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RECEIVED 05 September 2023

ACCEPTED 29 April 2024

PUBLISHED 27 June 2024

CITATION

Kotyza P, Cabelkova I, Pierański B, Malec K, Borusiak B, Smutka L, Nagy S, Gawel A, Bernardo López Lluch D, Kis K, Gál J, Gálová J, Mravcová A, Knezevic B and Hlaváček M (2024) The predictive power of environmental concern, perceived behavioral control and social norms in shaping pro-environmental intentions: a multicountry study.
Front. Ecol. Evol. 12:1289139.
doi: 10.3389/fevo.2024.1289139

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The predictive power of environmental concern, perceived behavioral control and social norms in shaping pro-environmental intentions: a multicountry study

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Pro-environmental intentions encourage individuals to make conscious decisions that help protect the environment, reduce waste, conserve resources, and preserve natural habitats. This study aims to assess the predictive power of environmental concern, perceived behavioral control and social norms in determining the pro-environmental intentions in the Theory of Planned Behavior (TPB) framework. Methodologically we rely on Structural Equation Modelling (SEM), applied to the survey study among 2,702 university students majoring in economics, finance, management, or marketing from Croatia, the Czech Republic, Hungary, Poland, Slovakia, and Spain. The results show that the model explained 51% of the total variance of pro-environmental intentions, with the predictive power of environmental concern and perceived behavioral control at 42% and 45%, respectively, and social norms at only 6% (out of total 51% of explanatory power). The implications of our results suggest a major focus on increasing environmental concern and perceived behavioral control in behavioral interventions to support pro-environmental behavior. The effectiveness of social pressure produced by injunctive social norms proved limited. The cross-country differences were not statistically significant. More research must be done to study the relative effect of injunctive and descriptive social norms on pro-environmental behavior.

KEYWORDS

theory of planned behavior, intention to protect the environment, latent variables, students, multicountry study

1 Introduction

Everyone has a right to a clean, healthy and sustainable environment, though environment is getting worse (UN General Assembly, 2022). Global action is called to conserve natural resources, preserve and remediate the existing natural environment to protect future generations from nature degradation (Currie and Deschênes, 2016). Consumers can help a lot, as they substantially contribute to various environmental problems, such as acidification, eutrophication, diffusion of chemicals, waste generation and disposal, dehydration, noise (Ölander and Thøgersen, 1995) or light pollution (Gallaway et al., 2010).

The EU population generally agrees on the necessity of environmental protection (European Commission, 2020); however, significant differences in the Europeans' perceptions and actions are observed (Punzo et al., 2019). The literature suggests that intention to protect the environment is affected by the economic situation (Mayerl and Best, 2019; Yang et al., 2021), cultural and national differences (Ignatow, 2006; Oreg and Katz-Gerro, 2006), social background (Yang et al., 2021), education (Ardoin et al., 2020), values (Hedlund, 2011) or age (Dardanoni and Guerriero, 2021; Skeiryte et al., 2022).

The young are often more environment-protection-oriented and they foster climate concerns among parents (Dupont, 2004; Lawson et al., 2019). However, even in this generation considerable inter-country variations exist. In some countries, young people are willing to carry environmental protection costs (Hao et al., 2019; Dardanoni and Guerriero, 2021); in others, they are not (Zámková et al., 2023). Environment protection needs will put particular pressure on today's educational system to raise pro-environmental awareness among youth (Ardoin et al., 2020).

The cross-cultural psychologists provide heterogeneous evidence on the cross-country differences in the pro-environmental values and the factors affecting them. A significant contrast stands out between Western, Educated, Industrialized, Rich, and Democratic (WEIRD) societies and the rest of the world (Henrich et al., 2010). The results suggest that the values of WEIRD societies deviate to such an extent from the global average that they can be regarded as outliers in the global sample. Yet other studies suggest, that the links between the factors affecting pro-environmental intentions and the intentions themselves are similar in other groups of countries (see for example Austria, Czech Republic, Italy, the Netherlands, and Sweden, De Groot and Steg, 2007b).

Following this rationale, the study focuses on the factors contributing to pro-environmental intentions of university students and aims to assess the relative predictive power of environmental concern, perceived behavioral control, and social norms in six European countries. We base our research on the Theory of Planned Behavior (TPB, Ajzen, 1985). Methodologically we estimate Structural Equation Model (SEM), on a survey study among 2,702 university students from Croatia, the Czech Republic, Hungary, Poland, Slovakia, and Spain. As the pro-environmental intentions vary across student specializations (Bernaciak et al., 2021), this paper focuses on university students majoring in

economics, finance, management, or marketing. These students are expected to be future leaders of economic processes.

Our research was conducted in six adjacent countries – Croatia, the Czech Republic, Hungary, Poland, Slovakia, and Spain – which are similar in many aspects. All countries are the members of EU, they are very similar according to GDP per capita, four of the countries belongs to the group of Visegrad countries. On the other hand, they present considerable diversity with respect to population size, geography, climate, historical development, tertiary education rate (Eurostat, 2023a) or waste recycling rate (Eurostat, 2023b).

This paper has the following structure. The first part includes the theoretical background and hypotheses development. The methodology continues to clarify the data collection and processing process, followed by results, discussion, limitations, and conclusions.

2 Theoretical background and hypotheses development

2.1 Factors affecting the pro-environmental intentions

Pro-environmental intentions are essential in leading to sustainable decisions and behaviors and supporting environmental protection. They encourage individuals to consider their daily habits and make conscious choices about interacting with the natural world. The importance of public participation in environmental protection, among other economic and social goals, was first accentuated in the 1970s in the United States under the umbrella of “societal marketing”, which was concerned with environmental issues. The theories categorizing public environment protection as a social goal started to get their popularity in the 70th of the last century with Fisk's Theory of Responsible Consumption (Fisk, 1974), Henion and Kinnear's Ecological Marketing (1976), and Kardash's Ecologically Concerned Consumer (Kardash, 1976). At first, research centered around energy consumption, pollution created by vehicles, oil and chemical businesses, as well as consumer responses to adverts and labels (Henion et al., 1976; Kilbourne and Beckmann, 1998; Peattie, 2010). Subsequently, investigations extended to include green purchasing of foodstuffs and environmentally sound products.

The social and economic paradigms highly influenced the early studies on factors affecting pro-environmental behavior. In the economic domain, the main investigated researchers focused on economic incentives and the financial capabilities of households. The marketers concentrated their attention on the socio-demographic characteristics of households as factors employed for market segmentation. The environmentally concerned consumption theories studied the effects of environmental awareness (Peattie, 2010).

The overall discussion dwelt on the relative role of economic and non-economic incentives in motivating the consumers for environmentally friendly behavior. Proponents of economic rationality argue that government policy should provide mainly

financial incentives (Jackson and Surrey, 2005; Wang et al., 2021; Shen and Wang, 2022). Waste management continues to utilize this approach, providing households with incentives to classify their waste through providing gratuitous disposal of sorted waste. The economic studies also suggest wealthier families have a higher environmental impact but can buy more “eco-friendly” commodities (Lenzen and Murray, 2003; Huang et al., 2022). Therefore, higher income can result in increased green consumption.

Initially, much attention was devoted to studying socio-demographic aspects as a critical predictor of pro-environmental consumption, mainly in terms of market segmentation based on gender, age, number of children, educational level, and socioeconomic class (Robinson and Smith, 2002; Jenkins et al., 2003). Even today, these elements are regularly included in empirical studies, typically as control variables (Walia et al., 2020).

Recent studies demonstrate that values and attitudes are much more influential predictors of examining pro-environmental behavior. For instance, in the context of Schwartz’s value model, altruist values were associated with pro-environmental conduct, while other investigations suggest that environmental values lead to increased intentions regarding product reuse and waste minimization, but they do not affect recycling (Barr, 2007). The lower effect of pro-environmental values on behavior could be explained by the role of economic incentives (Jackson and Surrey, 2005; Wang et al., 2021; Shen and Wang, 2022), as well as the green attitude–behavior gap (Wang et al., 2019; Witek, 2019). Social norms such as cultural/ethnic group norms or the dominant social paradigm may also reduce this influence (Kilbourne et al., 2002; Johnson et al., 2004; Halder et al., 2020; Fischer et al., 2021). Consumerism can negatively impact willingness to engage in pro-environmental behavior due to a perception that environmentally friendly products often come at a high price tag, making them a luxurious option (Krystallis and Chrysosoidis, 2005). Other interfering factors include lifestyles (Connolly and Prothero, 2003; Moisaner, 2007; Beatson et al., 2020; Fischer et al., 2021). For example, if perceived as normal, recycling prevails in society just because it is normal to do so (Barr, 2007; Ramkissoon, 2023).

When consumers understand their responsibilities in causing and resolving environmental issues, it will likely result in pro-environmental behavior (Gupta and Ogden, 2009; Yue et al., 2020). This suggests that values are effective when individuals feel a change of behavior leads to a substantial effect on the environment or if they believe they have caused their current state of the environment.

2.2 Intentions or behavior: the intention–behavior gap

The research literature on environmental behavior often highlights the “attitude–behavior gap”, which indicates that though people may have pro-environmental solid values, attitudes and intentions, these do not usually manifest in green purchasing or other pro-environmental behavior (Farjam et al., 2019; Yamoah and Acquaye, 2019; Park and Lin, 2020). One possible explanation is a bias toward socially accepting environmentally friendly actions (Follows and Jobber, 2000). Additionally, since studies typically

rely on self-reported behaviors when measuring engagement with environmental activities, such results might be overstated. For example, Davies et al.’s (2002) study examining recycling revealed 84% of nonparticipants still claimed they recycled some or all of their waste despite being observed as not engaging in recycling schemes.

2.3 TPB usage for pro-environment behavior and behavioral intention explanation

While the discrepancy between attitude and behavior is evident, various theories investigating factors influencing behavior suggest that intentions remain closely linked to behavior. Furthermore, in numerous instances, the intention to purchase and actual purchases are influenced by similar factors (Janssen, 2018), with behavioral intention regarded as a crucial determinant of actual behavior (Liu et al., 2017).

Three psychological theories are most widely used in relation to pro-environmental behavior: the theory of planned behavior (TPB), the norm activation model (NAM), value-belief-norm theory (VBN). The theory of planned behavior (TPB) posits that individuals make deliberate choices, and behavior stems from the intention to perform specific actions. Environmental intentions and behaviors are more likely when individuals have a favorable attitude toward the behavior, when subjective norms support it, and when individuals feel in control of their actions. The norm activation model (NAM) and the value-belief-norm theory (VBN) explore the link between morality and environmental behavior. The NAM suggests that pro-environmental actions result from activating personal norms, reflecting a sense of moral obligation. Personal norms are triggered when individuals are aware of environmental issues caused by their actions, feel responsible for addressing these issues, believe their actions can help mitigate problems, and perceive themselves as capable of taking necessary actions. The VBN theory, an extension of the NAM, proposes that situational factors, particularly problem awareness, depend on ecological worldviews and value orientations. While the NAM and VBN theories explain low-cost environmental behavior and good intentions, the TPB demonstrates greater explanatory power in situations involving high behavioral costs or strong behavior constraints (De Groot, 2019).

TPB is recognized as an influential psychological model that is used to forecast and explain human conduct within a specific setting. Icek Ajzen created the model in the late 1980s, and it has been utilized to study a variety of areas such as healthcare, advertising, and environmental research. TPB builds on the Theory of Reasoned Action (TRA) by Martin Fishbein and Icek Ajzen, which argued that an individual’s intention to do a particular action was the most reliable predictor of their behavior. TPB broadens this model by introducing a third component: perceived behavioral control. The model suggests that an individual’s behavior is controlled by their intention to perform the action, which is then based on three factors: perceived behavioral control, attitude towards the behavior, and subjective norm (Ajzen, 1991).

In line with [Yuriev et al. \(2020\)](#), the TPB has three main benefits in studying pro-environmental behavior (PEB). First, it allows for identifying the beliefs about PEB and assessing their importance for a particular group. Second, The TPB has been widely recognized as a powerful tool for constructing behavioral improvements ([Riebl et al., 2015](#); [Timm and Deal, 2016](#)). Third, the TPB is renowned for its adaptability.

2.4 Hypothesis development

The TPB, applied in the environmental domain, examines the predictors of pro-environmental intentions among the perceived behavioral control (PBC), environmental concern (EC), and social norms (SN) based on the following hypotheses, presented in [Figure 1](#).

2.4.1 Perceived behavioral control

Perceived behavioral control (PBC) refers to an individual's perception of their ability to perform a specific behavior, considering available resources, skills, and constraints ([Ajzen, 1991](#)). PBC is generally identified through self-report questionnaires, which assess control beliefs related to the behavior in question ([Ajzen and Madden, 1986](#)). In our current study, PBC was measured using a modified version of the scale developed by [Ajzen and Madden \(1986\)](#), adapted to the context of environmental protection.

PBC, as a psychological construct referring to an individual's belief in their ability to perform a behavior in the context of protecting the environment, can influence people's intentions and actions towards environmentally friendly behaviors ([Al Mamun et al., 2018](#)). Studies have shown that PBC is positively associated with recycling intention ([Al Mamun et al., 2018](#)), green food and beverage behavior ([Wang and Wang, 2016](#)), and environmentally friendly vehicle purchase intention ([Afroz et al., 2015](#)).

Overall, PBC is essential in promoting environmentally friendly behaviors, and individuals can engage in various activities to protect the environment, such as recycling, reducing energy consumption, using public transportation, and purchasing environmentally friendly products ([Al Mamun et al., 2018](#)). Incentive mechanisms

can also be used to encourage these behaviors by moderating the relationship between desire intention and behavior ([Ting et al., 2019](#)). All these observations allow us to formulate hypothesis H1.

H1: *Perceived behavioral control is positively related to pro-environmental intentions.*

2.4.2 Environmental concern

Environmental concern (EC) refers to the extent to which individuals are aware of and concerned about environmental issues ([Dunlap et al., 2000](#)). Public environmental concern can drive corporate environmental behavior, thereby strengthening the external environmental pressure on companies with high levels of pollution ([Wu et al., 2023](#)). Environmental concerns can also influence people's perceptions of the appropriateness of activities, facilities, and services ([Schultz, 2000](#)).

Environmental concern is often measured using self-report scales, like the New Ecological Paradigm (NEP) scale ([Dunlap et al., 2000](#)). Our study assessed EC using a modified version of the NEP scale, adapted to focus on relevant environmental issues.

Environmental concerns vary among different groups of people. Younger people tend to have greater environmental concerns than older people ([Chinh and Giang, 2021](#)); at the same time, girls are more likely to be members of environmental organizations compared with boys ([Strandbu and Skogen, 2000](#)). Environmental attitudes and concerns are also influenced by cultural factors, as seen in a comparative study between Brazilian and Portuguese students ([Côrtes et al., 2016](#)).

Social identity theory has been used to explain differences in individual support for environmental protection, a conative component of environmental concern ([Brieger, 2019](#)). Perspective-taking, dispositional empathy, and future-time perspective have also been associated with environmental respect and eco-tourism intention ([Sevillano et al., 2007](#); [Pham and Khanh, 2021](#)).

Several studies have investigated the relationship between PBC and environmental intentions, demonstrating a positive relationship between environmental concern and pro-environmental intentions ([Stern et al., 1995](#); [Whitmarsh and O'Neill, 2010](#); [Borusiak et al., 2021a](#)). For example ([Bamberg et al., 2003](#)), found that PBC significantly predicted intentions to

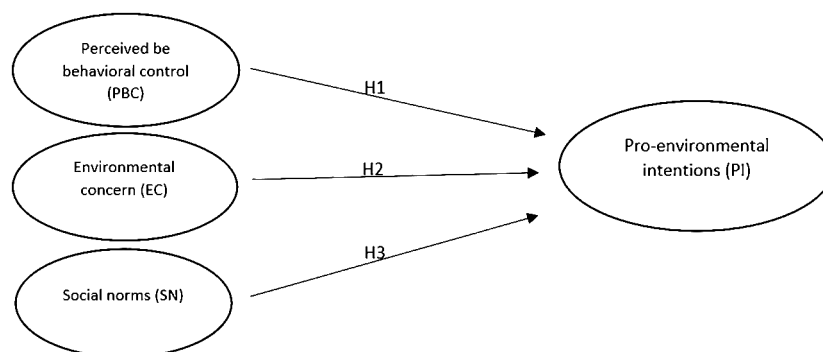


FIGURE 1
Determinants of pro-environmental intentions – a conceptual model.

use public transportation, influencing actual behavior. Similarly, Greaves et al. (2013) found that PBC was a significant predictor of intentions to reduce car use in favor of sustainable transport modes. Stern et al. (1995) found that individuals with greater environmental concerns were more likely to engage in pro-environmental behaviors, such as recycling and conserving energy. These findings support hypothesis H2.

H2: *Environmental concern is positively related to pro-environmental intentions.*

2.4.3 Social norm

Social norms (SN) are the unwritten rules and expectations that guide behavior within a particular group or society (Nyborg, 2018). They are the shared beliefs, attitudes, and values that shape how people perceive and respond to different situations (Schultz, 2022). In environmental behavior, social norms can influence whether individuals engage in pro-environmental actions (Viscusi et al., 2011). Social norms are typically assessed using self-report questionnaires that measure injunctive norms and descriptive norms (Cialdini et al., 1991). In our study, social norms were measured using a modified version of the scale developed by Cialdini et al. (1990), adapted to the context of environmental protection. These norms are explicitly injunctive in nature.

Social norms can vary depending on an individual's social background, such as age, gender, education, and cultural background (Nyborg, 2018). For example, research has shown that social norms more directly influence older farmers' pro-environmental behaviors, while personal norms also have an indirect impact via perceived behavioral control (Fang et al., 2018). Similarly, the personality traits of individuals can also moderate the influence of social norms on pro-environmental behavioral intentions (Yu and Yu, 2017).

In other words, social norms can have varying levels of impact on different kinds of environmental conduct, with perceived behavioral control and also social norms commonly influencing environmentally friendly behavior more strongly than socially beneficial behaviors. Additionally, information availability can play a role in both environmental behaviors (Hosta and Zabkar, 2021).

Social norms refer to the perceived social pressure to perform or not perform a specific behavior (Ajzen, 1991). Psychologists have distinguished between two types of social norms – the norms that just report what people in a group do (descriptive norms) and those which dictate how the group members are expected to act (injunctive norms; Deutsch and Gerard, 1955). Cialdini et al. (1991) refer to descriptive norms as the norms of “is,” while injunctive norms are seen as the norms of “ought” (Cialdini et al., 1991). The motivating effect of the descriptive norms is conducted via examples of socially effective and acceptable action, while injunctive norms motivate via social pressure.

Research has illustrated that social norms have an effect on pro-environmental intentions. Harland et al. (2007) observed that social standards significantly correlated with the desire to practice energy conservation habits. Also, Schultz et al. (2007) established that both descriptive and injunctive norms impacted recycling intentions, thus supporting hypothesis H3 below.

H3: *Social norms are positively related to pro-environmental intentions.*

The literature exploring cross-cultural differences in norms, beliefs, and values indicates the potential for notable variations among countries. Particularly notable is the contrast between Western, Educated, Industrialized, Rich, and Democratic (WEIRD) societies and the rest of the world (Henrich et al., 2010). The findings indicate that the values of WEIRD societies diverge so significantly from the global norm that they can be considered outliers in the worldwide sample (Henrich et al., 2010). When comparing pro-environmental beliefs across European countries (Austria, Czech Republic, Italy, the Netherlands, and Sweden; De Groot and Steg, 2007b), the results indicated that the value scales and the three-dimensional classification of egoistic, altruistic, and biospheric value orientations are applicable to all countries, although the positions of the countries on the scales vary. In this study, we will examine the differences in the relationships suggested by the hypotheses across the countries included in the sample (Croatia, Czech Republic, Hungary, Poland, Slovakia, and Spain).

3 Methodology

To verify our conceptual model and test hypotheses, data were collected in April–June 2021. The study was carried out by a self-administered questionnaire with questions on four factors: perceived behavioral control (PBC), environmental concern (EC), social norms (SN) and pro-environmental intentions (PI). Participants referred to statements on a 7-point scale (1 I strongly disagree – 7 I strongly agree). A complete list of questions and sources is presented in Table 1. The latter part of the questionnaire consists of questions on respondents' personal information.

The participants in the study included 2,702 (N = 2,702) university students majoring in economics, finance, management, or marketing. The choice of university students as respondents was justified by, on the one hand, the observation that youngsters foster climate concerns among parents (Dupont, 2004; Lawson et al., 2019), but on the other hand, on unclear results of young people's willingness to carry the costs of environmental protection (Hao et al., 2019; Dardanoni and Guerriero, 2021; Zámková et al., 2023), which challenge the educational system to raise the pro-environmental awareness among youth (Ardoin et al., 2020). Furthermore, these students are majoring in fields that are likely to lead them to the impactful positions of economic processes. The average age of respondents was 22.1 years (SD = 3.63, min = 18, max = 35). In the survey participated 1,574 women (58.2%), 1,099 men (40.7%), and 29 participants preferred not to provide their gender (1.1%). We relied on opportunity sampling method.

Our research is multi-country, as significant differences in the Europeans' perception and action toward environmental protection are observed (Punzo et al., 2019) due to differences in anticipated environmental problems and costs. Among respondents, 430 (15.9%) participants were from Croatia, 588 (21.8%) from the Czech Republic, 401 (14.8%) from Hungary, 481 (17.8%) participants from Poland, 400 (14.8%) from Slovakia, and 402 (14.9%) from Spain. The questionnaire was administered to university students in their home countries.

The study proceeded in two phases, similar to Anderson and Gerbing (1988), by first analyzing the validity and reliability of the constructs separately and then evaluating hypotheses based on the assumed research model using structural equation modeling (SEM). To assess the reliability, convergent validity and discriminant validity of the explored constructs, confirmatory factor analysis (CFA) was first conducted, following which, to understand the causal relationships between the latent variables, SEM was adopted to verify the hypotheses posed in the study, with the aid of AMOS software. We also performed a multi-group analysis of SEM to study the differences between the countries.

3.1 The country differences in Intention to protect the environment

We have also studied the cross-country differences in the intention to protect the environment. The indicator for Intention to protect the environment (PI) employed was computed as an arithmetic sum of three questions (PI1, PI2 and PI3, see Table 1). We compared the country-specific means in Intention to protect the environment via one factor ANOVA with *Post Hoc* tests (see Table 2 and Figure 2).

TABLE 1 Measurement scale construct.

Variable	Items	Source
Perceived behavioural control (PBC)	<p>PBC1. Protecting the environment is completely up to me.</p> <p>PBC2. I am positive that if I want, I can protect the environment.</p> <p>PBC3. I have opportunities to protect the environment.</p>	Han et al. (2010); Chen and Tung (2014)
Environmental concern (EC)	<p>EC1. In order to survive, humans must live in harmony with nature. I think that:</p> <p>EC2. Environmental problems are very important.</p> <p>EC3. Environmental problems cannot be ignored.</p> <p>EC4. We should care about environmental problems.</p>	Borusiak et al. (2021b)
Social norms (SN)	<p>SN1. My friends expect me to protect the environment.</p> <p>SN2. My family expects me to protect the environment.</p> <p>SN3. Most people who are significant to me think that I should protect the environment.</p>	Vermeir and Verbeke (2008); Joshi and Rahman (2017); Borusiak et al. (2020)
Pro-environmental intentions (PI)	<p>PI1. I plan to protect the environment.</p> <p>PI2. I am willing to do something to protect the environment.</p> <p>PI3. I will make an effort to protect the environment.</p>	Han et al. (2010); Chen and Tung (2014)

4 Results

Following Henrich et al. (2010) we expected that the pro-environmental intentions across countries may differ. Thus, before analyzing the total sample of 2,702 respondents, similar SEM analyses were performed for each country separately. Our study encompassed six neighboring countries: Croatia, the Czech Republic, Hungary, Poland, Slovakia, and Spain. These countries share numerous similarities. Firstly, they are all members of the EU. Additionally, they exhibit comparable GDP per capita levels. Furthermore, four of these nations are part of the Visegrad Group, further underlining their shared characteristics. The country-level results were similar to those for the entire sample; therefore, we omitted them for conciseness. No cross country differences were statistically significant.

4.1 Measurement model

The measurement model's overall goodness-of-fit indices indicate a high level of data correctness and fitness. The indices, including GFI (0.968), AGFI (0.954), CFI (0.980), RMSEA (0.049), and TLI (0.974), meet the standards for model fitting. Convergent validity and discriminant validity were assessed for all constructs and variables. The convergent validity was assessed by composite reliability (CR) and average variance extracted (AVE). AVE values greater than 0.5 as Fornell and Larcker (1981) suggested, indicate that the studied constructs achieve convergent validity. Similarly, the CR values for all variables should be above 0.60, according to Sekaran and Bougie (2016). Table 3 presents the AVE and CR values, demonstrating that all AVEs are greater than 0.5 and all CRs are greater than 0.6, indicating good convergent validity for the latent variables in this study. The factor loadings for all tested items were found to be significant at $p = 0.001$.

Discriminant validity was examined by comparing the AVE values and the squared correlations (Table 4). An evaluation of these figures suggested that the construct's square root of AVE values surpassed their correlations with other constructs, lending support to the discriminant validity of each construct (Fornell and Larcker, 1981). This implies that the constructs can be considered distinct factors while still being correlated. Consequently, the constructs and measurement model items were considered suitable to investigate the proposed hypotheses and structural models.

4.2 Structural model and testing of hypotheses

Structural equation modeling (SEM) was used to determine the path coefficients connecting the variables in the research model, and the measure of model fit was evaluated utilizing fit indices, such as GFI (0.954), AGFI (0.928), CFI (0.973), RMSEA (0.069), and TLI (0.965). According to Steenkamp and Baumgartner (2000), all of these indices and the model estimation indicated an excellent fit. The model accounted for 51% ($R^2 = 0.51$) of the variance in PI,

TABLE 2 The country differences in Intention to protect the environment.

(I) country	(J) country	Mean Difference (I–J)	Sig.
Poland	Croatia	0.10	1.000
	Slovakia	-0.11	1.000
	Czech Republic	1.07*	<.001
	Hungary	0.06	1.000
	Spain	1.86*	<.001
Croatia	Poland	-0.10	1.000
	Slovakia	-0.21	.999
	Czech Republic	0.97*	.001
	Hungary	-0.03	1.000
	Spain	1.75*	<.001
Slovakia	Poland	0.11	1.000
	Croatia	0.21	.999
	Czech Republic	1.18*	<.001
	Hungary	0.18	1.000
	Spain	1.97*	<.001
Czech Republic	Poland	-1.07*	<.001
	Croatia	-0.97*	.001
	Slovakia	-1.182*	<.001
	Hungary	-1.008*	<.001
	Spain	0.788	.075
Hungary	Poland	-0.06	1.000
	Croatia	0.03	1.000
	Slovakia	-0.18	1.000
	Czech Republic	1.00*	<.001
	Spain	1.79*	<.001
Spain	Poland	-1.86*	<.001
	Croatia	-1.75*	<.001
	Slovakia	-1.97*	<.001
	Czech Republic	-0.78	.075
	Hungary	-1.79*	<.001

* The mean difference is significant at the 0.05 level. Results of *Post Hoc* tests (Tamhane T2). The indicator for Intention to protect the environment was computed as arithmetic sum of relevant questions.

demonstrating that the different forms of need satisfaction explained a substantial amount of variance. The results of SEM are presented in Table 5 and in Figure 3. Figure 4 presents a reduced form of Figure 3, explaining hypothesis testing.

The SEM results revealed statistically significant path coefficients (β) in the expected directions for the relationships between perceived behavioral control, environmental concern, social norms, and intention to protect the environment. Specifically, the path coefficients were 0.42 ($p < 0.001$), 0.45 ($p <$

0.001), and 0.06 ($p < 0.001$), respectively (see Table 5). These findings support the notion that perceived behavioral control, environmental concern, and social norms statistically significantly impact the intention to protect the environment. The perceived behavioral control proved to explain 42% of the variability, environmental concern – 45% of the variability and social norms – 6% of the variability (Table 5).

The reduced form of Figure 3 concentrated on the hypothesis testing is presented in Figure 4.

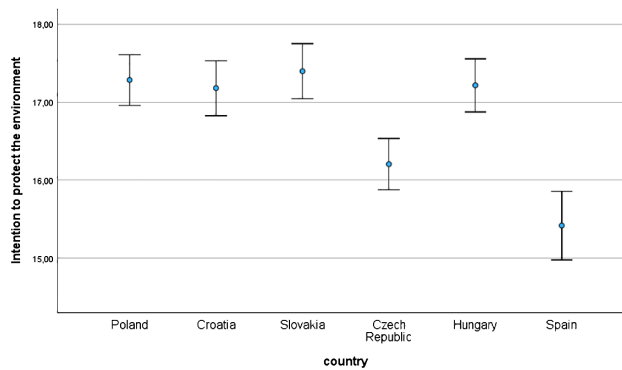


FIGURE 2 The country differences in Intention to protect the environment. Means and confidence intervals.

4.3 The country differences in Intention to protect the environment

The indicator for Intention to protect the environment (PI) employed in this part of the paper was computed as an arithmetic sum of three questions (PI1, PI2 and PI3, see Table 1).

The one factor ANOVA analysis reported $F = 18,199$ with $Sig. < .001$. Tests of Homogeneity of Variances (based on mean) provided Levene Statistic = 10,847 $Sig. < .001$. The *Post Hoc* tests (Tamhane T2) are presented in the following table.

The results suggest significant difference in Intention to protect the environment exists between the two groups of countries: the Czech Republic and Spain on one hand and Poland, Croatia, Slovakia, Hungary on the other. The differences withing the groups of countries proved to be statistically insignificant (see Table 2 and Figure 2).

5 Discussion

The literature on factors affecting pro-environmental intentions went through a long journey, starting with economic incentives and socio-demographic segmentation and ending with psychological motivators and social norms. This paper contributes to the latter research stage and studies the effects of environmental concern, perceived behavioral control, and social norms on pro-environmental intentions as suggested in the Theory of Planned Behavior. According to the findings, our model accounted for 51% of the overall variation in pro-environmental intentions, with environmental concern and perceived behavioral control having a predictive power of 42% and 45%, respectively (out of this 51% explanatory power of the model), while social norms accounted for only 6% (out of 51%).

TABLE 3 The Constructs and convergent validity.

Variable	Item	Loading	ρ Value	CR	AVE
Perceived Behavioral Control (PBC)	PBC1	0.57	***	0.8	0.57
	PBC2	0.82	***		
	PBC3	0.85	***		
Environmental Concern (EC)	EC1	0.68	***	0.91	0.72
	EC2	0.90	***		
	EC3	0.91	***		
	EC4	0.89	***		
Social Norms (SN)	SN1	0.85	***	0.92	0.80
	SN2	0.92	***		
	SN3	0.92	***		
Pro-environmental intentions (PI)	PI1	0.87	***	0.93	0.81
	PI2	0.91	***		
	PI3	0.93	***		

*** $p < 0.001$.

TABLE 4 Discriminant validity.

	PBC	EC	SN	IP
PBC	0.757			
EC	0.614	0.85		
SN	0.559	0.398	0.897	
IP	0.728	0.732	0.475	0.903

The results above align with the theory and expectations – all three factors were statistically significant; however, they differ in their predictive power. Pro-environmental intentions are strongly predicted by perceived behavioral control and environmental concern; however, the predictive power of social norms is relatively small (6% only). There are two major explanations. First, it might be possible that the real impact of the norms is limited due to the individualistic attitudes of respondents and social perception of individual responsibility for environmental issues. Second, it might be due to the way the social norms were measured. The expectation of others about the pro-environmental behavior of the respondents provides social pressure. Still, it does not give the normative example of others engaging in pro-environmental actions. These aspects are related to two types of social norms, descriptive norms reporting what people in a group do, and injunctive norms indicating how the group members are expected to act (Deutsch and Gerard, 1955). The low role of injunctive social norms in predicting pro-environmental intentions is well supported in the literature. The position of social influence was shown to be non-existent in Saudi Arabia (Alzubaidi et al., 2021). Injunctive social norms proved unrelated to pro-environmental behavior (PBS) in Luxembourg, though descriptive norms were statistically significant (de Leeuw et al., 2015).

The injunctive norms might be necessary if the motivating group (which expects the respondent to behave in a pro-environmental) was chosen correctly. De Groot and Steg (2007a) showed that for employers and shoppers, the explanatory power of injunctive social norms in predicting pro-environmental behavior was just a little smaller than that of environmental concern and perceived behavioral control. The respondents also had to approve that the motivating group was chosen correctly.

We suggest that future research concentrate on the difference between injunctive and descriptive norms on pro-environmental intentions and the correct choice of motivating group for injunctive social pressure.

The other part of our research concentrated on the cross-country differences in validity of the hypotheses above. Following Henrich et al.

(2010), we anticipated that factor impacting pro-environmental intentions might vary across countries. The cross-country comparison of the means in Intention to protect the environment showed, that the Czech Republic and Spain was statistically significantly different from the rest of the countries, which the difference within these two groups (Czech Republic and Spain in one group and the other countries in the other) were not statistically significant. Therefore, before analyzing the total sample of 2,702 respondents, we conducted similar SEM analyses for each country individually. The results at the country level mirrored those of the entire sample and did not show any statistically significant difference. We attribute this similarity to the inclusion of six neighboring countries in our study: Croatia, the Czech Republic, Hungary, Poland, Slovakia, and Spain. These nations share numerous similarities, including EU membership and comparable GDP per capita levels. Additionally, four of these countries are part of the Visegrad Group, emphasizing their shared characteristics. Moreover, the specific groups of students studied in these countries did not exhibit sufficient variability in socio-demographic factors to capture differences in the historical development of the nations. The country differences in Intention to protect the environment are presented in Table 2. The indicator “Intention to protect the environment” in this table was computed as arithmetic some of the scores of respondents to the relevant questions. A graphical demonstration of the differences is presented in Figure 2. These results are similar to (Schultz et al., 2005), who examined the correlation between values and environmental attitudes across six countries: Brazil, Czech Republic, Germany, India, New Zealand, and Russia. The results provided robust evidence supporting the cross-cultural applicability of the association between values and attitudes, as well as the framework of environmental concern.

5.1 Theoretical and practical implications

Our results contribute to theoretical implications. First, we added knowledge on the pro-environmental intentions, contributing to the discussion on shaping the societal attitude towards protecting the environment.

Second, as we grounded our research in the Theory of Planned Behavior, we also contributed to the discussion on the TPB, which has some constraints (Yuriev et al., 2020). TPB is criticized for its limitations in investigating a single behavior at a time while not accounting for the complexity of broader topics. The findings from TPB-based research are not easily transferable because the surveys used in these studies are specifically designed for the group being studied (Ajzen, 2011). The TPB’s original variables fail to consider a variety of factors that can affect behavior, such as emotions (Rapaport

TABLE 5 Results of Structural Equation Modelling (SEM).

Variable	Structural Path	Beta	SE	CR	pValue	Hypothesis Results
PBC	→ PI	0.42	0.24	17.87	***	supported
EC	→ PI	0.45	0.23	23.44	***	supported
SN	→ PI	0.06	0.13	3.65	***	supported

***p<0.001.

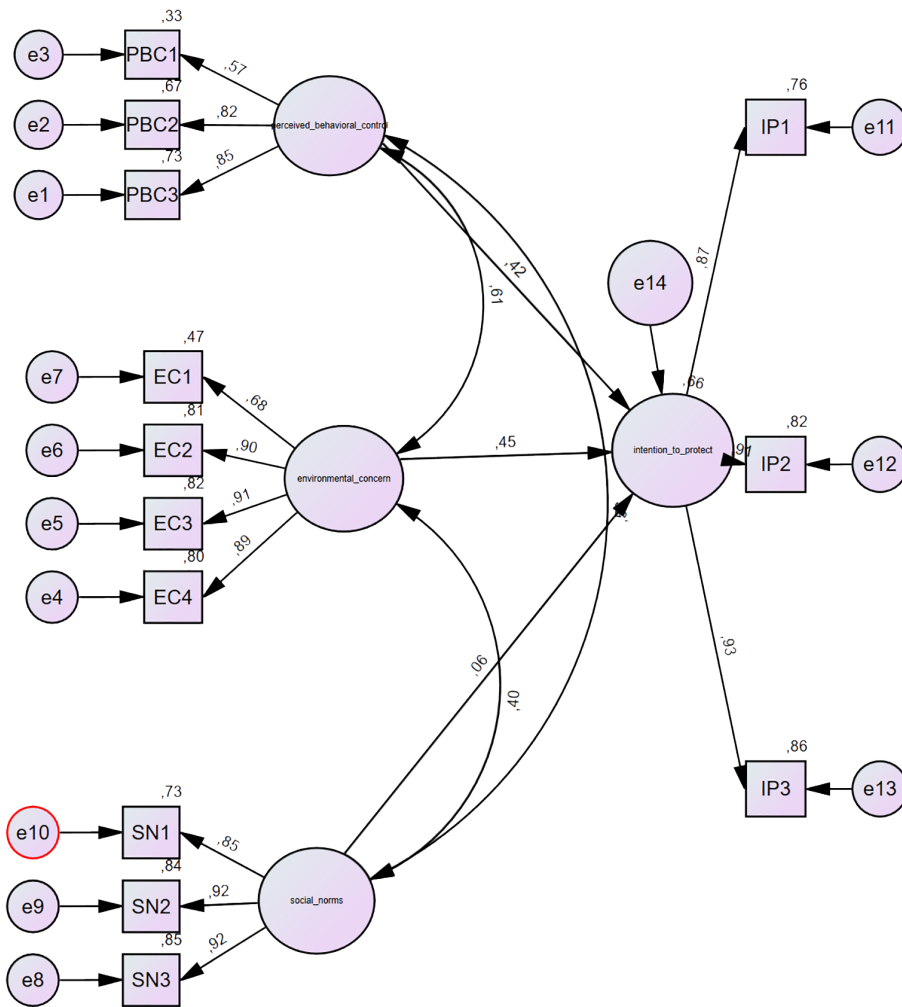


FIGURE 3 The impact of perceived behavioral control, environmental concern, and social norms on Intention to protect the environment. The results of structural equation modeling. The notation of particular variables is presented in Table 1. e_{1–13} denotes the error terms.

and Orbell, 2000), affect (Wolf et al., 2021), regret (Conner and Armitage, 1998), and socioeconomic status (Snihotta et al., 2013). In light of this criticism, our research confirms the usefulness of implementing TPB in investigating pro-environmental intentions.

However, it raises the question of the unequal importance of all three constructs of intentions predictors.

Third, we also contribute to the discussion on social norms in predicting pro-environmental intention by highlighting the need to

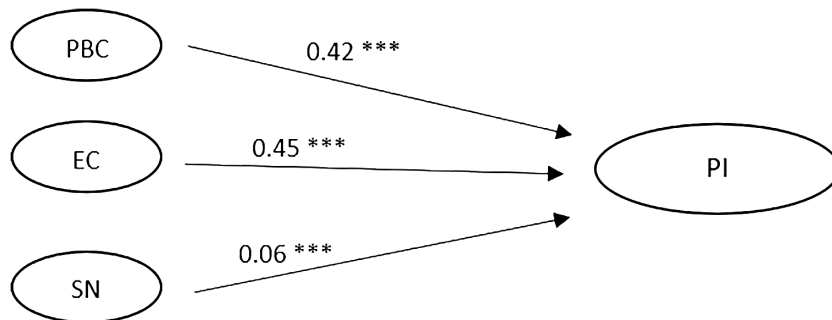


FIGURE 4 The impact of perceived behavioral control (PBC), environmental concern (EC), and social norms (SN) on Intention to protect the environment (PI). The reduced result of a structural equation modeling. *** $p < 0.001$.

distinguish between injunctive and descriptive norms on pro-environmental intentions instead of treating them as one factor and the correct choice of motivating group for injunctive social pressure. We suggest that in predicting pro-environmental intentions, four factors should be analyzed: perceived behavioral control, environmental concern, injunctive social norms, and descriptive social norms.

We examined cross-country differences across six European nations (no significant distinctions were observed) using a sample of university students specializing in economics. These students represent the forthcoming cohort of policymakers in economic sectors, underscoring their pivotal role in shaping the future of our environment. University students specializing in economics play a crucial role in shaping the future of the environment for several reasons. Firstly, they are often future policymakers who will be responsible for designing and implementing economic policies that have a direct impact on environmental issues. Their understanding of economic principles and their ability to integrate environmental considerations into decision-making processes are vital for creating sustainable policies. Additionally, these students are future business leaders, entrepreneurs, and professionals who will drive economic activities and innovations. By incorporating environmental sustainability into their business practices and strategies, they can contribute to reducing environmental degradation and promoting conservation efforts. Furthermore, their education equips them with analytical skills to assess the costs and benefits of environmental initiatives, making informed decisions that balance economic growth with environmental protection. Overall, university students specializing in economics are instrumental in fostering a more sustainable future by integrating environmental concerns into economic decision-making processes and driving innovation towards greener practices.

The results presented in the paper also suggest some practical implications. First, in the strata of university students, the behavioral intervention aimed at pro-environmental behavior needs to concentrate on two components – environmental concern and perceived behavioral control. Second, as the social pressure created via injunctive social norms has a limited effect on pro-environmental intentions, we suggest concentrating on descriptive norms, meaning the examples of real pro-environmental behavior of others rather than on expectations of others about individual behavior, though more research is needed. Third, if aiming behavioral interventions on injunctive social norms, more attention must be devoted to choosing an optimal motivating group.

5.2 Limitations and future research

As with any paper, this paper is subject to some limitations related to the nature of the method and the data. We limited the empirical research to 6 European Union countries, the results of modeling are similar for each country separately and all the samples; however, the results and conclusions are valid for these countries. The research was conducted among business students, so students majoring in other fields also require further investigation. The research was limited to the European Union countries, missing the perspective of other countries. Though frequently used in these types of studies, the questionnaire

method and the formulation of the questions also present some limitations. The intended or presented behavior does not necessarily correspond to real action; pro-environmental intentions do not always convert to pro-environmental behaviors. However, the literature suggests that in some cases, the factors affecting the intentions are the same as those impacting behavior (Janssen, 2018).

6 Conclusions

Following the current discourse in society, we intended to assess the explanatory power of perceived behavioral control, environmental concerns, and social norms in shaping pro-environmental intentions based on the Theory of Perceived Behavior. Although we confirmed that perceived behavioral control, environmental concern, and social norms determine the intention to protect the environment, the predictive power of these three components is not equal. The pro-environmental intentions are significantly stronger affected by perceived behavioral control and environmental concern, while the social norms' effect seems to be rather limited.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving humans were approved by Ethics Committee, Czech University of Life Sciences Prague. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

PK: Data curation, Funding acquisition, Investigation, Writing – original draft, Writing – review & editing. IC: Investigation, Writing – original draft, Writing – review & editing. BP: Data curation, Formal analysis, Methodology, Writing – original draft. KM: Investigation, Writing – original draft, Writing – review & editing. BB: Conceptualization, Data curation, Methodology, Supervision, Writing – review & editing. LS: Data curation, Funding acquisition, Investigation, Project administration, Supervision, Writing – review & editing. SN: Funding acquisition, Investigation, Writing – original draft. AG: Formal analysis, Investigation, Writing – review & editing. DB: Data curation, Investigation, Writing – original draft. KK: Data curation, Funding acquisition, Writing – original draft, Writing – review & editing. JG: Data curation, Funding acquisition, Investigation, Writing – review & editing. GJ: Formal analysis, Funding acquisition, Investigation, Writing – review & editing. MA: Data curation, Funding acquisition, Investigation, Writing –

review & editing. BK: Data curation, Investigation, Resources, Writing – review & editing. MH: Investigation, Writing – review & editing.

Funding

The author(s) declare that financial support was received for the research, authorship, and/or publication of this article. This paper has been prepared and data collected as a part of the Erasmus+ KA2 Strategic Partnerships project “Teaching Sustainability in Higher Education in the Field of Economics and Management (SUSTA)”, no. 2020-1-PL01-KA203-081980. The project has been financed from the funds of the European Union.

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