

# Evaluating determinants of employees' pro-environmental behavioral intentions

Evaluating  
determinants  
of OCBs

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## Abstract

**Purpose** – The aim of this study was to identify and quantitatively assess the importance of psychosocial and organizational factors that influence employees' intentions to engage in pro-environmental behaviors at the workplace.

**Design/methodology/approach** – A questionnaire based on the theory of planned behavior was completed by 318 employees. To validate three suggested hypotheses, a series of path analysis models were constructed using AMOS software.

**Findings** – The theory of planned behavior explained 79 percent and 37.7 percent of variance in predicting intentions of employees to travel to work using alternative transportation and to make eco-suggestions directed toward the workplace, respectively. While organizational barriers did not play a significant role in predicting intentions to use alternative transportation, some organizational obstacles (opinion of colleagues, required paperwork) influenced workers' intention to make eco-suggestions.

**Originality/value** – This is one of the first articles in the field of pro-environmental workplace behaviors in which the theory of planned behavior is implemented in a systematic manner (qualitative exploration of beliefs followed by their quantitative evaluation). This article contributes to the existing literature by shedding light on the disproportionate influence of organizational and psychosocial factors on pro-environmental workplace behaviors.

**Keywords** Organizational citizenship behaviors for the environment (OCBEs), Theory of planned behavior (TPB), Organizational barriers, Green human resource management

**Paper type** Research paper

## 1. Introduction

Greening organizations is a complicated endeavor that consists of multiple interconnected measures, such as developing internal environmental policy, obtaining an appropriate certification, modifying the production cycle (Jabbour and Santos, 2008; Ramus, 2002). Nevertheless, human activity is the main catalyst of climate change, and changing employees' behaviors is frequently considered to be the most important step in corporate greening (Boiral, 2009; Daily *et al.*, 2009; Robertson and Barling, 2013). Considering that pro-environmental behaviors are numerous (e.g. adjusting thermostats, recycling, energy-saving measures), it is difficult to control them efficiently through formal approaches (e.g. policies, strategies) (Daily *et al.*, 2009; Robertson and Barling, 2013). For instance, the success of an environmental management system based on the ISO 14001 in many ways depends on the daily actions of employees rather than on a mere adoption of the standard (Boiral, 2007; Yin and Schmeidler, 2009).

In an attempt to develop efficient recommendations for promoting pro-environmental behaviors among employees, scholars have explored factors that influence such actions. Previous studies reported that the likelihood of these behaviors depends mainly on organizational and psychosocial (individual) factors (Norton *et al.*, 2015; Yuriev *et al.*, 2018). Principal factors associated with individual characteristics of employees include self-efficacy (Boiral and Paillé, 2012; Boiral *et al.*, 2015), attitude (Bissing-Olson *et al.*, 2013; Blok *et al.*, 2015),



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social norms (Greaves *et al.*, 2013; Paillé *et al.*, 2013), and awareness of environmental problems (Tosti-Kharas *et al.*, 2016). Among the most influential organizational factors, scholars emphasize supervisors' support (e.g. Boiral *et al.*, 2015; Robertson and Barling, 2013), internal green culture (e.g. Pham *et al.*, 2019), and autonomy of employees (e.g. Blok *et al.*, 2015; Ramus, 2002).

Due to the existence of numerous factors, the challenge is to identify those that most influence the adoption of pro-environmental workplace behaviors. This identification process remains a subject of confusion in the scientific literature. For example, Chan *et al.* (2014) studied only individual factors (environmental knowledge, concern, and awareness), thus overlooking the importance of organization-related aspects. At the same time, some articles that do integrate both types of factors (e.g. Manika *et al.*, 2015) seem to neglect the importance of quantitatively assessing their separate influences. In fact, few studies have explored pro-environmental workplace behaviors by systematically identifying individuals' beliefs associated with such actions and consecutively assessing their relative importance (for a rare exception, see Greaves *et al.*, 2013). Given this context, the objective of this study was to present a step-by-step approach to identify both the psychosocial and the organizational factors that should be targeted to promote the adoption of pro-environmental behaviors among employees.

The remainder of this article is organized as follows. First, the current state of the literature on green workplace behaviors and foundations of the theoretical framework are explained to formulate several hypotheses. Second, various details of the methodological approach are presented. Third, the results of the study are discussed. The manuscript concludes with the discussion of theoretical and managerial implications as well as limitations and possibilities for future research.

## 2. Literature review and hypothesis development

### 2.1 Pro-environmental workplace behaviors – current state of knowledge

Some green workplace behaviors stem from the job description. For instance, daily ecology-preserving duties are part of an environmental manager's job description (Ramus, 2002). In contrast, numerous other behaviors cannot be imposed. For example, internal environmental policies can rarely force employees to turn off computers when finishing their workdays (Greaves *et al.*, 2013) or to wear more clothes rather than increasing the temperature (Blok *et al.*, 2015). These individual actions are commonly referred to as organizational citizenship behaviors for the environment (OCBEs): "individual and discretionary social behaviors not explicitly recognized by the formal reward system and contributing to improve the effectiveness of environmental management of organizations" (Boiral, 2009, p. 223).

As with other pro-environmental workplace behaviors, OCBEs are affected by organizational and psychosocial factors (Francoeur *et al.*, 2019; Yuriev *et al.*, 2018). Although some studies have reported that certain psychosocial factors associated with household activities are applicable to the workplace context as well (Robertson and Barling, 2013; Smith and O'Sullivan, 2012), recent publications have indicated that the spillover effect between the two contexts is rarely automatic (McDonald and Oke, 2018; Paillé *et al.*, 2017). This might be due to such organizational factors as a lack of autonomy (Robertson and Barling, 2013), the absence of supervisors' support (Boiral *et al.*, 2015), a non-green internal culture (Moktadir *et al.*, 2019; Tosti-Kharas *et al.*, 2016), or a lack of financial or human capital in the organization (Smith and O'Sullivan, 2012). Depending on the type of behavior, the influence of these factors can vary (Norton *et al.*, 2015; Yuriev *et al.*, 2018). In this context, the development of efficient promotional measures depends on the assessment of antecedent beliefs' relative importance.

This can be done through the use of the theory of planned behavior (TPB), one of the most successful models for identifying and assessing antecedent beliefs toward individual

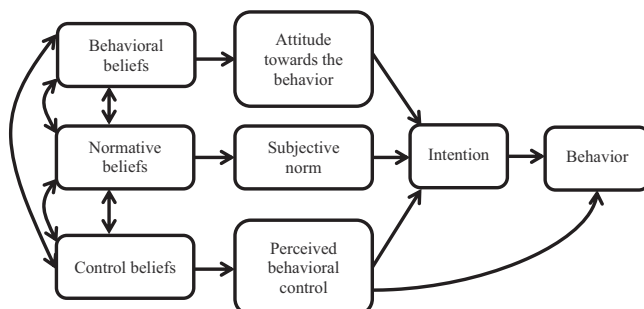
behaviors. Several studies on green workplace behaviors based on this theory (e.g. Boiral *et al.*, 2015; Zhang *et al.*, 2014) applied it only partially without exploring all variables included in this model. Furthermore, according to Yuriev *et al.* (2018), OCBs have been studied only using a handful of theoretical frameworks (e.g. social exchange theory, value-beliefs-norm), and thus, other approaches are necessary to shed light on which factors impede the emergence of such behaviors.

### 2.2 Foundations of the theory of planned behavior

The TPB is a theoretical model that allows scholars to identify psychosocial factors that determine studied behaviors (Ajzen, 1991). It has frequently been used in the healthcare sector, where the identification of these factors is a crucial part of intervention plans to promote healthy behaviors among individuals (Conner *et al.*, 2002; Cooke *et al.*, 2016). The TPB has also successfully been used in several studies on management issues (e.g. Jimmieson *et al.*, 2008; Jaén and Liñán, 2013).

According to the TPB (see Figure 1), the immediate precursors of behavior are intention and perceived behavioral control (PBC). Intention refers to the motivation to adopt a given behavior (Ajzen, 1991) and is predicted by three antecedents: attitude, subjective norm, and PBC (Ajzen, 1991). Attitude refers to the perceived advantages of adopting the behavior, subjective norm refers to the perceived social pressures from relevant others to perform the behavior, and PBC refers to the perceived control over performing the targeted behavior (Ajzen, 1991). Each determinant of intention (attitude, subjective norms, and PBC) is further defined by subconstructs: behavioral beliefs, normative beliefs, and control beliefs (Ajzen, 1991).

The successful application of the TPB requires a two-step approach: a qualitative exploration of beliefs followed by their quantitative evaluation (Ajzen, 2006); however, few researchers have applied the TPB in such a systematic way. For instance, Greaves *et al.* (2013) explored intentions of employees to switch off computers when leaving their offices, using video-conferencing instead of traveling, and recycling waste. The model explained between 46 percent and 61 percent of employees' intentions to perform these behaviors, and the authors were able to identify specific factors that should be prioritized to increase the number of employees who act ecologically. Similarly, Blok *et al.* (2015) conducted a survey among university employees to shed light on factors that influence their intention to perform a large number of green behaviors. Their research identified multiple beliefs that were reported to be significant for the studied behaviors. In contrast to these articles, the majority of studies in the field of pro-environmental behaviors of employees used only one or several variables of the TPB but did not explore behavioral, normative, or control beliefs, thus overlooking the principal force of the theory (e.g. Boiral *et al.*, 2015; Zhang *et al.*, 2014).



**Figure 1.**  
The theory of planned  
behavior (Ajzen, 1991)

### 2.3 Hypotheses formulation

Articles based on the main constructs of the TPB (attitude, subjective norm, PBC) successfully predicted the intention to perform several pro-environmental behaviors. For example, [Greaves et al. \(2013\)](#), who applied Ajzen's model to three workplace behaviors (videoconferencing, recycling, and switching off computers), reported relatively high levels of explained variance (from 46 percent to 61 percent) in the intention to engage in these behaviors. In a similar way, [Laudenslager et al. \(2004\)](#) explained almost 35 percent of employees' intention to recycle and to engage in carpooling. Remarkably, these studies emphasized the importance of integrating all three antecedents of intention. Therefore, the following hypothesis is proposed:

*H1.* Attitude, subjective norm, and perceived behavioral control positively predict the intention of employees to engage in OCBs.

To identify potential targets for interventions promoting pro-environmental workplace behaviors, [Ajzen \(1991\)](#) suggests regressing the intention on behavioral beliefs, normative beliefs, and control beliefs when their associated main construct (i.e. attitude, subjective norm, and PBC) is found to significantly predict intention. As demonstrated by [Greaves et al. \(2013\)](#), it is important that a data collection tool embed these specific beliefs of the studied population to identify those that should be targeted in interventions—identifying the most impactful beliefs increases the chances that interventions will be effective. In an effort to demonstrate the crucial role of antecedent beliefs and to provide grounds for the development of an intervention plan for the studied organization, the following has been hypothesized:

*H2.* Antecedent behavioral beliefs, normative beliefs, and control beliefs have a direct effect on intention and an indirect effect on the associated constructs of the TPB (attitude, subjective norm, PBC).

Of the studies based on the TPB, considerably more studies have investigated pro-environmental behaviors performed at home than such behaviors performed by employees at work. Although a spillover effect between the two contexts is possible ([Paillé et al., 2017](#); [Smith and O'Sullivan, 2012](#)), an employee is exposed to organizational obstacles and, in certain cases, motivational factors that do not intervene in household behaviors ([Norton et al., 2015](#); [Yuriev et al., 2018](#)). For instance, the opinion of colleagues was reported to significantly influence the intention to switch off computers and to use videoconferencing facilities at work ([Greaves et al., 2013](#)). Similarly, [Blok et al. \(2015\)](#) found that leaders' exemplary actions were significant predictors of intention to recycle, print double-sided, turn off heating, and conserve energy. Furthermore, in their study of 540 employees, [Wesselink et al. \(2017\)](#) found that institutional support, leadership behavior, and subjective norms influenced the intention to engage in pro-environmental workplace behaviors, while personal attitude toward environmental conservation did not. This might signify that rational thinking is dominated by organizational factors when people decide whether they will perform green behaviors at work. Therefore:

*H3.* In comparison with personal beliefs, organization-related beliefs are more significant predictors of employees' intention to perform OCBs.

## 3. Methodology

### 3.1 Context and participants

The study was conducted among nonacademic employees of a large Canadian university with over 43,000 students and over 4,000 nonacademic employees. Such employees play an important role in activities related to sustainability within higher-educational institutions. For instance, they can be consulted by university management and may provide

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recommendations for the development of new initiatives (Bellou *et al.*, 2017). Implementation and public recognition of such bottom-up initiatives are frequently identified as catalysts for the involvement of students in similar types of actions (Bellou *et al.*, 2017). University employees are also important members of the campus community. Their OCBEs can be perceived as exemplary by students and faculty members (Velazquez *et al.*, 2006).

### 3.2 Choice of behaviors

Two behaviors under study (traveling to the university using alternative transportation and making eco-suggestions directed toward workplace or work duties) were selected based on the results of a vote organized during a focus group discussion. Six full-time employees from different departments (position titles included receptionist, secretary, educational consultant, coordinator, and others) as well as two representatives of the university sustainability office participated in this meeting.

### 3.3 Identification of beliefs for questionnaire development

As the first step of applying the TPB, a pilot qualitative exploration was conducted. In accordance with the guidelines of Ajzen (2006), this methodological approach aims to identify behavioral beliefs (i.e. the perceived advantages and disadvantages), normative beliefs (the influencing persons or groups), and control beliefs (perceived barriers and facilitating factors) associated with performing each behavior under study within a particular population. A sample of 14 employees was recruited for individual one-hour, semidirected interviews to discuss behavioral, normative, and control beliefs regarding the two behaviors under study. The number of participants was determined by the criterion of saturation (O'Reilly and Parker, 2012). As responses were highly repetitive, the first eight interviews contained 95 percent of beliefs associated with both behaviors.

Double-blind coding, a technique frequently used in qualitative studies to decrease bias (Miles and Huberman, 1994), was performed by two coders. The intercoder agreement was close to the ideal correspondence rate (86 percent) suggested by Miles and Huberman (1994). For additional verification, a Cohen's kappa coefficient (Landis and Koch, 1977) of 0.887 ( $p < 0.0005$ ) was obtained with the help of the SPSS v0.23 software. This number refers to an almost perfect level of matching between researchers (Landis and Koch, 1977). The use of alternative transportation was influenced by 27 beliefs, while making eco-suggestions was affected by 21 beliefs; however, only beliefs present in at least 70 percent of the interviews were ultimately retained for further analysis (see Table I). This adjustment is consistent with studies based on the TPB (e.g. Conner *et al.*, 2002; Greaves *et al.*, 2013), and its objective is twofold: to focus the research on the most pertinent beliefs and to reduce the number of items in the questionnaire.

### 3.4 Item creation

The beginning of the questionnaire had four questions: gender, age, job title, and length of employment at the university. The remainder of the questionnaire was created following the guidelines of Ajzen (2006) and the best practices in the field (e.g. Greaves *et al.*, 2013; Francis *et al.*, 2004; Yuriev *et al.*, 2020). All items were rated on a five-point Likert scale because the majority of consulted management-related studies using the TPB employ this scale (e.g. Boiral *et al.*, 2015; Greaves *et al.*, 2013; Jimmieson *et al.*, 2008). It is also recommended by the guidelines for the construction of a questionnaire based on this theoretical framework (Ajzen, 2006; Francis *et al.*, 2004). Previously identified significant antecedent beliefs were transformed into pairs of affirmations: one to evaluate the strength of the participant's belief and the other to assess the outcome of the belief. For example, the belief "freedom of movement after work" was reformulated into the following two statements:

	Alternative transportation	Eco-suggestions
Behavioral beliefs	Freedom of movement after work Environmental impact Risk of accidents Health benefits	Possibility to facilitate the work of others Environmental impact Job benefits (promotion, being praised)
Normative beliefs	Family constraints (e.g. children) Previous agreements with colleagues (e.g. car-sharing) Verbal comments of a supervisor	Opinions of colleagues Supervisor reaction toward suggestions
Control beliefs	Arriving/departing times Cost Trip duration Bad weather Rush hour Parking Distance	Efforts of the university community Required paperwork High volume of work To whom can such ideas be communicated Lack of authority

**Table I.**  
Identified antecedent beliefs

Using alternative transportation to go to the office every working day in the forthcoming month will impede me from having the freedom of movement after work (groceries, friends, sports, etc.)

Strongly agree : \_\_ 1 \_\_ : \_\_ 2 \_\_ : \_\_ 3 \_\_ : \_\_ 4 \_\_ : \_\_ 5 \_\_ : Strongly disagree

For me, having the freedom of movement after work is. . .

Not important at all : \_\_ 1 \_\_ : \_\_ 2 \_\_ : \_\_ 3 \_\_ : \_\_ 4 \_\_ : \_\_ 5 \_\_ : Very important

In total, 28 affirmations targeted antecedent beliefs of using alternative transportation (four behavioral beliefs, three normative beliefs, and seven control beliefs), and 20 affirmations targeted beliefs associated with the eco-suggestions of employees (three behavioral beliefs, three normative beliefs, and four control beliefs).

Three direct determinants of intention were also measured in line with [Ajzen's \(2006\)](#) suggestions. Attitude measures contained three pairs of opposite adjectives. For instance, participants' attitudes toward suggesting eco-initiatives were evaluated with adjectives such as important–not important, positive–negative, and natural–atypical. Subjective norm was measured with four affirmations for each behavior ([Ajzen, 2006](#)) in an attempt to assess whether participants value opinions of others in relation to the studied behaviors. Examples of such items are: “Most people who are important to me will most likely use alternative transportation to go to the office every working day in the forthcoming month” and “It is expected of me that I use alternative transportation to go to the office every working day in the forthcoming month.” Measures of perceived behavioral control included three items that targeted the capacity of individuals to perform studied behaviors and their autonomy in the process ([Ajzen, 2006](#)). For instance, one of the items was formulated as follows: “It is mostly up to me to decide if I suggest new ecological initiatives to my supervisor/colleagues whenever I come up with such ideas.” Finally, the questionnaire contained three items to measure intention for both behaviors ([Ajzen, 2006](#)). The first evaluated the planning (“I plan to use alternative transportation. . .”), the second targeted the actual physical willingness of the action (“I will try to use alternative transportation. . .”), and the third assessed willingness (“I want to use alternative transportation. . .”).

Ten randomly chosen employees individually completed a printed version of the questionnaire in the presence of one of the researchers. The final questionnaire consisted of 77 items, and the ninth and tenth participants in the pretesting process completed the questionnaire in 17 and 18 minutes, respectively.

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### 3.5 Data collection

The questionnaire was sent electronically to 1,000 randomly chosen administrative employees. One of the researchers verified the titles of the selected personnel in the database to exclude employees involved in academic work. Prior to accessing the online tool, participants were informed of the general objectives of the research and the ethical guidelines (anonymity, confidentiality). The questionnaire was open for participation for two weeks. In total, 396 questionnaires were returned, which is a response rate of 39.6 percent. Seventy-eight not fully completed questionnaires were excluded, such that the final sample consisted of 318 respondents (sufficient sample size based on the total population of 4,000 and a 90 percent confidence level with a 5 percent margin of error). Participants were predominantly female (79.2 percent). The age of the respondents varied between 23 and 68 years, with an average age of 44.7 years (SD = 10.3 years). The number of years they had spent working at the university ranged from less than 1 to 43, with an average tenure of 11.2 years (SD = 8.4 years).

### 3.6 Analysis

The data analysis involved three stages. First, as recommended by [Hu and Bentler \(1999\)](#), the measurement model was assessed using the Chi-square statistic, the root mean square error of approximation (RMSEA), the comparative fit index (CFI), and the nonnormed fit index (NNFI). These indices were calculated with the help of AMOS software using the covariance matrix with a maximum likelihood estimation. Common recommendations indicate that the relative/normed Chi-square ( $\chi^2/df$ ) should be between 2.0 and 5.0 ([Tabachnick and Fidell, 2007](#)),  $CFI \geq 0.90$  and  $NNFI \geq 0.90$  are recognized as indicative of a good fit ([Hu and Bentler, 1999](#)), and RMSEA values between 0.05 and 0.10 are perfect ([MacCallum et al., 1996](#)). The Cronbach's alpha, the common criterion of internal consistency, of four principal TPB constructs (attitude toward behavior, subjective norm, perceived behavioral control, and intention) for both studied behaviors was also calculated at this stage.

Second, the mediating effects of each antecedent belief were evaluated using SPSS software. Both direct effects (the influence of antecedent beliefs on intention) and indirect effects (the influence of antecedent beliefs on intention through associated TPB constructs) were estimated. Mediation was considered significant when the bias-corrected confidence level (95 percent) did not include zero ([Field, 2009](#)). Beliefs that did not demonstrate the significant direct effect on intention were discarded.

Third, following the example of [Greaves et al. \(2013\)](#), a series of path analysis models were constructed in AMOS software to verify the complete TPB model. In contrast to the traditional step-by-step analysis, a path analysis allows researchers to simultaneously assess the model as a whole, to evaluate multiple mediation paths, and to compare indirect and direct effects of various variables ([Baron and Kenny, 1986](#)). Specifically, the influence of significant beliefs on associated TPB constructs and the influence of TPB constructs on intention were estimated with multiple linear regression, which is the most widespread technique in TPB-based studies (e.g. [Greaves et al., 2013](#); [Blok et al., 2015](#); [Yuriev et al., 2020](#)).

## 4. Results

### 4.1 Assessment of model fit and construct reliability

The research model provided a good fit for the data on alternative transportation ( $\chi^2 = 168.84$ ,  $df = 32$ ,  $p < 0.001$ ;  $CFI = 0.92$ ;  $NNFI = 0.90$ ;  $RMSEA = 0.12$ ) and an excellent fit for the data on eco-suggestions ( $\chi^2 = 80.98$ ,  $df = 32$ ,  $p < 0.001$ ;  $CFI = 0.96$ ;  $NNFI = 0.93$ ;  $RMSEA = 0.06$ ). Although some fit indices seemed to be on the lower end of the thresholds, [Hu and Bentler \(1999\)](#) estimated that only two of the aforementioned criteria should be satisfied for the model to be considered acceptable. For internal reliability, the Cronbach's

alpha ranged from 0.730 to 0.865 (see Table II), which is considered a good level (Field, 2009). The means and standard deviations (SD) of antecedent beliefs that were found to be significant predictors of associated constructs are shown in Table III.

#### 4.2 Hypotheses testing

Hypothesis 1 predicted a positive relationship between the principal constructs of the TPB and the intention of employees to engage in the studied behaviors. The results support this hypothesis for both behaviors as demonstrated by the values of explained variance in the path analysis graphs (see Figures 2 and 3): all three constructs of the TPB (attitude, subjective norm, and PBC) were found to be statistically significant. In the case of the intention to use alternative transportation, the TPB explained 79 percent of variance: attitude toward this behavior was the most significant factor (69.1 percent,  $p < 0.001$ ) followed by the PBC (9.6 percent,  $p < 0.001$ ) and the subjective norm (0.3 percent,  $p < 0.05$ ). Significantly fewer representative results were obtained for intention to propose eco-suggestions, where the model explained 37.7 percent of the variance: attitude accounted for 27.4 percent ( $p < 0.001$ ), subjective norm explained 7.6 percent ( $p < 0.05$ ), and PBC added 2.7 percent ( $p < 0.001$ ).

According to Hypothesis 2, antecedent beliefs were expected to have a direct effect on intention and an indirect effect on the associated TPB constructs; however, the analysis of confidence intervals of direct and indirect effects (Table III) confirms this suggestion only partially. More precisely, in the case of alternative transportation, Hypothesis 2 was confirmed for three behavioral beliefs (freedom of movement –  $\beta = 0.1$ , environmental impact –  $\beta = 0.05$ , and health benefits –  $\beta = 0.05$ ), one normative belief (family constraints –  $\beta = 0.12$ ), and three control beliefs (cost –  $\beta = 0.09$ , trip duration –  $\beta = 0.08$ , and distance –  $\beta = 0.1$ ). Regarding eco-suggestions, the hypothesis was supported by two behavioral beliefs (facilitate the work of others –  $\beta = 0.09$  and environmental impact –  $\beta = 0.07$ ) and one control belief (required paperwork –  $\beta = 0.11$ ).

Hypothesis 3 suggested that organization-related beliefs would have a larger influence on employees' intention to engage in OCBs than individual beliefs. A mediation analysis (Table III) of the two behaviors indicated opposing results for each. In the case of alternative transportation, respondents did not seem to be influenced by any barriers related to the organization when deciding how to go to the office, thus invalidating Hypothesis 3. In comparison, intention to propose eco-suggestions was predominantly explained by organizational factors (the possibility to facilitate the work of others and the volume of bureaucratic procedures), thus supporting Hypothesis 3.

## 5. Discussion

In this study, the TPB framework was applied to explore the factors influencing the intentions of nonacademic university personnel to perform two types of OCBs: the use of alternative transportation and making eco-suggestions at work. The findings indicate that the intention to perform both behaviors was significantly predicted by the main constructs of the TPB: attitude, subjective norm, and PBC. The analysis of antecedent beliefs identified

**Table II.**  
Intercorrelations and Cronbach's alpha of principal TPB constructs

	Alternative transportation ( $N = 318$ )				Eco-suggestions ( $N = 318$ )			
	AT	SN	PBC	INT	AT	SN	PBC	INT
AT	$\alpha = 0.825$				$\alpha = 0.726$			
SN	0.517	$\alpha = 0.838$			0.422	$\alpha = 0.865$		
PBC	0.627	0.447	$\alpha = 0.855$		0.221	0.325	$\alpha = 0.730$	
INT	0.832	0.523	0.763	$\alpha = 0.972$	0.524	0.471	0.342	$\alpha = 0.833$

**Note:** AT = attitude; SN = subjective norm; PBC = perceived behavioral control; INT = intention



Beliefs	Mean	SD	Direct( $\beta$ )	Indirect( $\beta$ )
Alternative transportation ( $N = 318$ )				
<i>Behavioral beliefs</i>				
Freedom of movement	17.6	6.7	0.1* (0.14, 0.61)	0.33* (0.08, 0.48)
Environmental impact	13.1	6.8	-0.05* (-0.52, -0.2)	-0.15* (-0.31, -0.15)
Health benefits	13.3	8.5	-0.05* (-0.43, -0.13)	-0.15* (-0.17, -0.11)
<i>Normative beliefs</i>				
Family constraints	13.5	9.2	-0.12* (-1.1, -0.5)	-0.06* (-0.51, -0.1)
<i>Control beliefs</i>				
Arriving and departing time	6.9	4.2	NS (-0.19, 0.31)	0.23* (0.07, 0.28)
Cost	9.7	6.5	0.09* (0.3, 0.78)	0.22* (0.43, 0.61)
Trip duration	13.3	8.1	0.08* (0.27, 0.45)	0.2* (0.28, 0.37)
Bad weather	8.3	4.1	NS (-0.01, 0.28)	0.22* (0.11, 0.17)
Parking	8.6	5.7	NS (-0.4, 0.15)	0.08* (0.2, 0.45)
Distance	7.8	6.6	0.1* (0.11, 0.39)	0.21* (0.06, 0.25)
Eco-suggestions ( $N = 318$ )				
<i>Behavioral beliefs</i>				
Facilitate the work of others	10.3	6.7	0.09** (0.2, 0.33)	0.07* (0.15, 0.24)
Environmental impact	15.2	6.8	0.07* (0.17, 0.23)	0.07* (0.18, 0.29)
<i>Normative beliefs</i>				
Opinion of colleagues	7.1	3.7	NS (-0.18, 0.03)	0.07* (0.09, 0.37)
Efforts of the university community	5.1	3.4	NS (-0.08, 0.56)	0.08* (0.11, 0.44)
<i>Control beliefs</i>				
Required paperwork	6.1	4.2	0.11* (0.37, 0.79)	0.03* (0.47, 0.69)

**Table III.**  
Direct and indirect  
effects of antecedent  
beliefs on intention

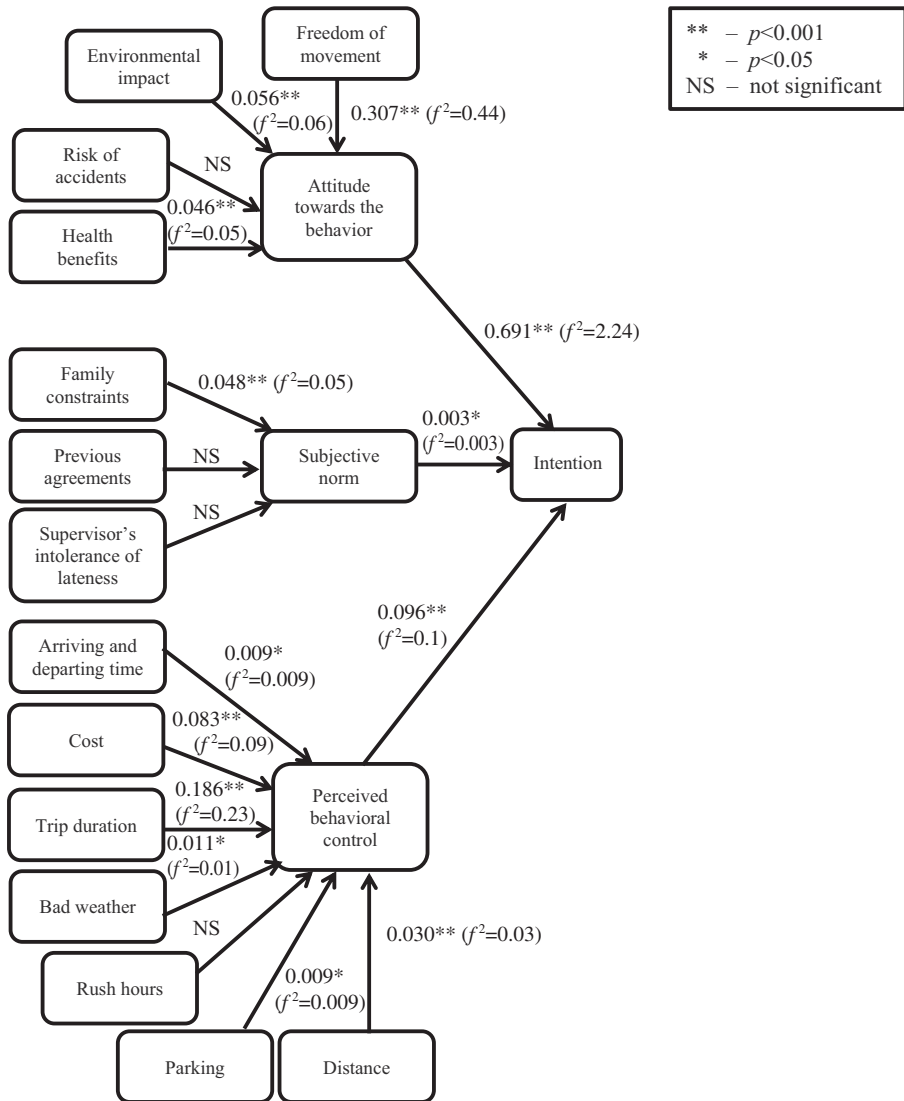
**Notes:**  $\beta$  was considered significant when confidence interval did not include 0 (reported in brackets); \*\* -  $p < 0.001$ ; \* -  $p < 0.05$ ; SD - standard deviation; NS - not significant

several factors that must be prioritized to increase the success of promotional measures. Nevertheless, attitude was the most important factor for the intention to perform both behaviors. This means that employees' perceptions of the advantages and disadvantages of these individual actions play the determining role in the intention to engage in such behaviors. The obtained results have important implications for scholars and managers.

### 5.1 Theoretical implications

This research demonstrates the pertinence of using the TPB to study individuals' intentions to engage in pro-environmental behaviors at work. [Hypothesis 1](#) was supported by the collected data for both behaviors, which is consistent with several previous TPB-based studies on the green behaviors of employees (e.g. [Greaves et al., 2013](#); [Laudenslager et al., 2004](#); [Yuriev et al., 2020](#)). For instance, three antecedents of intention (attitude, subjective norm, and perceived behavioral control) were found to significantly influence intentions of university employees to put forward eco-suggestions; however, delving deeper in understanding the specific factors, this study indicated a much more important role of personal attitude in the formation of such behaviors. In this sense, as predicted by the original model of the TPB ([Ajzen, 1991](#)), the testing of [Hypothesis 2](#) made it possible to disentangle the antecedent beliefs and to assess the relative importance of each of them.

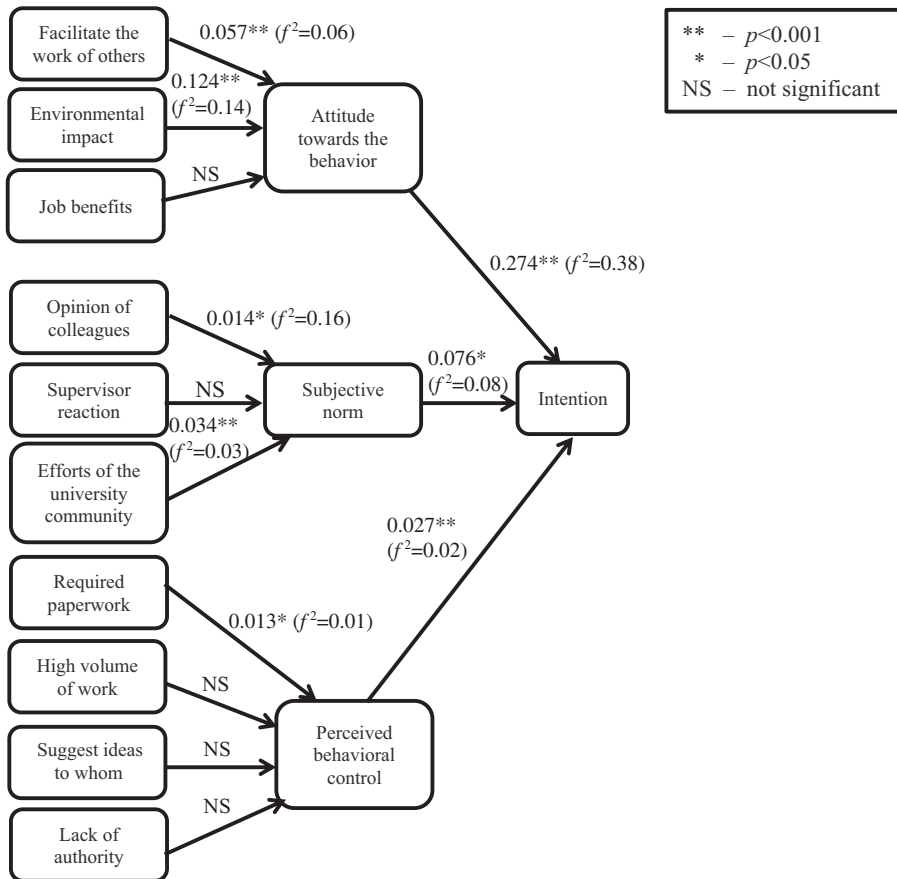
For [Hypothesis 3](#), the obtained results only partially supported it. Specifically, the analysis of antecedent beliefs demonstrated that two studied behaviors of university employees were



**Figure 2.** Path analysis for the use of alternative transportation with  $R^2$  values and  $f^2$  effect size

affected by completely different types of factors: eco-suggestions were predominantly influenced by organizational factors, while the choice of transportation was not affected by any factors related to the workplace. This result calls into question the definition of OCBEs and, more precisely, their boundaries. The insignificance of organization-related factors implies that certain behaviors classified as OCBEs could be performed by individuals who are not employees. In the present study, such "outsiders" could be students, professors, or even university visitors. For instance, a student at a cafeteria can close a leaking water tap just as efficiently as an employee can. Similarly, a visitor who closes an open front door of a building during cold weather is not functionally different from a guard who does the same. In this context, it seems reasonable to theorize regarding the existence of another type of behavior:

## Evaluating determinants of OCBEs



**Figure 3.** Path analysis for eco-suggestions with  $R^2$  values and  $f^2$  effect size

customer citizenship behavior directed toward the environment. Drawing from the definition of customer citizenship behaviors (Groth, 2005), such actions can be conceptualized as discretionary behaviors of customers who are not required or rewarded by organizations but who help to improve their environmental performance. A thorough investigation of this new category of behaviors would be beneficial for the literature.

### 5.2 Practical implications

In view of the obtained results, managers could adopt two diametrically opposite strategies to increase the number of employees involved in pro-environmental behaviors. The first strategy is applying various green human resource management practices (Jabbour and Santos, 2008; Pham *et al.*, 2019). Multiple measures could be useful to achieve this aim, including regular incentive campaigns (Smith and O'Sullivan, 2012), interdepartmental competitions (Manika *et al.*, 2015), and public recognition of eco-suggestions (Ramus, 2002). The second strategy involves breaking habits or encouraging employees to form new ones (Holland *et al.*, 2006). The aim is to ask individuals to associate the execution of the behavior with a specific context: "When I have free time at work, I will think about ways to make my daily tasks more environmentally friendly" or "When it is sunny, I will not use my vehicle to come to work" (Holland *et al.*, 2006).

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More globally, findings indicate the need to differentiate between practical recommendations depending on the behavior. In the present study, two beliefs associated with organizational factors significantly predicted the intention to propose eco-suggestions, but no such beliefs were identified for the intention to choose alternative transportation. Hence, pro-environmental actions performed by employees outside their duties require long-term interventions. Therefore, the goal of organizations should be to remove these barriers to alternative transportation that affect the largest number of employees: offering reserved parking places for cars involved in the car-sharing program, providing employees with a flexible schedule, and creating informative graphics about the health benefits of using alternative transportation. In contrast, the number of eco-suggestions could be increased by overcoming factors that seem to impede employees from engaging in this behavior. Managers should consider reducing paperwork required for the submission of (and follow-up on) ideas. For example, gathering such suggestions could be done during a personnel reunion on a monthly or yearly basis depending on the size of the department.

### *5.3 Limitations and future research*

Apart from the several future research avenues identified, three principal limitations of this research can help researchers identify areas that require additional exploration. First, due to the inexistence of validated measures of the studied behaviors, this research explored only intentions and not actual behaviors. The literature recognizes the necessity to explore the so-called intention-behavior gap (Ajzen, 2011; Sniehotta *et al.*, 2014), and hence, future studies could focus on actual behaviors by integrating validated techniques to measure actions. For instance, Wang *et al.* (2018) measured recycling by weighing the contents of the bins, and Bissing-Olson *et al.* (2013) recorded behaviors with the help of daily diaries.

Second, the results of studies based on the TPB are tailored to the studied environment (Sniehotta *et al.*, 2014). Each population, even if it belongs to the same type of organization, might have a different set of beliefs (Ajzen, 2006). This means that the findings of this study have limited generalizability and should only cautiously be transferred to other contexts. Despite this limitation, the relevance of the theory for exploring OCBEs should not be underestimated. Future studies could confirm or deny these suggestions related to organizational and personal barriers.

Third, the data collection tool relied solely on self-reported measures, and hence, responses could have been affected by a social desirability bias. Although the design and the development process of the questionnaire strictly included recommendations outlined by the main guidelines for this theory (e.g. Ajzen, 2006), future studies should aim to limit the potential effect of social desirability bias by using alternative bias-mitigation methods, such as proxy subjects, the bogus pipeline, and special scales for measuring social desirability.

## **6. Conclusion**

This article has presented a systematic application of the TPB to study the factors influencing the intentions of nonacademic university employees to perform two pro-environmental behaviors: the choice of alternative transportation and proposing eco-suggestions. Having identified the plurality of factors associated with these behaviors through a qualitative exploration, a questionnaire was developed to evaluate their relative importance. The analysis of the collected data indicated that the TPB could be a powerful framework for exploring the intention of individual employees to engage in green actions as it explained up to 79 percent of variance. The study indicates that while the intention of choosing alternative transportation was not significantly affected by organization-related factors, the intention to propose eco-suggestions was found to be influenced by several

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factors related to the workplace, notably the opinion of colleagues, the authenticity of the environmental efforts of the organization, and the required paperwork. The results have led to the development of several practical recommendations and theoretical discussions.

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