Original Research Article

Effect of attitude, subjective norms, self-efficacy, controllability and behavioural intentions on pro-environmental action

Abstract

Environmental degradation has become one of the most significant threats for humanity. Insights on individual's pro-environmental actions remain insufficiently investigated. The current study aims to explore the effect of attitude, injunctive and descriptive subjective norms, self-efficacy, controllability and behavioural intentions on individual's pro-environmental action. In this context, an online cross-sectional survey was conducted employing a sample of three hundred and eight adults across India. Data was analysed using multilinear regression. Furthermore, correlation analysis was also conducted. The results indicated that pro-environmental action was significantly affected by individual's behavioural intentions along with the descriptive and injunctive norms. The effect of attitude was close to significant on pro-environmental action, whereas, self-efficacy and controllability showed negligible effects. Moreover, individual's self-efficacy and controllability may be challenged during the unusual environment created by ongoing pandemic. Overall, 35% of the variance in pro-environmental behaviour can be explained by behavioural intentions, injunctive and descriptive norms. Considering the urgency and threat posed by environmental degradation, this study observed that behavioural intentions, injunctive and descriptive norms, attitudes, self-efficacy and controllability were correlated with individual's pro-environmental behaviour. On this basis, this study provides key information to researchers about the factors to address when targeting pro-environmental behaviour change in individuals.

Keywords: pro-environmental attitudes, behavioural intentions, self-efficacy, controllability, subjective norms

Comment [AK1]: The words in the title of the manuscript should not be key words. This should be avoided if possible.

Introduction

Environmental degradation has become one of the most pressing issues in the world. The worsening condition of the environment poses one of the most significant challenges of the twenty-first century. In India, the deteriorating air quality, land contamination and improper disposal of waste are causing a severe threat to human security, natural ecosystems, and biodiversity. With this, an enormous amount of scientific evidence has emerged across the globe and formed a full consensus among scientists that environmental degradation is promptly happening due to human activities (Anderegg et al., 2010; IPCC, 2014; Cook et al., 2016; De Pryck, 2021). The peak and severity of the degradation remains relentless and unprecedented. The crisis exists in a variety of interconnected ranges, such as ozone depletion, deforestation, biodiversity loss and alteration in weather cycles ultimately resulting in climate change. For instance, in one week of August 2021 alone, 38 districts of Bihar state in India were heavily flooded (Davies, 2021), heavy rains were seen in many parts of Africa (CPC, 2021), Haiti faced dual disasters- an earthquake and hurricane together (CDP, 2021), whereas many parts of the world faced record-breaking wildfires, including the US where more than 6.5 million acres have been burned (CDP, 2021). These are just a portion of many natural catastrophes gaining stride due to the interconnected degradation of the environment. All these calamities may appear to be physical in nature, but their causes and solutions are deeply rooted in human attitudes, norms, intentions, and behaviour. Environmental degradation is a human problem which is impacted by all of humanity and therefore it intrinsically embodies actions of every individual in defining the consequences.

In this line, the latest IPCC's sixth assessment report has strongly emphasized to encourage behavioural change for environment protection (IPCC, 2021). For behaviour change to take place, understanding what makes an individual act in environment friendly way is fundamental in tackling the current pace of destruction of the environment. And to address the effects of environmental degradation, individual behaviour needs to be focused on environmental orientations (Nickerson, 2002). Most of the research in past have focused on global, institutional, or household levels whereas minimal focus has been given towards understanding the individual behaviour concerning the environment. Notedly, individual behaviour is crucial in driving societal change (Clayton & Myers, 2015). Therefore, leveraging from the understanding of individual pro-environmental actions can contribute to understand and possibly mitigate the biggest threat of this century.

Individuals are crucial stakeholders who shape the environment by their pro-environmental actions. Individuals are also the one to bear the negative consequences of behavioural negligence towards the environment. At present, most of the research in environmental psychology focuses on the population of developed countries while there is a little known in the context of developing countries. And with bourgeoning population in India, investigating individual pro-environmental behaviour has become urgent. Thus, it is crucial to understand behaviour through a holistic and valuable approach for environment sustainability.

To grasp pro-environmental behaviours, we need to understand the pro-environmental attitudes of the individual, the subjective norms aligning with those attitudes, behavioural

Comment [AK2]: manuscript text must be justified

Comment [AK3]: This reference does not exist in the list of bibliographic references.

Comment [AK4]: This reference does not exist in the list of bibliographic references.

intentions to act pro-environmentally, and the perceptions of control to carry the behaviour forward. In this line, the present study investigates these factors firmly with respect to individual's pro-environmental behaviour. Notedly, previous research has shown that young individuals are more willing to adapt to pro-environmental behaviour than older individuals despite their positive environmental attitudes (Grønhøj & Thøgersen~~Gronhoj & Thogersen~~, 2012). Therefore, it is pertinent to develop a profound understanding on pro-environmental behaviours of young individuals.

Understanding individual pro-environment attitudes is crucial grasp pro-environmental behaviour (De Leeuw et al., 2015; Bohner & Dickel, 2011). It was suggested that the emergence of behaviour is associated with the concerned attitude (Bohner & Dickel, 2011). However, research has recognized that simply pro-environmental attitudes may not affect pro-environmental action of individuals (Wallace et al., 2005). As much as positive attitudes are necessary for behaviour to take place, previous studies also showed that having positive attitudes may not necessarily affect environment-friendly actions (Bamberg, 2003; Barr et al., 2003; Kothe et al., 2019). Researchers further highlighted that identifying subjective norms that relate to behaviour is also necessary for pro-environmental behaviour (for more, please see Bamberg & Möser, 2007; Klöckner, 2013). To study the effect of subjective norms on behaviour in a localized manner, it was further split into descriptive norms (what others do) and injunctive norms (what others approve/disapprove of). The distinction in norms have been utilized to study various behaviours, for example, descriptive norms successfully impacted transport choice (Hopper & Nielsen, 1991), while injunctive norms successfully impacted littering behaviour (Reno et al., 1993) and stealing behaviour (Cialdini et al., 2006). Household energy usage was influenced by both injunctive as well as descriptive norms (Schultz et al., 2007). Descriptive and injunctive norms offer potential in affecting actions of individuals. But with respect to individual pro-environmental behaviour, they remain underutilized. Notedly, previous as well as contemporary research suggests that individual guide their behaviour based on the observation of others, it would indeed be useful to explore the role of injunctive as well as descriptive norms in determining pro-environmental behavioural responses.

Several theories have highlighted the importance on individual's intentions to perform a behaviour, attitudes towards action and normative influence on behaviour have been given importance in the past research (eg., Triandis Attitude-behaviour Theory, Value-Belief-Norm Theory, Norm Activation Model). Moreover, it is argued that intentions offer the origin of behaviour (Lian et al., 2014). Various models in psychology such as the Theory of Reasoned Action (Fishbein & Ajzen, 1975), later modified to the Theory of Planned Behaviour (Ajzen, 1985, 1991), the Protection Motivation Theory (Maddux & Rogers, 1983) states that an intention to perform the behaviour is an important predictor of behaviour. Even now, deeper understanding of intention-behaviour association is needed to effectively understand pro-environmental behaviour of individuals. With this respect, behavioural intentions to promote environment-friendly behaviour may be an efficient tool in influencing behaviour towards environment protection. Previous research has suggested the importance of intentions to act as highly able in performing behaviour in question (Zailani et al., 2016; Tuu et al., 2008). But with respect to individual's pro-environmental behaviour, there is not enough evidence to support the effect on environment loving intentions to environment-friendly actions.

Moreover, the literature on behavioural intentions shows conflicting conclusions with respect to behaviour. In most cases, behavioural intentions fail to transform into individual behaviour (Milner et al., 2011). There exists a disparity between intentions to act and actions. Consequently, the mechanisms of behavioural intentions should be considered as one of the antecedents for behaviour to take place, but it cannot affect individual action in isolation. In this line, the effect of behavioural intentions needs to be explored towards pro-environmental actions.

Another important mechanism for behaviour to take place is the perceived behavioural control. Scholars have accounted the gap between intentions, attitudes, norms, and behaviour by controllability of action and self-efficacy (Ajzen, 2002). Research found many desirable impacts of perceived control on behaviour. For example, perceived behavioural control predicted health behaviours (Nugent et al., 2015; Mullan et al., 2016) and recycling behaviours (Kumar, 2019). Research also suggests direct and positive impact of perceived control on behaviour (Ajzen, 2002, 2011, 2015; Nugent et al., 2015). Perceived behavioural control can be understood as the degree of control over performing one's behaviour. In most research from the past, self-efficacy and controllability have been used as a single construct. Both these factors remain largely overlapped. There is a need for further research to examine how factors of self-efficacy and controllability can affect individual's pro-environmental behaviour. However, most research use self-efficacy alone, and little work has been done concerning individual's controllability towards the action.

The current study aims to gain insights into the individual pro-environmental behaviour. Individual pro-environmental behaviours are crucial but often overlooked. This research attempts to contribute to answering the complex yet urgent question of how environment-friendly actions of individuals are affected. In the context of rapid environmental degradation, new insights concerning the strength of effect of factors like attitudes, intentions, subjective norms, and perceived behavioural control may contribute to the research in the area. There remains a room for new research in environmental psychology for further efforts to holistically offer insights with respect to human behaviour and the threat of the millennia.

Despite the abundance of research in this area, not much has been known about these factors in a developing country like India. The richness and flexibility of human behaviour varies across contexts. Notedly, the behavioural context in the developing countries is much more complex than the developed countries. In this line, there is a need to advance local studies in developing countries. This study attempts to study the effect of attitudes, norms, intentions, and control factors on pro-environmental behaviour of a sample based on Indian population.

Method

Participants

The study employed 308 participants from India from the age group of 18 to 44 years. The research focused on the cohort of young Indian population. It is crucial to understand the pro-environment behaviour of young people of India (18-44 years of age) as this cohort (18-44 years) forms approximately 48% (i.e., 59 crore/590 million people) of the Indian population. This age group may bear the adverse effects of current as well as future

Comment [AK5]: What is the source of this assertion?

environmental degradation and has the significant potential to change the course of environmental destruction through their actions. Lack of pro-environmental attitudes and behaviour in individuals may have detrimental impacts on the environment. Therefore, to contribute to a better understanding of pro-environmental behaviour, this study focuses on the individuals from the age group of 18-44 years. Concentrating on a particular age group also benefits in controlling confounding effects of *age* in the study. The study also collected socio-economic information of the participants such as their income, region and occupation.

The data collection was conducted using PsyToolkit, a web-based resource to design and conduct online questionnaire and cognitive psychological experiments (Stoet, 2017). Convenience sampling technique was used by encouraging participants to forward the survey to as many people as possible. From the first point of contact, the link of the questionnaire was forwarded further. Researchers tried their best to get quality data through online questionnaire. Due to the ongoing contagious pandemic, it was not possible to conduct the studies with in-person participation from the individuals. The obtained data was analysed using the statistical software package SPSS version 25.0. Statistical techniques of regression analysis and correlation analysis were used.

Measures

The study employed seven questionnaires. The questionnaires were administred for the purpose of measuring pro-environmental behaviour, attitudes, behavioural intentions, injunctive subjective norms, descriptive subjective norms, self-efficacy, and controllability towards the environment.

❖ *Pro-environmental Behaviour Scale*

The scale on "pro-environmental behaviour" was developed by Huang (2016). The scale had two divisions, namely direct pro-environmental behaviour and indirect pro-environmental behaviour. The scale on direct pro-environmental behaviour consisted of 7 items (e.g., "I turn off or unplug electronic devices when not needed", "I reduce air conditioning"), whereas the scale on indirect pro-environmental behaviour consisted of 3 items (e.g., "I persuade others to change behaviour to mitigate global warming"). Each item contained a 7-point Likert scale which ranged from 1 ("never")-to-7 ("always"). Participants were asked to indicate how frequent it is for them on the scale. The alpha of the pro-environmental behaviour scale was 0.78, thereby indicating an internally reliable scale.

❖ *Behavioural Intentions Scale*

The behavioural intentions scale (Kim et al., 2013) consisted of 7 items (e.g., "I intent to reduce car use", "I intent to reduce cooling and heating use"). Each item contained a 5-point Likert scale which ranged from 1 ("strongly disagree")-to-5 ("strongly agree"). Participants were asked to indicate their agreement to each statement on the scale. The alpha of behavioural intentions scale was 0.75, thereby indicating an internally reliable scale.

❖ *Attitudes Scale*

The attitudes scale was developed by Christensen & Knezek (2014). The scale consisted of 5 items (e.g., "Knowing about environmental problems and issues is important to me", "Things I do have no effect on the quality of the environment"). Each item contained a 5-point Likert scale which ranged from 1 ("strongly disagree")-to-5 ("strongly agree"). Participants were asked to indicate their agreements to each statement on the scale. The alpha of attitudes scale in the current study is 0.77, thereby indicating an internally reliable scale.

❖ *Descriptive Norms Scale*

The descriptive norms scale (Han & Cheng, 2020) consisted of 3 items (e.g., "My family wants me to do things that are good for the environment", "My friends want me to do things that are good for the environment"). Each item contained a 5-point Likert scale which ranged from 1 ("never")-to-5 ("always"). Participants completed the scale by indicating the

frequency of the statements. The alpha of the descriptive norms scale for the current study was 0.73, thereby indicating an internally reliable scale.

❖ *Injunctive Norms Scale*

The injunctive norms scale (Han & Cheng, 2020) consisted of 3 items (e.g., "My family praises what I do for environmental protection", "My friend praises what I do for environmental protection"). Each item contained a 5-point Likert scale which ranged from 1 ("never")-to-5 ("always"). Participants completed the scale by indicating the frequency of the statements. The alpha of the injunctive norms scale for the current study was 0.76, thereby indicating an internally reliable scale.

❖ *Self-efficacy Scale*

The self-efficacy scale (Abraham et al., 2015) consisted of 4 items (e.g., "I believe in my ability to reduce environmental degradation around me", "I believe in my ability to reduce environmental degradation in my city"). Each item contained a 5-point Likert scale which ranged from 1 ("strongly disagree")-to-5 ("strongly agree"). Participants indicated their agreement with each statement on the scale. The alpha for the self-efficacy scale in the present study was 0.82, indicating an internally reliable scale.

❖ *Controllability Scale*

The controllability scale (Chen, 2016) consisted of 3 items (e.g., "Whether or not I try to mitigate global climate change is completely up to me", "I am confident that if I want, I can try to mitigate global climate change"). Each item contained a 5-point Likert scale which ranged from 1 ("strongly disagree")-to-5 ("strongly agree"). Participants indicated their agreement with each statement on the scale. The alpha for the controllability scale in the present study was 0.71-, indicating an internally reliable scale.

Procedure

To understand the pro-environmental behaviour, behavioural intentions, attitudes, subjective norms (injunctive and descriptive), perceived behavioural control (self-efficacy and controllability), seven scales were selected. The questionnaire was prepared on PsyToolkit, a web-based resource to design and conduct online questionnaire and cognitive psychological experiments (Stoet, 2017). The link to the questionnaire was personally messaged and emailed to people across India.

A request was made to individuals to participate in the study and subsequently forward the link of questionnaire in their circles. The questionnaire took approximately 6 minutes to complete. All the participants were assured of anonymity. The objective of the research was stated in the instructions for participants. All participants were asked to be accurate and honest throughout the questionnaire. They were also requested to not be influenced by their answer to one statement to their answer to other statement. They were informed that the data collection will be utilized for research purpose only. Participants were asked to be as realistic as possible while responding to the questionnaire.

After data was collected, it was downloaded from the PsyToolkit server and stored in a spreadsheet format. A total of 360 responses were collected. Data cleaning showed uncompleted surveys. The uncompleted surveys were removed from the spreadsheet. After that, a total of 308 responses were validated. For further data analysis, the spreadsheet was imported to IBM SPSS Statistics v.25.

Results

Demographic Characteristics of the Sample

Table 1 shows the demographic characteristics of the sample (n= 308) of the study. The sample comprised of slightly more men than women who are between 18 to 44 years of

age. The socio-economic information of the participants showed that with 67.5%, majority of the respondents were from cities, 24.6% from suburban region and 7.7% from the rural area of India. The occupation level of the participants showed that 49.6% were employed, while 36.6% were currently pursuing their education and 13.9 % identified themselves as unemployed. For monthly income, participants were asked to categorize themselves among three ranges: below average Indian income, average Indian income, and above average Indian income.

The average monthly wage (i.e., USD 437/ Rs 32,800) (See Picodi.com report, 2020) was clearly mentioned along with the question to avoid any misapprehensions from the participants. 38.9 % of the participants earned above average wage, whereas 31.1% and 29.8% were from average income and below average income respectively. On analysis, none of the socio-economic factors showed significant effect on pro-environmental behaviour. Therefore, the sample population for this study was homogenous.

Descriptive Statistics of the Sample

The current study measured the effect of attitude (M = 2.66, SD = 0.77), descriptive norm (M = 3.22, SD = 0.83), injunctive norm (M = 2.99, SD = 0.97), self-efficacy (M = 3.76, SD = 0.84), controllability (M = 3.58, SD = 0.90), and behavioural intentions (M = 3.95, SD = 0.61) on pro-environmental behaviour (M = 4.87, SD = 0.90) of adults (n = 308). Descriptive statistics (See Table 2) of the sample were reported to examine all the variables.

Multilinear Regression Analysis

To tap the effect of attitudes, injunctive norm, descriptive norm, self-efficacy, controllability, and behavioural intentions on the pro-environmental behaviour, the present study employed multilinear regression as the tool for statistical analysis. Regression analysis shows the association between the dependent and independent variables. A multiple linear regression was calculated to predict pro-environmental behaviour based on attitude, injunctive and descriptive norms, self-efficacy and controllability and behavioural intentions. A significant regression equation was found ($F (6, 301) = 27.737$, $p < 0.000$), with an R^2 of 0.356 (see Table 1).

Table 1. Regression coefficients attitudes, injunctive norm, descriptive norm, self-efficacy, controllability, and behavioural intentions as a function of the pro-environmental behaviour

Model	Unstandardised Coefficients		Standardised Coefficients	t	Significance
	B	Std. Error	Beta		
(Constant)	0.84	0.38		2.2.42	0.026
Behavioural Intentions	0.61	0.09	0.414	6.788	0.000
Attitude	0.12	0.06	0.098	1.794	0.074
Descriptive Norm	0.15	0.07	0.137	2.132	0.034
Injunctive Norm	0.16	0.06	0.175	2.788	0.006
Self-Efficacy	0.05	0.07	0.043	0.684	0.495
Controllability	0.05	0.06	0.047	0.799	0.425

$R^2 = 0.356$

Participants predicted pro-environmental behaviour is equal to 0.840 + 0.115 (attitude) + 0.163 (injunctive norm) + 0.149 (descriptive norm) + 0.47 (self-efficacy) + 0.47 (controllability) + 0.610 (behavioural intentions). Looking at the unique individual contributors, it was found associated with behavioural intentions ($\beta = 0.414$, $t = 6.788$, $p < 0.000$) significantly predicted pro-environmental behaviour, as did descriptive norms ($\beta = 0.137$, $t = 2.132$, $p < 0.05$) and injunctive norms ($\beta = 0.175$, $t = 2.788$, $p < 0.05$). While attitude ($\beta = 0.098$, $t = 1.794$, $p > 0.05$), self-efficacy ($\beta = 0.043$, $t = 0.684$, $p > 0.05$) and controllability ($\beta = 0.047$, $t = 0.799$, $p > 0.05$) had no statistically significant effect on pro-environmental
behaviour.

Correlation Analysis

Furthermore, a Pearson's *r* data analysis was conducted to measure the level of correlation between attitude, norms (injunctive and descriptive), perceived control (self-efficacy and controllability) and pro-environmental behaviour (See Table 4). The analysis revealed that pro-environmental behaviour had a moderate positive correlation with behavioural intention ($r = 0.487$), injunctive norms ($r = 0.385$), descriptive norms ($r = 0.386$), self-efficacy ($r = 0.372$) and controllability ($r = 0.335$). However, between attitude and pro-environmental behaviour, the correlation was found to be weak.

Table 2. Correlation among attitude, norms (injunctive and descriptive), perceived control (self-efficacy and controllability) and pro-environmental behavior

Variable	1	2	3	4	5	6
Pro-environmental Behaviour						
Behavioural Intention	0.487**					
Attitude	0.027*	-3.33**				
Descriptive Norm	0.386**	0.20**	0.28**			
Injunctive Norm	0.385**	0.17**	0.27**	0.655**		
Self-efficacy	0.372**	0.57**	-0.24**	0.317**	0.278**	
Controllability	0.335**	0.51**	-0.17**	0.23**	0.233**	0.552**

**p < 0.01 (2-tailed); *p > 0.05

The findings for the association between attitude and pro-environmental behaviour in the present study conforms with the previous findings which suggests that having positive attitude towards environment does not necessarily result into positive action towards the environment (Wallace, 2005), and therefore little to no influence. Previous research has also indicated that positive attitude towards environment may not reflect in everyday behaviour (Bamberg, 2003; Barr, 2003). So, empirical research has shown conflicting evidence on the association of attitude and behaviour and there have been contradictory result regarding attitude and behaviour link. However, findings from this study shows that there is close to significant effect on predicting pro-environmental actions from an individual's attitude.

For the factors of perceived behaviour control i.e., self-efficacy and controllability, we can speculate reason for its failure to predict pro-environmental actions. First, one reason might be that the study being conducted during an uncontrollable pandemic which has resulted into helplessness all around the world. More specifically, India faced the worst of the COVID-19 pandemic during the period of data collection for this study. The uncertainty caused by unprecedented epidemic led to loss of freedom and certainty of conducting everyday lives as normal for all individuals. The controllability and self-efficacy to act in an extreme situation such as a pandemic or environmental degradation may be challenged for individuals when they are facing thousands of deaths in a day. On the other hand, however, self-efficacy and controllability shows moderate association with pro-environmental action on correlation analysis. But as regression shows, an increase in the association between perceptions of control and action may be less likely, which is what we observe here. This study demonstrates that the association of pro-environmental behaviour with attitude; with self-efficacy; with controllability may not always be straightforward, but may display unpredictability as well.

Discussion

Comment [AK6]: The discussion of certain results is not sufficient.

Understanding individual's pro-environmental behaviour is clearly complex and multifaceted. The main purpose of the study was to tap how understanding of individual's pro-environmental behaviour are aided by attitude, types of subjective norms (injunctive and descriptive) and perceptions of behavioural control (self-efficacy and controllability) and intentions to act in an environment-friendly way. The objective of the research was to see the effect of these variables on individual's actions with respect to environment. Most of the studies concerning pro-environmental behaviour focuses on population of the developed countries and little attention has been given to a developing and socially plural country like India. To this extent, the current study investigated attitudes, subjective injunctive and descriptive norms, self-efficacy, controllability, and environmental behaviour intentions in effecting pro-environmental behaviour of adult Indian population. The sample population for the present study was homogenous.

For analysis, multiple linear regression was utilized as a statistical tool to investigate the extent of impact between attitudes towards environment, both kinds of subjective norms (injunctive and descriptive) concerning the environment, self-efficacy as well as controllability regarding pro-environmental actions and behavioural intentions in impacting pro-environmental behaviour. The analysis revealed that pro-environmental behaviour was significantly affected by behavioural intentions, injunctive as well as descriptive norms, but the effect of attitude on pro-environmental behaviour was close to significant.

While there exists a substantial number of contradictory findings on the role of attitudes in pro-environmental behaviour (Wicker, 1969; Kim & Hunter, 1993; Bamberg, 2003; Barr, 2003; Wallace, 2005), this study found a close to significant effect on pro-environmental behaviours by an individual's attitude towards environment. It may very well

be that having positive attitudes towards environment does not necessarily result in positive actions towards the environment. By this means, general positive attitude towards environment protection may not readily map onto action for environment protection.

On the other hand, both injunctive as well as descriptive norms have significant impact on pro-environmental behaviour. One possible explanation could be that India is a collectivistic society where normative influence plays a significant part in an individual's life. The actions and beliefs of significant others are valued and if significant others appreciate or practice pro-environmental actions, it may result into a spillover effect in the social networks. Furthermore, self-efficacy and controllability were non-significant. The possible explanation could be the ongoing pandemic. The COVID-19 pandemic resulted in the loss of thousands of lives each day in the months of March, April, May and June in India. The COVID-19 pandemic has caused feelings of helplessness and hopelessness across the population of the country. The beliefs of perceptions of control are being compromised in a continuing unprecedented pandemic. During such traumatic time, individuals may not feel self-efficacious and perhaps lack a sense of controllability towards their environment. To shed more light on these findings, it is necessary to consider the current situation of an unpredictable contagious outbreak. This shows that the relationship between self-efficacy and controllability with pro-environmental behaviour may not be straightforward, which is what we observe here. Notedly, the current study found no effect on individual's pro-environmental behaviour by socio-demographic characteristics such as gender, income, employment status and region.

Overall, this study provided an empirical support on how pro-environmental behaviour is affected by attitudes, injunctive and descriptive norms, controllability, self-efficacy and behavioural intentions. Congruent with the previous literature on pro-environmental behaviour, this study highlights the importance of these indicators as antecedents to pro-environmental behaviour.

Conclusion

The findings of this study add to existing research that argues for the importance of taking behavioural intentions, injunctive norms, descriptive norms, attitudes, and perceived control into account when analysing individual pro-environmental behaviour. The study was conducted on a sample of 308 adults of Indian population using a set of reliable measures. Results provide evidence for the impact of attitudes, injunctive and descriptive norms, self-efficacy, controllability and behavioural intentions – which jointly explained a variance of 35% in pro-environmental behaviours. In line with previous research, findings highlight the effects on individual's pro-environmental behaviour. Taken together, this study suggests that individual's pro-environmental behaviour is complex and multi-faceted and that environmental psychologists should include a multidisciplinary approach by exploring different aspects of individual behaviour and decision-making.

References

Abraham, J., Pane, M., & Chairiyani, R. (2015). An investigation on cynicism and environmental self-efficacy as predictors of pro-environmental behavior. *Psychology*, *6*, 234-242.

Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In *Action control* (pp. 11-39). Springer, Berlin, Heidelberg.

Ajzen, I. (1991). The theory of planned behavior. *Organizational behavior and human decision processes*, *50*(2), 179-211.

Ajzen, I. (2002). Perceived behavioral control, self- efficacy, locus of control, and the theory of planned behavior 1. *Journal of applied social psychology*, *32*(4), 665-683.

Ajzen, I. (2015). Consumer attitudes and behavior: the theory of planned behavior applied to food consumption decisions. *Italian Review of Agricultural Economics*, *70*(2), 121 138.

Ajzen, I. (2011). The theory of planned behaviour: Reactions and reflections.

Anderegg, William RL, et al. "Expert credibility in climate change." *Proceedings of the National Academy of Sciences*107.27 (2010): 12107-12109.

Bamberg, S., & Möser, G. (2007). Twenty years after Hines, Hungerford, and Tomera: A new meta-analysis of psycho-social determinants of pro-environmental behaviour. *Journal of environmental psychology*, *27*(1), 14-25.

Bohner, G., & Dickel, N. (2011). Attitudes and attitude change. *Annual Review of Psychology*, *62*, 391-417. doi: 10.1146/annurev.psych.121208.131609

Bamberg, S. (2003). How does environmental concern influence specific environmentally related behaviors? A new answer to an old question. *Journal of environmental psychology*, *23*(1), 21-32.

Barr, S., Ford, N. J., & Gilg, A. W. (2003). Attitudes towards recycling household waste in Exeter, Devon: quantitative and qualitative approaches. *Local Environment*, *8*(4), 407-421.

Cialdini, R. B., Demaine, L. J., Sagarin, B. J., Barrett, D. W., Rhoads, K., & Winter, P. L. (2006). Managing social norms for persuasive impact. *Social influence*, *1*(1), 3-15.

Chen, M. F. (2016). Extending the theory of planned behavior model to explain people's energy savings and carbon reduction behavioral intentions to mitigate climate change in Taiwan–moral obligation matters. *Journal of Cleaner Production*, *112*, 1746-1753.

Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press. In Press.

Christensen, R., & Knezek, G. (2015). The Climate Change Attitude Survey: Measuring Middle School Student Beliefs and Intentions to Enact Positive Environmental

Comment [AK7]: The references are missing. The missing authors' names should be added.

Comment [AK8]: You need to write a list of all the authors.

Change. *International journal of environmental and science education*, *10*, 773-788.

Clayton, S., & Myers, G. (2015). *Conservation psychology: Understanding and promoting human care for nature*. John Wiley & Sons.

Cook, J., Oreskes, N., Doran, P. T., Anderegg, W. R., Verheggen, B., Maibach, E. W., ... & Rice, K. (2016). Consensus on consensus: a synthesis of consensus estimates on human-caused global warming. *Environmental Research Letters*, *11*(4), 048002.

Davies, R. (2021, Aug 17). India – 12 Dead, Thousands Displaced by Floods in Bihar. Floodlist.
https://floodlist.com/asia/india-floods-bihar-august-2021-update

De Leeuw, A., Valois, P., Ajzen, I., & Schmidt, P. (2015). Using the theory of planned behavior to identify key beliefs underlying pro-environmental behavior in high-school students: Implications for educational interventions. *Journal of environmental psychology*, *42*, 128-138.

De Pryck, K. (2021). Intergovernmental expert consensus in the making: The case of the summary for policy makers of the IPCC 2014 Synthesis Report. *Global Environmental Politics*, *21*(1), 108-129.

Fishbein, M. (1975). Ajzen. i.(1975). *Belief, attitude, intention and behavior: An introduction to theory and research*, 181-202.

Grønhøj, A., & Thøgersen, J. (2012). Action speaks louder than words: The effect of personal attitudes and family norms on adolescents' pro-environmental behaviour. *Journal of Economic Psychology*, *33*(1), 292-302.

Han, R., & Cheng, Y. (2020). The Influence of Norm Perception on Pro-Environmental Behavior: A Comparison between the Moderating Roles of Traditional Media and Social Media. *International Journal of Environmental Research and Public Health*, *17*(19), 7164.

Hopper, J. R., & Nielson, J. M. (1991). Recycling as 29. Hair, JF, WC Black, BR Babin, RE Anderson and Altruistic Behavior: Normative and Behavioral RL Tatham, 2006. Multivariate Data Analysis (6th Strategies to Expend Participation in a Community edition). *New Jersey: Prentice Hall. Recycling Program. Environment and Behavior*, *30*, 195-220.

Huang, H. (2016). Media use, environmental beliefs, self-efficacy, and pro-environmental behavior. *Journal of Business Research*, *69*(6), 2206–2212.

IPCC, 2021: *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y.

Kim, S., Jeong, S. H., & Hwang, Y. (2013). Predictors of pro-environmental behaviors of

American and Korean students: The application of the theory of reasoned action and protection motivation theory. *Science Communication*, *35*(2), 168-188.

Klöckner, C. A. (2013). A comprehensive model of the psychology of environmental behaviour—A meta-analysis. *Global environmental change*, *23*(5), 1028-1038.

Kothe, E. J., Ling, M., North, M., Klas, A., Mullan, B. A., & Novoradovskaya, L. (2019). Protection motivation theory and pro- environmental behaviour: A systematic mapping review. *Australian Journal of Psychology*, *71*(4), 411-432.

Kumar, A. (2019). Exploring young adults'e-waste recycling behaviour using an extended theory of planned behaviour model: A cross-cultural study. *Resources, Conservation and Recycling*, *141*, 378-389.

Lian, J. W., & Yen, D. C. (2014). Online shopping drivers and barriers for older adults: Age and gender differences. *Computers in human behavior*, *37*, 133-143.

Maddux, J. E., & Rogers, R. W. (1983). Protection motivation and self-efficacy: A revised theory of fear appeals and attitude change. *Journal of experimental social psychology*, *19*(5), 469-479.

Milner, H. R., Landsman, J., & Lewis, C. (2011). But good intentions are not enough. *White teachers/diverse classrooms: Creating inclusive schools, building on students' diversity, and providing true educational equity*, *2*, 56-74.

Mullan, B., Henderson, J., Kothe, E., Allom, V., Orbell, S., & Hamilton, K. (2016). The role of habit and perceived control on health behavior among pregnant women. *American journal of health behavior*, *40*(3), 291-301.

Nickerson, R. S. (2002). *Psychology and environmental change*. Psychology Press.

Nielsen, K. S., Clayton, S., Stern, P. C., Dietz, T., Capstick, S., & Whitmarsh, L. (2021). How psychology can help limit climate change. *American Psychologist*, *76*(1), 130.

Nugent, L. E., Carson, M., Zammitt, N. N., Smith, G. D., & Wallston, K. A. (2015). Health value & perceived control over health: behavioural constructs to support Type 2 diabetes self- management in clinical practice. *Journal of clinical nursing*, *24*(15-16), 2201-2210.

Pearce, W., Holmberg, K., Hellsten, I., & Nerlich, B. (2014). Climate change on Twitter: Topics, communities and conversations about the 2013 IPCC Working Group 1 report. *PloS one*, *9*(4), e94785.

Picodi Report. 2020. See online at: https://infogram.com/1pg20z6qx7dkm5f93zjvk2dvwviw7re1zy3

Reno, R. R., Cialdini, R. B., & Kallgren, C. A. (1993). The transsituational influence of social norms. *Journal of personality and social psychology*, *64*(1), 104.

Schultz, P. W., Nolan, J. M., Cialdini, R. B., Goldstein, N. J., & Griskevicius, V. (2007). The constructive, destructive, and reconstructive power of social norms. *Psychological science*, *18*(5), 429-434.

Stoet, G. (2017). PsyToolkit: A novel web-based method for running online questionnaires and reaction-time experiments. *Teaching of Psychology*, *44*(1), 24-31.

Tamar, M., Wirawan, H., Arfah, T., & Putri, R. P. S. (2020). Predicting pro-environmental behaviours: the role of environmental values, attitudes and knowledge. *Management of Environmental Quality: An International Journal*.

Tuu, H. H., Olsen, S. O., Thao, D. T., & Anh, N. T. K. (2008). The role of norms in explaining attitudes, intention and consumption of a common food (fish) in Vietnam. *Appetite*, *51*(3), 546-551.

Wallace, D. S., Paulson, R. M., Lord, C. G., & Bond Jr, C. F. (2005). Which behaviors do attitudes predict? Meta-analyzing the effects of social pressure and perceived difficulty. *Review of general psychology*, *9*(3), 214-227.

Zailani, S., Iranmanesh, M., Masron, T. A., & Chan, T. H. (2016). Is the intention to use public transport for different travel purposes determined by different factors?. *Transportation research part D: transport and environment*, *49*, 18-24.

2021 Haiti Earthquake and Tropical Storm Grace. (2021). Centre for Disaster Philanthropy. https://disasterphilanthropy.org/disaster/2021-haiti-earthquake-and-tropical-storm-grace/

2021 North American Wildfire Season. (2021). Centre for Disaster Philanthropy. https://disasterphilanthropy.org/disaster/2021-north-american-wildfire-season/