norms to engage in environmental behaviors are activated by the employee's beliefs that environmental problems have potential negative consequences for valued elements (one's team, colleagues, organization), and the belief that the employee can take work actions to reduce these negative consequences. Thus,

> **H6:** In the workplace, Awareness of Consequences (AC) has a positive and significant relationship with Personal Norms (PN).

> **H7:** In the workplace, Ascription of Responsibility (AR) has a positive and significant relationship with Personal Norms (PN).

Further, when employees believe they are partially responsible for environmental harm, they develop an intention to engage in green actions (Papagiannakis & Lioukas, 2017). Violating a personal norm leads to feelings of guilt, while acting consistently with personal norms enhances an individual's pride and self-esteem (Schwartz, 1973). Hence, a greater sense of moral responsibility within the workplace can lead to engagement in environmental workplace behaviors (*i.e.,* conservation behaviors). Thus,

> **H8:** In the workplace, Ascription of Responsibility (AR) has a positive and significant relationship with (a) Reducing Use, (b) Reusing, (c) Repurposing, and (d) Recycling behaviors.

> **H9:** In the workplace, Personal Norms (PN) have a positive relationship with (a) Reducing Use, (b) Reusing, (c) Repurposing, and (d) Recycling behaviors.[3]

The hypotheses and relationships are summarized in *Figure 1*.

INSERT FIGURE 1 HERE

METHODOLOGY

Data Collection

This study uses a quantitative survey methodology administered by *Qualtrics* to a UK panel composed of office employees. We chose to focus on UK employees mainly because UK residents, compared to other European residents, do not exhibit strong attitudes regarding climate change: according to Round 8 of the European Social Survey (ESS), less than 25% of UK residents are "very or extremely worried" about climate change and less than 10% are "very or extremely" concerned about energy reliability and affordability. Further, UK residents somewhat believe that individuals have a personal obligation to save energy (personal norms) and are moderately confident in their ability to reduce energy (ESS, 2018).[4] Within a workplace context, these environmental beliefs, attitudes, and behaviors are expected to be even weaker than in the home context (Manika et al, 2015). Hence, understanding how UK employees form these attitudes and beliefs at work would be useful to managers and organizations in the UK in their CSR endeavors to motivate employees to engage in conserving behaviors.

The benefits of partnering with *Qualtrics* are that this organization finds participants who fit research purposes, thus improving access, and generates an externally valid sample in a cost-effective way (Brandon et al, 2014).[5] Employees received an e-mail invitation to participate and were assured of the anonymous and voluntary aspects of their participation. Only participants who were employed in an office at the time of the data collection were eligible. The questionnaire was pre-tested under actual field conditions and no revisions were needed. The sample was demographically and geographically dispersed (see below).

Survey Measures

Established scales adapted from prior literature were used to measure all constructs. All variables were measured on a 7-point Likert scale, from 1 (strongly disagree) to 7 (strongly agree). Values were measured via scales adapted from Snelgar (2006). The original NEP measure from Dunlap et al (2000) included 15 items; however, due to measurement issues, only six items were retained. Awareness of Consequences (AC) was measured using adapted items from Wynveen et al (2015). Ascription of responsibility (AR) was measured via items adapted from Zhang et al (2013). Environmental personal norms were measured via items from Chou (2014). Conservation behaviors were measured with instruments derived from different sources (Manika et al, 2015; Lamm et al, 2013; McConnaughy, 2014). The survey also asked participants to indicate their position in the organization, their tenure with the organization, any environmental responsibilities held, organization size, and industry (based on the Industry Classification Benchmark) (*Table 2*). No significant differences were found in

conserving behaviors regarding participants' position, tenure, organization size, or industry. As expected, however, respondents with environmental responsibility reported higher levels of engagement in conserving behaviors.

INSERT TABLE 2 HERE

Sample Description

In total, 714 respondents completed the survey and met the specified criteria (i.e., office employees). The sample had a balance of age, gender, education, and organizational levels. The average organizational tenure across participants was 10.39 years (SD=9.32), 18% percent of respondents had a GCSE degree or equivalent, and 35% had an undergraduate degree. About 43% of respondents work in small or medium organizations and 56% in large or very large organizations. Most employees occupy non-management roles (55%), although a sizable proportion occupy managerial roles as well (43%) (see *Table 2*).

Common Method Bias (CMB)

Potential effects of common method bias (CMB) were minimized by randomizing all scales. Assuring respondents of their anonymity also minimized social desirability bias (Podsakoff et al, 2003). Results of a Harman single factor test (commonly used in the literature, e.g. Zhang et al 2013), assessed through a principal component analysis with no rotation, showed one factor explains 48.24% (i.e., less than 50%). This compares to two factors with Eigenvalues greater than one, explaining 63.87% of the variance, thus suggesting CMB is not a threat in the interpretation of the results.

   Based on the process suggested by Kock (2015) to examine CMB in PLS-SEM, we also tested the Variance Inflation Factor (VIF) of all factor-level dependent variables (i.e., all four conservation behaviors) by loading all independent factors on each dependent factor. In line with the recommended threshold of 3.3 VIF by Kock (2015), we found all inner VIF values of independent factors are well below 2.7, except the inner VIF values associated with altruistic values, which was 5.3 across all four conservation behaviors. It should also be noted that "Kock & Lynn (2012) pointed out that classic PLS-SEM algorithms are particularly effective at reducing model-wide collinearity, because those algorithms maximize the variance explained in latent variables by their indicators" (Kock, 2015, p. 8). Thus, it is unlikely that the higher than acceptable inner VIF value of altruistic values has a significant effect on our analysis and findings. Hence, we consider CMB not to be an issue in this study, although we do note it as a limitation of our paper, which should be minimized in further research (see *Limitations*).

ANALYSIS AND RESULTS

We use a Partial Least Square (PLS) approach to Structural Equation Modelling (SEM). PLS-SEM is used across a wide range of disciplines (Hair et al, 2012; Hair et al, 2013) and has previously been used to study environmental behavior (Wells et al, 2016). It is an alternative approach to covariance-based SEM and has been used in this study for four reasons. Firstly, this research has an exploratory focus (Edmondson and Mcmanus, 2007) and secondly, it is interested in prediction (Hair et al, 2014). Thirdly, we examine whether the constructs predict four distinct conserving behaviors in the workplace. Our environmental measures in a workplace context are also relatively new, and have not previously received empirical attention, conditions that make use of PLS-SEM an excellent choice (Hair et al, 2014). Finally, PLS-SEM estimation is more resistant to departures from normality than covariance-based SEM (Hair, et al, 2011). SmartPLS 3.0 and 10,000 bootstrap resamples are used to test both measurement and structural models (Hair et al, 2011).

Measurement Model

After checking the variable-to-sample ratio, the analysis procedure by Hair et al (2014) and Fornell and Larcker (1981) for assessing convergent and discriminate validity was used. As illustrated in *Table 3*, each construct had an acceptable Cronbach Alpha, composite reliability, Average Variance Extracted (AVE) and Maximum Shared Variance (MSV). *Table 4* includes the means, standard deviations, and correlations among constructs. The data also resulted in acceptable values for the Fornell-Larcker criterion (1981) [AVE> $(r)^2$] and the heterotrait-monotrait ratio (HTMT) (Henseler et al, 2015), for all multi-item scales. Thus, these results confirm convergent and discriminant validity. The loadings of each latent factor can be seen in *Table 3*. Overall, the measurement model performs adequately [Standardized Root Mean Square Residual (SRMR) =.05; Normed Fit Index (NFI) =.85]. [6]

INSERT TABLES 3 AND 4 HERE

Structural Model

The quality of the structural model (*i.e.* blindfolding as per Hair et al, 2014) was assessed using cross validation communality and redundancy indices. All Stone-Geisser's Q^2 (Geisser, 1974) values are positive and higher than zero for all endogenous constructs, supporting the predictive relevance of the model for all constructs (see *Table 5*). The model explains 26% of reducing use, 31% of reusing, 28% of repurposing and 26% of recycling behaviors. *Table 6* presents the estimated structural model paths, along with a hypotheses support summary. In the model's

main relationships H1a, H1b, H5, H7 and H9 (a-d) were supported, while H1c and H3 were not supported. Therefore, the later part of the VBN model (AC → AR → PN → Workplace Conserving Behaviors) is supported in the workplace context. Regarding the other hypothesized relationships, H4 was supported, while H2, H6 and H8 were not supported. These findings lend support to the core VBN model (if a shorter version of it, i.e. Values → NEP → AC → AR → PN → Behavior) as relevant in the workplace context. These results are depicted in *Figure 2* below.

INSERT FIGURE 2, TABLES 5 & 6 HERE

Indirect Effects Using PROCESS

To examine the suggested mediations and estimate the indirect effects, an OLS regression approach to path analysis (Hayes, 2013) was employed using SPSS. The results of indirect effects estimated using PROCESS and the calculation of 95% confidence intervals using bias-corrected and accelerated bootstrap and 10,000 resamples (Hayes, 2013) are illustrated in *Table 7*. The average of the latent constructs for the analysis and model 4 of Hayes' PROCESS were used. All indirect effects are consistent with the hypotheses presented and tested through PLS-SEM. The results indicate AR fully mediates the relationship between AC and PN, and PN fully mediates the relationships between the following pairs of variables: AR and Reducing Use, AR and Repurposing, AR and Recycling. An inconsistent partial mediation was also found between AR and Reusing, mediated by PN. This again supports the core model (if shortened version, i.e., Values → NEP → AC → AR → PN → Behavior) of VBN in the workplace. Lastly, it should be noted that results do not differ significantly based on the examination of mediations using PLS-SEM (also reported in *Table 7*).

INSERT TABLE 7 HERE

DISCUSSION

This research examined the antecedents of conserving behaviors using VBN theory. As the first study to use the full VBN model in the organizational context and the first to apply the VBN to understand conserving behaviors specifically (Ones & Dilchert, 2013), this research contributes to the extant literature on antecedents of employee environmental behaviors. Additionally, it uses a large sample of office employees across various industries in the UK.

Theoretical Implications

The results suggest that the core VBN model (Values → NEP → AC → AR → PN → behavior) holds to a certain extent in the workplace context. Concentrating first on the core VBN model, the research found biospheric and altruistic values predict employees' ecological beliefs, but this was not the case for egoistic values. The strongest relationship was between biospheric attitudes and ecological beliefs. This is consistent with previous studies (Stern, 2000; van Riper & Kyle, 2014; Ruepert et al, 2016; Yeboah & Kaplowitz, 2016), which highlight the influence of biospheric and altruistic values on norm activation (via NEP) and this also appears to be the case in the workplace. However, we found the relationship between NEP and AC does not hold in the workplace: higher ecological values do not necessarily translate into a heightened awareness of consequences. This might be explained by the fact that, while employees might hold ecological beliefs, they are not aware of how environmental issues directly create negative consequences for their team or organization. Further, they may believe they have little control over infrastructure (lighting, heating/cooling, recycling bins); they share devices, resources (e.g. printers, paper) and office space; and have limited or no ability to measure their savings and impact directly (Carrico & Riemer, 2011). Next, consistent with past research (Christina et al, 2014; Stern, 2000; Wynveen et al, 2015), we found employees' awareness (AC) of the problems generated by environmental degradation for their workplace explains their personal ascription of responsibility (AR). Like other studies, we found personal norms (PN) were predicted by AR (Sahin, 2013). Finally, PNs were found to positively predict all four types of conserving behaviors, consistent with past research (*e.g.* Kaiser et al, 2005; Lo et al, 2012; Yeboah & Kaplowitz, 2016; Zhang et al, 2013).

Moving away from the core original VBN model, our analysis found several relationships among the variables that did not fit the linear flow of the original model or uncovered surprising relationships. Contrary to our expectations, the relationship between egoistic values and AC was positive and significant. One explanation might be related to measurement differences: in the private environmentalism literature, egoistic values measure people's concern about money and power (van der Werff & Steg, 2016), while here they measure employees' concern for their own future, lifestyle, or health. Another possible explanation could be the fact that the workplace environment is perceived by the individual as part of "their" lifestyle and life, connected to their future and health, and hence part of their "egotistic" or personal domain. As Unsworth et al (2013) note, "an employee with egoistic values may be just as likely to engage in environmental behavior as one with altruistic or biospheric values" (p. 222). Our finding of a positive association between egoistic values and AC might suggest differences between the

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application of VBN in private and organizational contexts, and it warrants further investigation. Additionally, a positive and significant relationship was found between NEP and ascribed responsibility (AR), suggesting that employees' general ecological values will increase their sense of responsibility toward environmental actions in the workplace. We also found AC indirectly affects PN via AR. That is, employees' awareness of the ecological problems requires an activation of AR in order to influence their personal norms. This indirect effect is consistent with Zhang et al's (2013) research on electricity-saving behavior and Wynveen et al's (2015) study on marine conservation, although both also reported direct effects from AC to PN.

Further, PN had a positive and significant relationship with all the conserving behaviors, the strongest one being with reusing materials, perhaps because employees felt they had the most control over this type of behavior. In previous studies of VBN in organizations, relationships were stronger when employee control was the highest (Ruepert et al, 2016). Overall, our study confirms the VBN model variables can be used effectively to explain employees' conserving behaviors. While many elements of the core model are supported in the workplace context, we present an adapted VBN model (see *Figure 2*) based on the notion that employees' biospheric and altruistic values affect ecological beliefs, and that these beliefs affect awareness of consequences of environmental problems for their jobs, teams, and organizations. Then, employees feel jointly responsible for the impact of their work actions on the environment (AR), and, consequently, are personally obligated (PN) to engage in environmental behaviors at work. Overall, while each variable was shown to play a part in the workplace, some relationships were indirect, or did not follow the original VBN model.

Practical and Business Implications

This study has implications for organizations seeking to increase employee environmental behavior. In a comprehensive review of extant research on employee green behaviors, Norton et al (2015) note practitioners need more guidance on how to make non-green employees engage in green behaviors and how to 'green' their organizational culture. Our study helps provide such guidance by identifying the antecedents of green behavior and their causal structure.

Specifically, the strongest relationships we found were between personal norms and all the conserving behaviors, pointing to the need to highlight and encourage these norms through social normalization approaches, training and communication efforts (Rettie et al, 2014). The more normal these behaviors are seen to be in the workplace, the more likely employees are to

perform them. While according to VBN, cognition and affect form the basis for the creation of personal norms (PN), the influence of social norms is recognized as well (van Riper & Kyle, 2014). Employees may be more vulnerable to processes of normative influence (Arpan et al, 2015) as behavior is more easily observed by one's peers in the workplace. Norms interventions could use environmental feedback information to increase perceptions of norms (Dixon et al, 2014). Environmental behaviors could be normalized by incorporating energy efficiency considerations into task strategy and job design (Locke & Latham, 2002). For instance, tasks could be aligned with organizational goals, one of which should be saving energy.

Links between consequences, responsibility, and personal norms were also highlighted. Here, interventions could focus on enhancing awareness of the consequences of their behavior which has been shown to be an important determinant in engagement in environmental behavior (Klöckner, 2013; Wynveen et al, 2015). To support these interventions, environmental workshops could be used to remind and encourage employees to be responsible for these behaviors.

However, awareness of consequences is not enough on its own to motivate behavioral change, and extrinsic motivation can motivate employees to act (Wiernik et al, 2018). Consistent with Stern's (2005) recommendation for the use of extrinsic motivation for behavioral change, green performance evaluations could also be used to raise expectations of personal responsibility in the workforce (Ciocirlan, 2018). Additionally, to strengthen the link between personal norms and behavioral intentions, organizations could implement public commitment/pledge statements (Lee & Kotler, 2011).

The questionnaire developed here could be used as an assessment tool, especially in green orientation, onboarding, green training and development (Ciocirlan, 2018) to understand employees' attitudes and their perceptions of sustainability. This would help organizations embed sustainability into the organizational culture, a current area of interest in the academic literature (Norton et al, 2015). Interventions could be tailored to different employee groups based on a segmentation analysis that considers employees' differing levels of values, beliefs, and norms. Future research could assess the potential of this type of segmentation.

The recommendations above result from the significant links in our model (see summary in *Figure 3*), but future research may also look to build or strengthen other links, which were not supported. Managers might consider interventions strengthening the link between workplace conservation intentions and behaviors. This might be done through informational and instructional interventions, such as informational training and prompts (Ones

& Dilchert, 2013), making green behaviors more convenient, adding reminders in common areas, organizing recycling drives (Wiernik et al, 2018), or creating work contexts allowing employees to engage in environmental behaviors (Ruepert et al, 2016). However, practitioners should be aware that environmental information and communication strategies would only be effective for employees who already care about the environment (Christina et al, 2014).[7] For those who do not, programs aimed at behavioral change might focus on motivators such as convenience and personal economic benefits, as opposed to environmental concerns (Yeboah & Kaplowitz, 2016).

INSERT FIGURE 3 HERE

LIMITATIONS, FUTURE RESEARCH DIRECTIONS, AND CONCLUSION

While this study makes valuable theoretical and practical contributions, it suffers from several limitations. Our study relied on self-reported measures, which can lead to CMB and social desirability bias. While we did not consider CMB to be a critical issue with this study, we recommend that future studies use a marker variable to further test for CMB, as recommended by Podsakoff et al. (2003) and address the higher inner VIF values of altruistic beliefs in relation to our dependent variable, based on Kock's (2015) CMB procedure in PLS-SEM. To reduce the bias associated with attitude-behavior and intentions-behavior gaps (Sheeran, 2002) and self-reported data, future studies could aim to replicate this research using a field experiment design, which would allow the observation and measurement of actual behaviors via peer ratings, supervisor ratings, participant, or direct observation. However, such an approach would probably limit the breadth of the data collected.

Another limitation of our study is that it uses a cross-sectional sample. As with other cross-sectional research, causality associations should be interpreted with caution. Future research should use longitudinal samples to analyze changes in employee perceptions and behaviors over time (Norton et al, 2015). Additionally, we only studied UK office workers, thus reducing generalizability to other occupations, such as manufacturing workers or service providers. Differences between controversial and non-controversial behaviors, conserving and non-conserving behaviors, or between industry sectors, and countries should also be examined. Industry sectors that are leaders in stimulating conserving behaviors could be compared with those that are laggards, and a set of best practices derived.

While all the variables included in the VBN model contributed to the understanding of conserving behaviors, the relationships between these variables are more complex than predicted and differ somewhat from research on VBN in other contexts. This suggests further research is needed to validate the present findings, given that several hypotheses were not supported and only a handful of VBN studies in organizations exist in the literature. Future studies should explore other categories of behaviors identified by Ones & Dilchert (2013), *i.e.* avoiding harm, working sustainably, influencing others, and taking initiative.

In conclusion, the paper met all its original aims. Firstly, it holistically examined the antecedents of environmental behaviors using the VBN theory; secondly, it extended the VBN framework by using the taxonomy of conserving behaviors; thirdly, it adapted VBN constructs to the workplace environment and utilized a large sample of office employees across a range of industries in the UK. The study laid the foundations for future applications of VBN in the organizational context, and highlighted interventions that organizations can use to encourage environmental behavior amongst their employees.

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Table 1. VBN Studies in Prior Literature

Study	VBN model	Behaviors studied/ context	Sample size	Findings
Andersson et al, 2005	Adapted VBN model	Conserving behavior of employees -multinational pharmaceutical company headquartered in the UK	N= 147	▪ no significant relationship between ecological beliefs and conserving behaviors, or behavioral intention of employees ▪ perceived corporate commitment to sustainability was significantly related to trust
Christina et al, 2014	Multiple goal theory and an adapted VBN model	Building energy use - UK retail organization	N=51 (qualitative research design)	▪ altruistic and biospheric values not important; ▪ managerial vision, commitment, strategy, and performance management have a positive impact on environmental behaviors
Kaiser et al, 2005	Truncated VBN model (excludes the 'values' variables)	Conservation behaviors of students in a German university	N=648	▪ NEP positively influences AC ▪ AC positively influences AR ▪ AR positively influences PN ▪ PN positively influences conservation behaviors
Papagiannakis & Lioukas, 2017	Norm activation and social cognitive theories	Top managers' engagement in environmental management initiatives (EMI)	N=125 companies	▪ AC and AR positively correlated with higher engagement in corporate environmental management initiatives; ▪ Charismatic leadership is a mediator of the relationship between personal norms and EMI engagement
Ruepert et al, 2016,	Adapted VBN model, including environmental self-identity	Employees of four large organizations in Europe, including two state organizations (a municipality in the Netherlands and a university in Spain), and two service providers (one in Romania and one in Italy)	N=618 (117 in the Netherlands, 255 in Spain, 122 in Romania, 124 in Italy)	▪ altruistic and biospheric values were important antecedents in norm activation; ▪ self-identity positively affected PN and mediated the relationship between biospheric values and PN ▪ PN positively affected energy saving, waste prevention, and recycling
Sahin (2013)	VBN model	Education students at a Turkish university (energy conservation behaviors)	N=512	▪ ecological worldview influenced positively PN ▪ PN, egoistic and biospheric value orientations were significant predictors of energy conservation behaviors ▪ Biospheric values, AC, and AR were directly and significantly related to PN ▪ AC and NEP influenced AR
Scherbaum et al, 2008	Truncated VBN model	Employees of a large state university in the U.S. (energy conservation behaviors)	N=154	▪ Values not included ▪ Ecological beliefs a significant predictor of PN ▪ no significant relationship between ecological beliefs and conserving behaviors, or behavioral intention of employees; ▪ ecological beliefs affected behaviors indirectly, via PN PN influenced PEBs
Yeboah & Kaplowitz, 2016	VBN model	Multiple behaviors examined such as environmental activism, energy conservation behavior, environmentally based purchasing behaviour, and energy saving behaviors	N= 3,896 students, faculty and staff from Michigan State University	▪ Altruistic and biospheric values affect PN ▪ NEP positively influenced AC; ▪ NEP mediated the relationship between altruistic values and AC
Zhang et al, 2013	Norm Activation Model (NAM)	Employee electricity-saving behaviors	N=273 office workers in Beijing, China	▪ AC positively influenced AR; ▪ AC, AR, and electricity-saving organizational climate positively influenced PN; ▪ PN positively influenced employee electricity-saving behavior ▪ Values not included in the model

Table 2. Sample Description

Variable	Category	n (%)
Age	18-30	134 (18.8%)
	31-40	155 (21.7%)
	41-50	160 (22.4%)
	51-60	158 (22.1%)
	61-70	98 (13.7%)
	70+	9 (1.3%)
Gender	Male	347 (48.6%)
	Female	367 (51.4%)
Education	GCSE or equivalent	129 (18.1%)
	A level or equivalent	178 (24.9%)
	Undergraduate degree	250 (35.0%)
	Master degree	96 (13.4%)
	Higher degree (e.g. PhD)	32 (4.5%)
	Other (e.g., some school, accreditation)	27 (3.8%)
	Prefer not to answer	2 (0.3%)
Environmental responsibility with job description	Yes	115 (16.1%)
	No	599 (83.9%)
Organization Size (employees)	Small (1-50)	167 (23.4%)
	Medium (51-250)	146 (20.4%)
	Large (251-5,000)	215 (30.1%)
	Very large (5,000+)	186 (26.1%)
Level	Management	307 (43.0%)
	Non-management	394 (55.2%)
	Other (e.g., consultant, trainee)	13 (1.8%)
Industry	Oil & gas	6 (0.8%)
	Basic materials	12 (1.7%)
	Industrials	69 (9.7%)
	Consumer goods	58 (8.1%)
	Health care	68 (9.5%)
	Consumer services	89 (12.5%)
	Telecommunications	11 (1.5%)
	Utilities	12 (1.7%)
	Financials	73 (10.2%)
	Technology	50 (7.0%)
	Other (e.g., charity, government)	266 (37.3%)

Table 3. Measurement Items and Checks

Constructs/Measures	Loadings	CR, AVE, Cronbach's Alpha
Egoistic Values		
I am concerned about environmental problems because of the consequences for me.	.90**	a=.94
I am concerned about environmental problems because of the consequences for my future.	.92**	CR=.96
I am concerned about environmental problems because of the consequences for my lifestyle.	.91**	AVE=.81
I am concerned about environmental problems because of the consequences for my health.	.90**	MSV=.53
I am concerned about environmental problems because of the consequences for my prosperity.	.87**	
Altruistic Values		
I am concerned about environmental problems because of the consequences for humanity.	.91**	a=.90
I am concerned about environmental problems because of the consequences for children.	.86**	CR=.93
I am concerned about environmental problems because of the consequences for people in the community.	.85**	AVE=.78 MSV=.59
I am concerned about environmental problems because of the consequences for future generations.	.91**	
Biospheric Values		
I am concerned about environmental problems because of the consequences for plants.	.94**	a=.97
I am concerned about environmental problems because of the consequences for trees.	.95**	CR=.98
I am concerned about environmental problems because of the consequences for marine life.	.96**	AVE=.91
I am concerned about environmental problems because of the consequences for birds.	.97**	MSV=.44
I am concerned about environmental problems because of the consequences for animals.	.95**	
New Environmental Paradigm (NEP)		
Plants and animals have as much right as humans to exist.	.66**	a=.83
When humans interfere with nature it often produces disastrous consequences.	.73**	CR=.88
The balance of nature is strong enough to cope with the impacts of modern industrial nations.	.74**	AVE=.55
Humans are severely abusing the environment.	.84**	MSV=.35
The so-called "ecological crisis" facing humankind has been greatly exaggerated.	.65**	
If things continue on their present course, we will soon experience a major ecological catastrophe.	.82**	
Awareness of Consequences (AC)		
Environmental degradation generates…		a=.97
…. problems for my organization/employer.	.92**	CR=.98
…. problems for my work teams.	.96**	AVE=.89
…. problems for my workplace environment (e.g. building, office).	.93**	MSV=.16
…. problems for my work colleagues.	.95**	
…. problems for my daily work activities.	.94**	
…. problems for my department.	.96**	
Ascription of Responsibility		
I fee jointly responsible for the exhaustion of resources (such as water, paper, energy) at my workplace.	.91**	a=.97 CR=.98
I feel joint responsibility for the contribution of resources consumption at my workplace to climate change.	.96**	AVE=.89 MSV=.29
I feel joint responsibility for the contribution of resources consumption at my workplace to environmental degradation.	.97**	
I feel joint responsibility for the contribution of resources consumption at my workplace to local ecological damage.	.94**	
I feel joint responsibility for the negative consequences of resources consumption at my workplace.	.94**	

Table 3 (cont'd) Constructs/Measures	Loadings	CR, AVE, Cronbach's Alpha
Personal Norms		
I feel a personal obligation to do whatever I can at work to prevent environmental degradation.	.85**	a=.95
I feel a sense of personal obligation to take action at work to stop wasting resources.	.87**	CR=.96
I feel morally obliged to save energy at work regardless of what other employees do.	.86**	AVE=.73
Business and industry should reduce their waste production to help protect environment.	.83**	MSV=.29
The government should exert pressure on industry to better their job in protecting environment.	.77**	
Employees like me should do everything they can to reduce energy use.	.91**	
I feel obliged to bear the environment and nature in mind in my daily work behavior.	.82**	
Employees like me should do everything they can to recycle materials.	.86**	
Employees like me should do everything they can to reduce consumption of materials.	.89**	
Reducing use		
I turn off office equipment when not in use, especially overnight (e.g., photocopiers, printers etc.).	.62**	a=.79 CR=.86
I switch off lights when not needed.	.70**	AVE=.55
I add or remove clothing rather than turning heating or air conditioning up when it's hot or cold.	.75**	MSV=.28
I open or close windows rather than turning heating or air conditioning up when it's hot or cold.	.83**	
I turn heating or air conditioning down if I can find other ways to remain comfortable.	.80**	
Reusing		
I am a person who uses a reusable water bottle instead of a paper cup at the water cooler or tap.	.63**	a=.71
I am a person who uses a reusable coffee cup instead of a paper cup.	.71**	CR=.82
I use a reusable bag/bag for life rather than single use plastic bags.	.78**	AVE=.54
I reduce waste by reusing items.	.80**	MSV=.33
Repurposing		
I am a person who uses scrap paper for notes instead of fresh paper.	.74**	a=.78
I give materials a new use or purpose instead of throwing them away.	.82**	CR=.86
I use supplies in new ways.	.74**	AVE=.60
I save extra supplies or materials for a future project.	.80**	MSV=.42
Recycling		
I put the following in separate recycling/compost bins:		
paper	.85**	a=.93
cardboard	.85**	CR=.95
cans	.86**	AVE=.74
bottles	.89**	MSV=.23
glass	.87**	
plastic cups	.85**	

**Significant at the 0.01 level; CR = composite reliability; a = Cronbach's a; AVE = average variance extracted; MSV = maximum shared variance

Table 4. Descriptive Statistics and Correlations

Constructs	M (SD)	Correlations											
Egoistic Values	4.72 (1.37)	1											
Altruistic Values	5.40 (1.26)	.73**	1										
Biospheric Values	5.39 (1.35)	.63**	.77**	1									

NEP	5.39 (1.02)	41**	.53**	.63**	1						
AC	3.38 (1.42)	.54**	.41**	.33**	.36**	1					
AR	4.18 (1.51)	.45**	.49**	.48**	.36**	.40**	1				
PN	5.60 (1.08)	.48**	.64**	.66**	.59**	.26**	.54**	1			
Reducing Use	5.86 (1.12)	.22**	.30**	.37**	.35**	.13**	.31**	.53**	1		
Reusing	6.05 (1.04)	.26**	.32**	.35**	.33**	.14**	.22**	.54**	.58**	1	
Repurposing	5.15 (1.18)	.37**	.38**	.40**	.30**	.24**	.32**	.52**	.51**	.65**	1
Recycling	6.36 (1.04)	.22**	.32**	.32**	.30**	.08	.23**	.54**	.51**	.61**	.48**	1

**Significant at the 0.01 level

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Table 5. Blindfolding Results

Constructs	R^2	Omission distance = 8	
		Communality Q^2	Redundancy Q^2
NEP	.43**	.37	.24
AC	.29**	.82	.26
AR	.24**	.80	.21
PN	.29**	.65	.21
Reducing Use	.26**	.30	.14
Reusing	.31**	.24	.17
Repurposing	.28**	.33	.16
Recycling	.26**	.62	.19

**Significant at the 0.01 level

Table 6. Structural Model Results: Direct Effects

Relationships	Path Coefficients	Hypothesis Supported?
H1a: Biospheric Values → NEP	.60**	**Yes**
H1b: Altruistic Values → NEP	.12*	**Yes**
H1c: Egoistic Values →NEP	-.07	No
H2a: Biospheric Values → AC	-.10	No
H2b: Altruistic Values →AC	.06	No
H2c: Egoistic Values → AC	.53**	No
H3: NEP → AC	.06	No
H4: NEP → AR	.30**	**Yes**
H5: AC → AR	.32**	**Yes**
H6: AC → PN	.05	No
H7: AR → PN	.52**	**Yes**
H8a: AR → Reducing Use	.01	No
H8b: AR → Reusing	-.08*	No
H8c: AR → Repurposing	.01	No
H8d: AR → Recycling	-.08**	No
H9a: PN → Reducing Use	.50**	**Yes**
H9b: PN → Reusing	.60**	**Yes**
H9c: PN → Repurposing	.52**	**Yes**
H9d: PN → Recycling	.55**	**Yes**

Table 7. Indirect Effects Using PROCESS

Indirect Effects	β*	CI
AC → AR → Norms	.16	from .12 to .20
AR→ PN → Reducing Use	.21	from .15 to .26
AR→ PN → Reusing	.22	from .17 to .28
AR → PN → Repurposing	.21	from .16 to .27
AR → PN → Recycling	.22	from .16 to .29

* Mediation results based on PLS-SEM did not differ significantly with values .16, .26, .30, .27, and .28 respectively.
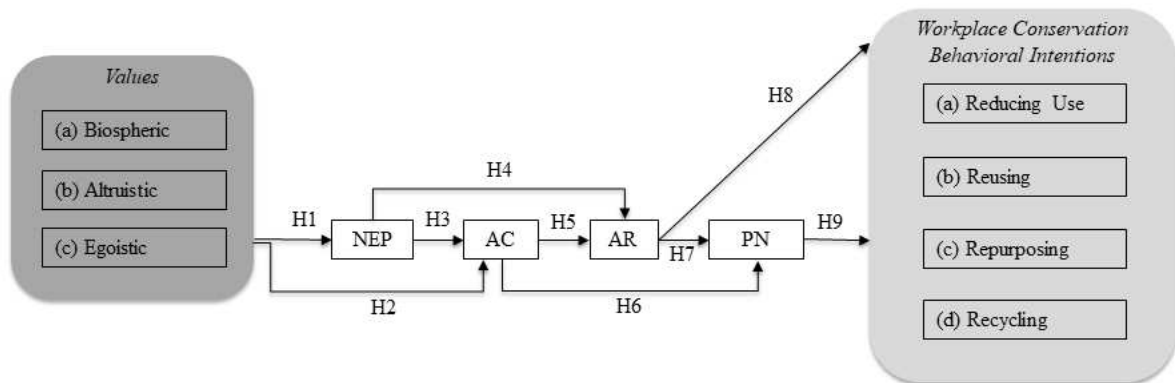
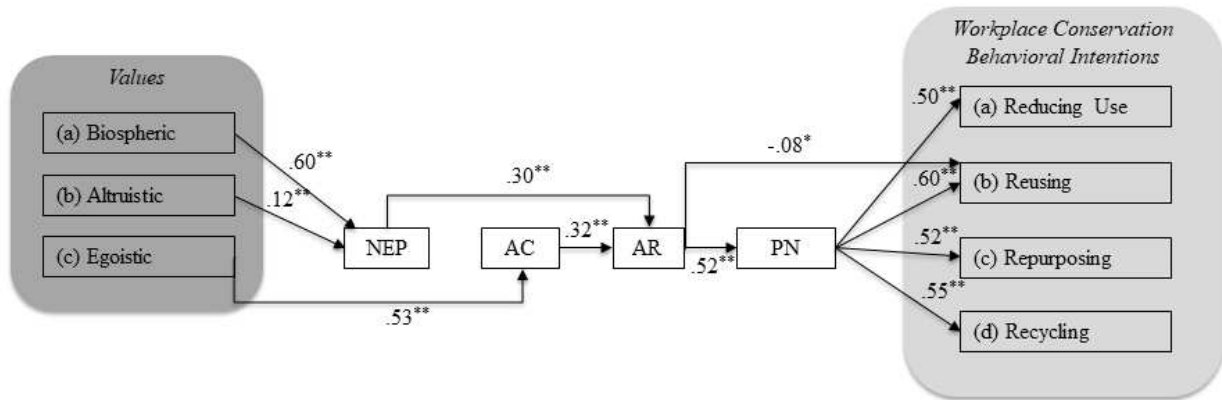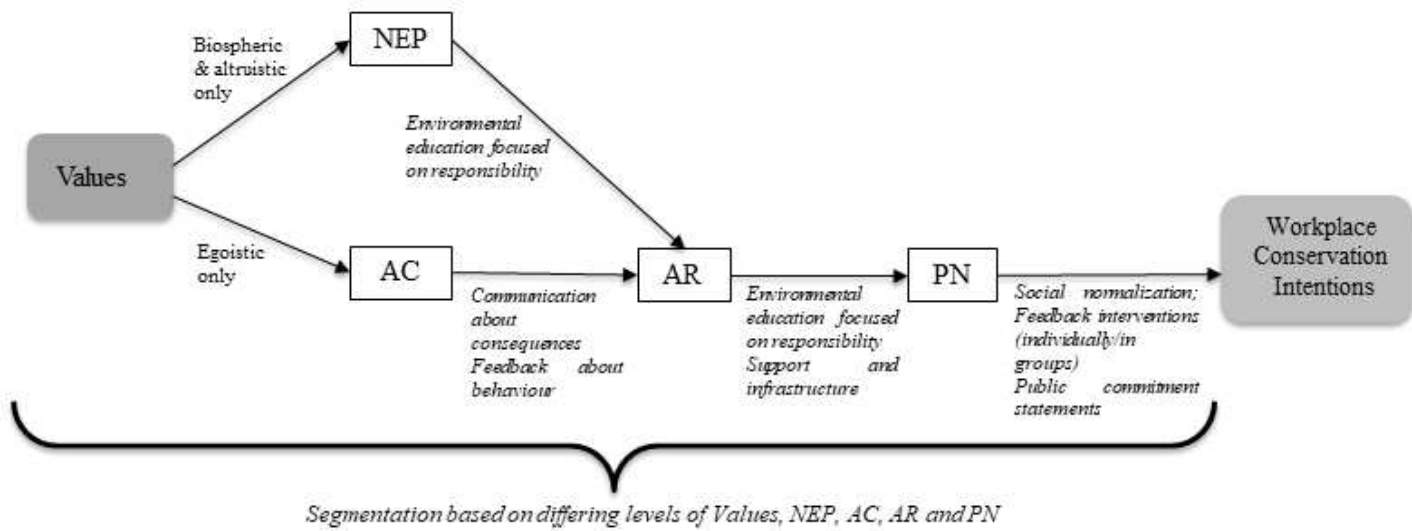**Figure 1.** *Proposed VBN model.*

Figure 2. *PLS-SEM Results*

Figure 3. *Suggested interventions*

[1] This is in contrast with other behaviors in the taxonomy (e.g. taking initiative or working sustainably), categorized as 'high-intensity,' due to their higher visibility and requiring others' cooperation (Ciocirlan, 2016).

[2] For instance, the behaviors analyzed by Andersson et al (2005) consist of supervisors' support for environmental innovation, environmental competence building, environmental communication, environmental rewards/recognition, and setting environmental goals. These behaviors are highly visible, somewhat risky, and potentially costly to the individual and organization (Ciocirlan, 2016).

[3] Given the similarity of conserving behaviors (recycling, reducing use, repurposing, reusing), there is little reason to expect variation regarding their antecedents, although we do measure and analyze each sub-category separately. Most of these sub-categories of behaviors are under employees' control and can be executed individually (printing double sided, using a non-disposable lunch box or coffee cup, recycling, using scrap paper, etc). Given the exploratory nature of this study, we predict that all four conserving behaviors have a similar set of antecedents and causal structure.

[4] The average on these questions was around 6.0 on a 11-point scale. Further, UK respondents scored under 5.0 on average on the belief that saving energy can be effective in reducing climate change (outcome expectancy) (ESS, 2018).

[5] The costs associated with data collection were covered from grants obtained from a U.K. university and the USA-UK Fulbright Commission. Without Qualtrics, it would have been difficult for researchers to gain access into scores of organizations in the UK and secure managers' willingness to distribute their surveys to their office employees.

[6] Although these values are below the SRMR threshold of .08 and NFI threshold of .90, Hair et al. (2017) caution researchers in reporting and using model fit in PLS-SEM.

[7] The extent to which employees care about the environment is adequately measured by the VBN model.