L-Università ta' Malta
Centre for Resilience & Socio-Emotional Health

International Journal of Emotional Education
ISSN: 2073 7629

Volume 16, Number 1, April 2024 pp 88 - 105

www.um.edu.mt/ijee

The relationship between Emotions, Beliefs, and Pro-Environmental Behaviors in Young Adults through the lens of Self-Determination Theory

Francesca Liga[a][1], Marco Cannavò[b], Federica Papa[b] and Francesca Cuzzocrea[b]

[a] Department of Clinical and Experimental Medicine, University of Messina, Messina, Italy

[b] Department of Health Science, University "Magna Graecia" of Catanzaro, Catanzaro, Italy

Understanding the variables that promote pro-environmental behaviors (PEBs) can be useful for sustainable development. Research has shown that several factors, including emotions, can influence PEBs. Eco-empathy and helplessness beliefs toward the environment (HBTE) can facilitate or discourage PEBs. To understand the role of these factors, it may be interesting to study their connection with different emotion regulation strategies suggested by Self-Determination Theory. The current study sought to test a model that could explain the associations of dysregulation, suppressive regulation, and integrative regulation with eco-empathy, HBTE, and PEBs. In a sample of 305 emerging adults, we found an association between integrative regulation and eco-empathy, dysregulation, and HBTE. The analyses revealed an indirect pathway from integrative regulation to PEBs through eco-empathy, suggesting the need to implement educational and informational programmes that consider the impact of emotional constraints on PEB implementation in the younger generation.

Keywords: pro-environmental behaviours; emotion regulation; eco-empathy; young adults; self-determination theory

First submission 16th May 2023; Accepted for publication 16th February 2024

1 Corresponding author. Email address: federica.papa@unicz.it

https://doi.org/10.56300/SRFF1178

ISSN 2073 7629

Introduction

Humankind's behaviors and choices drive climate change, ecosystem alteration, and biodiversity loss (IPBES, 2019). The Intergovernmental Panel on Climate Change (IPCC), in its report *Climate Change 2022: Mitigation of Climate Change,* presented action plans to contain climate change risks through sustainable development (IPCC, 2022), which considers approaches related to different research areas. The impact of anthropogenic activities on the natural environment is widely acknowledged, with the recent term Anthropocene used to denote the geological epoch shaped by human activities on the planet (Grusin, 2017). While this concept initially originated in the context of natural sciences (Jickling et al., 2018; Lloro-Bidart, 2015), subsequent theoretical and practical advancements have emphasized its applicability in diverse fields, such as education and sociology (Ejsing, 2023; Sjögren, 2020), due to its focus on human behaviors (Steffen et al., 2007). For instance, sociological perspectives on the Anthropocene highlight the interconnectedness between human societies and the environment, the societal dimensions of environmental challenges, and the impact of power dynamics and cultural elements in shaping responses to the ecological crisis (Ejsing, 2023). Similarly, environmental psychology aims to comprehend factors that can either support or undermine ecological choices beneficial for safeguarding environmental health, starting with individuals' daily habits (Girod et al., 2014).

Environmental issues are connected to human perception and behaviour, and it is thus pivotal to identify the factors linked to individuals' attitudes toward the environment in order to develop solutions to address these problems (Benton & Funkhouser, 1994). *Pro-environmental behaviors* (PEBs) are actions aimed at curbing environmental damage or to protect the natural environment (Steg & Vlek, 2009). These are undifferentiated constructs (Lee et al., 2014) that include both everyday habits (e.g., energy consumption) and civic actions (e.g., promoting climate protection policies). PEBs are generally conceived of as prosocial behaviors because they entail altruistic actions intended to help others or foster positive interactions (Neaman et al., 2018; Nolan & Schultz, 2013). It is interesting to analyze the factors that may influence PEBs in emerging adults because prior research suggests that they are often connected to environments such as universities or nonprofit organizations (Vicente-Molina et al., 2018; Wallis & Loy, 2021), which may offer them a platform to learn about and discuss environmental issues. Thus, they may foster sustainable action in their communities (de Leeuw et al., 2015; Yu et al., 2017).

Mediterranean communities can be particularly interesting to observe, given that the Mediterranean area has consistently shown a heightened risk of increased pollution due to its distinct semi-closed configuration (Sharma et al., 2021). For example, Genovese et al. (2023) showed that individuals living in a marine context recognized the significance of safeguarding marine ecosystems against pollution, and acknowledged the necessity of curbing human impact. Moreover, participants exhibited varied understandings of how their actions impact the environmental condition. This was further supported in a Mediterranean context, such as the Italian one, where more than 60% of individuals aged 20-24 stated that they were genuinely concerned about climate change and environmental degradation (ISTAT, 2020). Similarly, Rocchi et al. (2023)

showed that younger Italian individuals are the most vulnerable to eco-anxiety, emphasizing the significance of the environmental topic in this sociocultural context.

Emotion Regulation and Pro-Environmental Behaviours According to Self-Determination Theory

Emotion regulation is a multidimensional construct that enables us to recognize, understad, and be aware of emotional experience (McRae & Gross, 2020). Self-determination theory (SDT; Ryan & Deci, 2017) is a holistic framework that views the handling and understanding of emotions as a core element of individual well-being (Ryan & Deci, 2001). It posits that emotions play a vital role as informative guides influencing people's behaviors and contributing to their personal growth and development (Roth et al., 2019). It highlights the importance of individual motivation to understanding and exploring emotions and suggests that this process can be identified in three different styles of emotion regulation: (1) integrative emotion regulation, (2) suppressive emotion regulation, and (3) emotion dysregulation (Roth et al., 2019; Ryan et al., 2006).

Integrative emotion regulation is an autonomous style, defined as the capability to explore and be aware of personal affective dimension (Roth et al., 2019; Ryan et al., 2006; Weinstein et al., 2013). Given that individuals high in an integrative regulation style are likely to show greater empathic abilities (Benita et al., 2017; Roth et al., 2017), it may be appropriate to assume that they may engage in a higher level of prosocial actions, such as PEBs. Indeed, greater self-awareness and other-awareness of emotions may guide one's actions and contribute to the acknowledgment of others' needs (Houle & Philippe, 2020), thereby fostering the implementation of actions aimed at benefiting others (both humans and nonhumans), such as PEBs. Integrative regulation is manifested through an awareness not only of personal emotions but also those of others (Roth et al., 2019).

In contrast, *suppressive emotion regulation* is regarded as a maladaptive style that indicates the tendency to avoid and hide negative emotional experiences (Benita, 2020; Roth et al., 2014; Roth & Assor, 2012). It entails experiencing negative emotions as threatening and overwhelming, giving rise to mental strategies aimed at distancing oneself from them (Brenning et al., 2021).

Emotion dysregulation indicates a lack of awareness of emotional experiences and interferes with effective individual functioning (Thompson, 2019). It is manifested by difficulty in sharing one's emotional states intentionally and is negatively linked with empathic listening (Roth et al., 2019; Shahar et al., 2018). Dysregulated individuals are less likely to explore their negative emotional states, which may influence the development of emotional competence, perhaps leading to compromised empathic abilities (Roth et al., 2019) and potentially hindering the ability to undertake behaviors such as pro-environmental actions. Furthermore, given that the suppressive emotion regulation style implies non-acceptance of emotional material (Roth et al., 2019), a tendency to ignore environmental problems because they are perceived as fearful may likely follow (Norgaard, 2011; Stoknes, 2014). In addition, a poorer sense of control over the environment may occur because dysregulated individuals may experience a low sense of control over their emotional world and the environment (Houle & Philippe, 2020), creating a feeling of helplessness beliefs toward the environment (HBTE). Considering that previous studies have suggested that general empathy could be related to an

integrative emotion regulation style, and general helplessness could be related to suppressive and dysregulation strategies (Roth et al., 2019), it is plausible that eco-empathy and HBTE could have the same paths of association with these emotion regulation strategies.

Processes Influencing Pro-Environmental Behaviors: Eco-Empathy and Helplessness Beliefs Toward the Environment

The concept of eco-empathy may help one comprehend the extent to which individuals understand and feel what elements of the ecosystem they are experiencing, given that it represents the ability to recognize problems that affect the natural world (Musitu-Ferrer et al., 2019). Previous research suggests that people who care deeply about the natural world are more inclined to take preventive measures about the environment (Berenguer, 2007; Berenguer, 2010) and that specific types of pro-environmental actions, such as attitudes toward animal welfare, are positively linked to greater levels of empathic concerns (Schultz, 2000; Taylor & Signal, 2005). Because eco-empathy represents the ability to understand what elements of the natural world they are experiencing, it is likely that individuals will be willing to take actions that benefit the natural environment (Musitu-Ferrer et al., 2019). Although eco-empathy may foster PEBs, helplessness beliefs have been identified as an emotional barrier to sustainable actions and underlie pro-environmental amotivation (Pelletier et al., 1999; Sass et al., 2018). *Helplessness beliefs toward the environment* refers to the construct of *learned helplessness*, which refers to an individual behaving helplessly because previous experience has indicated they are not able to change an adverse situation (Abramson et al., 1978). Everyday actions to protect the environment require extensive social and economic reforms and are often seen by individuals as ineffective in producing meaningful benefits, potentially contributing to the perception of a lack of control (Hamilton, 2010; Leiserowitz et al., 2014).

As eco-empathy involves comprehending the experiences of elements within the natural world, individuals are more likely to engage in actions that contribute to the well-being of the environment (Musitu-Ferrer et al., 2019). Conversely, HBTE implies a sense of incapacity to address the environmental crisis effectively, leading individuals to doubt the impact of their efforts in mitigating environmental damage (Landy et al., 2018). Consequently, it can be reasonably inferred that a heightened sense of HBTE is likely to hinder individuals' inclination to emit PEBs.

Aims of the Study

Both eco-empathy and HBTE comprise a range of emotional processes that influence the personal experience of the natural environment (Landy et al., 2018; Musitu-Ferrer et al., 2019), and it is thus crucial to investigate the general emotional processes that may promote eco-empathy or HBTE. Therefore, gaining a better understanding of how the emotional dimension of individuals links to PEBs may prove useful in developing personalized educational interventions. The present study is aimed to observe the links between emotion regulation styles (integrative regulation, suppressive regulation, and dysregulation), eco-empathy, HBTE, and PEBs in the Italian context. Specifically, integrative regulation was expected to be positively related with eco-

empathy and negatively related with HBTE. In addition, both suppressive regulation and dysregulation were expected to be positively related with helpless beliefs toward the environment and negatively related with eco-empathy. Finally, PEBs were expected to be positively related with eco-empathy and negatively related with HBTE.

Methodology

Participants and Procedure

The participants in this study included 305 emerging adults (17% males and 83% females) living in Italy, with an average age between 19 and 25 years (M = 21.03, SD = 1.53). All participants identified themselves as Caucasian, were Italian native speakers and living in Messina, Italy. Participants were recruited through student associations and participated voluntarily without any form of compensation. Inclusion criteria included being aged 18-30 and being proficient in the Italian language. All participants signed an informed consent form before completing the protocol. Respondents were invited to respond as honestly as possible, and anonymity was guaranteed. The questionnaire was completed in a paper-and-pencil format, so as to allow any individual willing to join the research to complete the questionnaire without using any electronic device or internet connection, thus avoiding potential selection bias (Ward et al., 2012). The study followed guidelines of the Declaration of Helsinki (World Medical Association, 2013), the Ethics Code of the Italian Association of Psychology, and received the permission of the local ethics committee (Centre for Research and Intervention of the University of Messina Institutional Review Board). Data were collected from 01-Jan-2022 to 30-Apr-2022.

Measures

Emotion regulation styles. Emotion regulation styles were assessed using the *Emotion Regulation Inventory* (ERI; Roth et al., 2009). This is a questionnaire used to assess one's emotion regulation patterns and includes 20 items divided into 3 different scales that measure integrative regulation (α = .92) (e.g., "On occasions, negative emotions helped me to understand something about the situation I was in."), suppressive regulation (α = .86) (e.g., "Usually, I ignore my feelings"), and dysregulation (α = .85) ("When I'm afraid or feel anxious I can't concentrate on other things I have to do"). For the current study, the original 5-point response system was replaced by a 7-point Likert scale (1 = strongly disagree; 7 = strongly agree) in line with past findings using the same questionnaire (Houle & Philippe, 2020). Past findings showed the robust psychometric properties of this instrument (Benita et al. 2017; Brenning et al. 2015; Roth et al., 2009). The internal consistency was satisfactory (Table I).

Eco-empathy. Eco-empathy was assessed by the *Environmental Empathy Scale* (EES; Musitu-Ferrer et al., 2019). EES is an 11-item self-report questionnaire measuring one's emphatic concerns toward the environment (e.g., "When the environment recovers after damage, I feel happy."). Respondents were asked to rate their degree of agreement with each statement on a 5-point Likert scale (1 = never; 5 = always). Higher scores represent higher eco-empathy (α = .83). The internal consistency was satisfactory (Table I).

Helplessness beliefs toward the environment. Helplessness beliefs toward the environment was assessed using the 4-item helplessness subscale (e.g., "The environmental problems are considerable, and I don't think I'd be able to change anything about it.") of the *Amotivation Toward the Environment Scale* (AMTES; Pelletier et al., 1999). Participants were their degree of agreement on a 7-point Likert scale (1 = does not correspond at all; 7 = corresponds exactly). Higher scores represent higher helplessness belief toward the environment. The internal consistency was satisfactory (α = .87) (Table I).

Pro-environmental behaviors. Pro-environmental behaviors were assessed by the scale provided by Whitmarsh and O'Neill (2010). This is a questionnaire used to assess individuals' engagement in pro-environmental behaviors composed of 17 items (e.g., "Reuse or repair items instead of throwing them away"). Respondents were asked to provide their degree of agreement with each statement on a 4-point Likert scale (0 = never; 4 = always). Higher scores represent a higher engagement in ecological and sustainable behaviors. The internal consistency was satisfactory (α = .82) (Table I).

Data Analysis

An a-priori sample size calculation suggested a minimum sample size of 177 participants, with a medium effect size (0.3), a two-tailed test with $\alpha = 0.05$, and a power level of 0.8 (Westland, 2010; Cohen, 1988). Sample size calculation was conducted via a freely available online Sample Size Calculator for Structural Equation Models (Soper, 2024). All statistical analyses were conducted via SPSS and R with the integration of RStudio and *Lavaan Package* (Rosseel, 2012). An evaluation of missing data was carried out at the item and scale levels. The total number of missing responses was 33 representing 0.2% of the total 15860 responses (52 items for 305 participants). Little's MCAR test revealed that the data were not missing completely at random, $\chi 2(1068) = 1342.58$, p = <.01. However, the minimal amount of missing data (<5%) suggests that the choice of the methods for handling them makes little difference (Raymond & Roberts, 1987). At the scale level, instead, the total scores and the parcels were created by the average of the items and when some items were missing the score was created with the mean of the other available items. All the scores were created with at least 3 items and at the scale level, there were no missing values.

Correlations and descriptive analyses were performed to observe the links between variables. The relationships between emotion regulation styles (integrative regulation, suppressive regulation, dysregulation), eco-empathy, helpless belief toward the environment, and pro-environmental behaviors were examined through the use of Structural Equation Model (SEM) with latent variables. The latent construct consisted of the random aggregation of items within the scales, with three indicators of the latent construct being established for each (Little et al. 2002; Marsh et al., 1998). With regards to the helplessness belief towards the environment, items that compose the scale were instead used. The direct paths between variables in the hypothesized model (Figure 1) were tested on R software with latent variables based on robust maximum likelihood, which includes the Yuan-Bentler scaled $\chi 2$ index (Yuan & Bentler, 1998). To test indirect and total paths between the observed variables, a maximum likelihood estimation was used (Satorra & Bentler, 1988), while a bootstrap-generated

bias-corrected confidence interval approach was used to assess the significance of emerged effects (Preacher & Hayes, 2004; Shrout & Bolger, 2002).

Results

The descriptive statistics, internal consistency values, and correlations for all the observed variables are shown in Table I. The distribution of the data was examined through skewness and kurtosis values, suggesting that no problems related to the violation of the normal distribution were observed (George & Mallery 2010). The results of the correlation analysis are shown in Table I.

Table I

Descriptive statistics and correlations

	M	SD	Ske	Kur	α	1	2	3	4	5
1- Dysregulation	3.16	1.20	.59	-.07	.85	-				
2. Suppressive regulation	3.26	1.28	.42	-.34	.86	.11	-			
3. Integrative regulation	5.45	1.23	-.84	.28	.92	.01	-.08	-		
4. HBTE	2.43	1.33	.94	.37	.87	.17**	.01	-.10	-	
5. Eco-empathy	4.32	.52	-1.32	2.09	.83	.03	.04	.32**	-.24**	-
6. Pro-environmental behaviors	1.64	.47	-.04	.01	.82	.00	-.02	.14*	-.24**	.35**

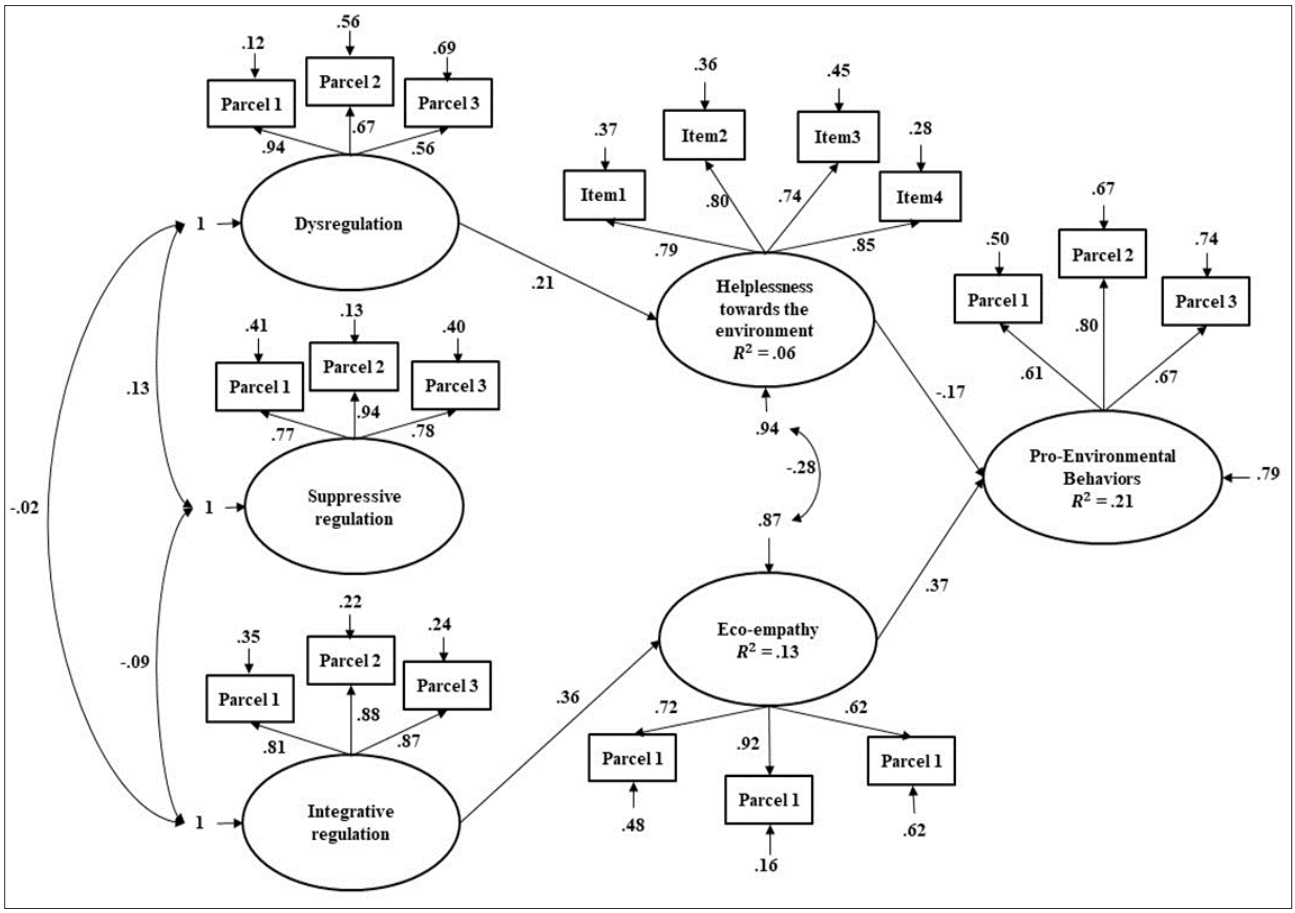
Note: **p < .05; **p < .01
HBTE= Helplessness Belief Toward the Environment

Structural Equation Modelling with latent variables was adopted to test the hypothesized model (Figure 1). Results showed adequate fit for the data: $\chi 2(137) = 261.51$, p <.01, Y-B$\chi 2(137) = 226.86$, p < .01, R-CFI = .96, SRMR =.05, R-RMSEA (90% CI) = .05 (.04, .06). Results highlighted a significant path from dysregulation to HBTE, b =.19, p <.01. 95% CI (.06, .32), β = .21, and a significant path from integrative regulation to eco-empathy, b = .14, p .01. 95% CI (.06, .22). β = .36. No significant association was observed between dysregulation and eco-empathy b = .00, p >.05. 95% CI (-.03, .05), β = .03. The association between: suppressive regulation and HBTE, b =-.04, p >.05. 95% CI (-.18, .10), β = -.04, suppressive regulation and eco-empathy,b = .02, p >.05. 95% CI (-.03, .07). β = .06 and integrative regulation with HBTE, b = -.14, p >.05. 95% CI (-.28, .00). β = -.12 were non-significant. A positive significant path was found from eco-empathy to PEBs, b = .29, p <.001. 95% CI (.17, .41). β = .37, and a negative significant path from HBTE to PEBs, b = -.05, p <.05. 95% CI (-.09, -.00). β = -.17. The direct association between: PEBs and integrative regulation, b = .00, p >.05. 95% CI (-.04, .05). β = .03, PEBs and suppressive regulation, b = -.01, p >.05. 95% CI (-.05, .03). β = -.04, PEBs and dysregulation, b = .00, p >.05. 95% CI (-.03, .04). β = .00, were non-significant. Among the indirect associations, tested with the bootstrapping approach, the only significant path

was found from integrative regulation to PEBs by eco-empathy, b = .04 p = < .05. 95% CI (.02, .08). β = .13. This indirect association ensured that the total effect of integrative regulation on PEBs was statistically significant b = .06. p =.05. 95% CI (.01, .12), β = .19. No other indirect significant associations were present.

Figure 1

The model representing the relationships between study variables.



Note: Circles represent the latent variables, boxes represent the observed variables. The numerical values on the arrows between latent variables are standardized multiple regression coefficients. The table depicts only significant paths for the sake of clarity.

Discussion

This study aimed to test a model with HBTE and eco-empathy as variables that could play indirect roles between emotion regulation styles and PEBs. As hypothesized, the results showed that dysregulation was positively associated with HBTE, and integrative regulation was positively related with eco-empathy. The positive relationship between dysregulation and HBTE can be explained by the emotional overload experienced by individuals when faced with the prospect of doom related to climate change (Stoknes, 2014). Emotional integration arguably helps individuals better handle negative emotions associated with climate

change and the detrimental impact of human activities on the natural environment, such that individuals are better prepared to deal with the emotional costs associated with such experiences (Brenning et al., 2021).

Contrary to our expectations, no relationship was found between suppressive regulation and HBTE. Suppressive emotional regulation, whereby one relies on the avoidance of negative emotional experiences, could reduce awareness of environmental problems by avoiding feelings of helplessness (Stoknes, 2014). One possible explanation could be the adaptive nature of emotional suppression in the short run, as it allows individuals to manage potentially overwhelming emotions (Brenning et al., 2021). In the long term, however, it may be maladaptive because of its relatively controlling nature; that is, individuals feel compelled to avoid or minimize their emotions (Ryan et al., 2016). However, our results showed that integrative regulation was related to PEBs through eco-empathy. People with a high integrative regulation style are more willing to observe internal and external experiences (Roth et al., 2014; Ryan et al., 2006), which may inspire them to explore more the planet they inhabit and thus help them experience and comprehend environmental challenges better by decreasing the perceived distance between themselves and nature (Dutcher et al., 2007; Panno et al., 2018).

Integrative emotion regulation implies an interest in new emotional events and the exploration of one's and others' affective experiences to facilitate psychological well-being and growth over time (Roth et al., 2019). This result is in line with previous studies grounded in SDT, which have argued that individuals with an integrative regulation style displayed greater empathy toward others (Benita et al., 2017; Roth et al., 2017). Zelenski and Desrochers (2021) found that positive emotionality may promote PEBs. Given that eco-empathy includes altruistic and prosocial components (Berenguer, 2007; Musitu-Ferrer et al., 2019), such as concern for other living things, it is reasonable to assume that environmental protection behaviours arise as a result. Some studies have observed empathy in the context of human–environment interactions (Brown et al., 2019; Di Fabio & Kenny, 2018), thus supporting the idea that empathic attitudes toward nature can foster altruistic behaviours aimed at reducing dangers to the health of others or of the environment (Bamberg & Möser, 2007). This is consistent with a recent line of research on empathy toward nature (Ienna et al., 2022; Tam et al., 2013) that has argued that compassionate concerns arise when one attributes human qualities to nature (i.e., anthropomorphizing). As Griffin et al. (2020) stated, the more elements of nature that are perceived as having human qualities (e.g., suffering), the more likely it is that altruistic behaviors toward them will follow (Westbury & Neumann, 2008). In addition, when nature is perceived as having human qualities, the social norms used in interpersonal interactions, such as respect, can be extended to the environment (Waytz et al., 2010).

The present findings also show that HBTE are negatively associated with PEBs, which are consistent with the findings of previous studies (Gifford, 2011; Sass et al., 2018). In fact, people's beliefs about the ineffectiveness of pro-environmental actions are related to low commitment to sustainable actions or represent an important barrier (Landry et al., 2018). Another possible explanation may stem from the fact that learned helplessness implies fear (Adolphs, 2013), which may prevent individuals from proactively engaging in practices aimed at curbing their impact on the ecosystem.

Overall, this study's findings parallel those related to how PEBs are closely related to both situational and individual components in emerging adults (Hickman et al., 2021; Sanson & Bellemo, 2021). Moreover, these results support previous findings from other Italian contexts, demonstrating varying degrees of individuals' understanding of how their behaviour influences the natural environment (Genovese et al., 2023). Furthermore, they align with findings from the Mediterranean region, indicating a positive association between perceived effectiveness of one's behavior and one's waste management practices (Escario et al., 2020).

While this study provides various useful insights on the relationships between emotions and PEBs, it has several limitations which may be addressed in future research. Firstly, this was a cross-sectional study and thus, it is not possible to substantiate the directionality of the hypotheses. Secondly, the sample consisted only of Italian young people who identified themselves as Caucasian, which limits the generalization of the findings to other populations, and future studies should include different age groups, particular in view of the differences in emotion regulation during the life cycle (Puente-Martínez, 2021). It should also be acknowledged that several sociodemographic characteristics of the sample such as sexual orientation were also not collected. Furthermore, the limited number of male participants limits the exploration of potential gender-related differences. Investigating such differences is particularly intriguing, as previous findings have suggested that gender stereotypes may influence individuals' emotional expressions (Löffler & Greitemeyer, 2021).

It should also be noted that participants were all from a Western context, such as the Italian one, where a cultural preference for individual orientation is highly valued (Gatti et al., 2013). This may potentially prevent individuals from engaging in collective forms of action, such as participating in protests. Future studies may want to substantiate these findings by observing more collectivistic cultures. Moreover, the present study did not differentiate between everyday behaviours (e.g., energy consumption) and civic engagements (e.g., advocating for climate protection policies). Subsequent research should make this distinction among various types of PEBs to offer a more detailed analysis of the factors influencing their enactment.

Empathy, as described by Cuff et al. (2016), encompasses a deep connection with others and non-judgmental stance. Well-established literature emphasized how compassion may encapsulate these components as well (Gilbert, 2005). Investigating compassion may thus be an appealing venue for research in environmental psychology. Additionally, as pro-environmental behaviors (PEBs) often include a prosocial component, future studies may explore how these aspects contribute to fostering various sustainable actions. Furthermore, given that emotion regulation patterns develop during infancy (Cooke et al., 2019), it might be interesting to observe the potential influence of attachment dimensions (Bowlby, 1969).

Conclusion

The present study provides a deeper understanding of the psychological components underlying sustainable actions and offers a more holistic approach to a challenging topic like sustainability. It examined the role of emotional functioning in improving the effectiveness of pro-environmental informational and educational actions. Educational programmes may benefit from focusing on the modalities through which environmental

literacy empowers individuals to make informed decisions (Norgaard, 2011; Stoknes, 2014). Moreover, beliefs of helplessness toward the environment can be addressed by creating programmes aimed at fostering experiences of success in achieving sustainable goals, helping to build a sense of competence and control.

Disclosure

All the authors report that they have no conflicts of interest and no funding was received for this study. The data that support the findings of this study are available on request from the corresponding author.

References

Abramson, L. Y., Seligman, M. E., & Teasdale, J. D. (1978). Learned helplessness in humans: critique and reformulation. *Journal of Abnormal Psychology*, *87*(1), 49. https://doi.org/10.1037/0021-843X.87.1.49

Adolphs, R. (2013). The biology of fear. *Current Biology, 23*(2), R79-R93. https://doi.org/10.1016/j.cub.2012.11.055

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*, 14-25. https://doi.org/10.1016/j.jenvp.2006.12.002

Benita, M. (2020). Freedom to feel: A self-determination theory account of emotion regulation. *Social and personality psychology compass, 14*(11), e12563. https://doi.org/10.1111/spc3.12563

Benita, M., Levkovitz, T., & Roth, G. (2017). Integrative emotion regulation predicts adolescents' prosocial behavior through the mediation of empathy. *Learning and Instruction*, *50*, 14-20. https://doi.org/10.1016/j.learninstruc.2016.11.004

Brenning, K., Bart S., Stijn V. P., & Maarten V. (2015). Perceived maternal autonomy support and early adolescent emotion regulation: A longitudinal study. *Social Development 24*(3), 561-578. https://doi.org/10.1111/sode.12107

Benton, R. J., & Funkhouser, G. R. (1994). Environmental attitudes and knowledge: An international comparison among business students. *Journal of Managerial Issues*, *6*, 366–381

Berenguer, J. (2008). The effect of empathy in environmental moral reasoning. *Environment and Behavior, 42*(1), 110-134. https://doi.org/10.1177/0013916508325892

Berenguer, J. (2007). The effect of empathy in Proenvironmental attitudes and behaviors. *Environment and Behavior*, *39*(2), 269-283. https://doi.org/10.1177/0013916506292937.

Berenguer, J. (2010). The effect of empathy in environmental moral reasoning. *Environment and Behavior, 42*(1), 110-134. https://doi.org/10.1177/0013916508325892

Bowlby, J. (1969). *Attachment and loss: Attachment* (Vol. V). Basic Books.

Brenning, K., Soenens, B., Vansteenkiste, M., De Clercq, B., & Antrop, I. (2021). Emotion regulation as a transdiagnostic risk factor for (Non)Clinical adolescents' internalizing and externalizing

psychopathology: Investigating the intervening role of psychological need experiences. *Child Psychiatry & Human Development*, *53*(1), 124-136. https://doi.org/10.1007/s10578-020-01107-0

Brown, K., Adger, W. N., Devine-Wright, P., Anderies, J. M., Barr, S., Bousquet, F., Butler, C., Evans, L., Marshall, N., & Quinn, T. (2019). Empathy, place and identity interactions for sustainability. *Global Environmental Change, 56*, 11-17. https://doi.org/10.1016/j.gloenvcha.2019.03.003

Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences* (2nd Ed.). Lawrence Earlbaum Associates.

Cooke, J. E., Kochendorfer, L. B., Stuart-Parrigon, K. L., Koehn, A. J., & Kerns, K. A. (2019). Parent–child attachment and children's experience and regulation of emotion: A meta-analytic review. *Emotion, 19*(6), 1103.

Cuff, B. M., Brown, S. J., Taylor, L., & Howat, D. J. (2016). Empathy: A review of the concept. *Emotion Review, 8*(2), 144-153.

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. https://doi.org/10.1016/j.jenvp.2015.03.005

Di Fabio, A., & Kenny, M. E. (2018). Connectedness to nature, personality traits and empathy from a sustainability perspective. *Current Psychology, 40*(3), 1095-1106. https://doi.org/10.1007/s12144-018-0031-4

Dutcher, D. D., Finley, J. C., Luloff, A., & Johnson, J. B. (2007). Connectivity with nature as a measure of environmental values. *Environment and Behavior*, *39*(4), 474-493. https://doi.org/10.1177/0013916506298794

Ejsing, M. (2023). The arrival of the Anthropocene in social theory: From modernism and Marxism towards a new materialism. *The Sociological Review, 71*(1), 243-260.

Escario, J., Rodriguez-Sanchez, C., & Casaló, L. V. (2020). The influence of environmental attitudes and perceived effectiveness on recycling, reducing, and reusing packaging materials in Spain. *Waste Management, 113*, 251-260. https://doi.org/10.1016/j.wasman.2020.05.043

Gatti, E., Corsano, P., Majorano, M., & Confalonieri, E. (2013). Body perception and self-esteem: a comparison between preadolescents in northern and southern Italy. *Clinical Developmental Psychology, 17*, 123–134.

Genovese, M., Mangano, M. C., Papa, F., Romeo, T., & Greco, S. (2023). Local businesses' consumption and perception of Single-Use Plastics: A preliminary assessment for conservation and mitigation plans in the Egadi Islands Marine Protected Area. *Marine Pollution Bulletin, 194*, 115252. https://doi.org/10.1016/j.marpolbul.2023.115252

George, D., & Mallery, P. (2010). *SPSS for Windows Step by Step: A Simple Guide and Reference, 17.0 update* (10th ed.). Pearson.

Gifford, R. (2011). The dragons of inaction: Psychological barriers that limit climate change mitigation and adaptation. *American Psychologist*, *66*(4), 290-302. https://doi.org/10.1037/a0023566

Gilbert, P. (2005). *Compassion: Conceptualisations, research and use in psychotherapy*. Routledge.

Girod, B., Van Vuuren, D. P., & Hertwich, E. G. (2014). Climate policy through changing consumption choices: Options and obstacles for reducing greenhouse gas emissions. *Global Environmental Change*, *25*, 5-15. https://doi.org/10.1016/j.gloenvcha.2014.01.004

Griffin, A. S., Callen, A., Klop-Toker, K., Scanlon, R. J., & Hayward, M. W. (2020). Compassionate conservation clashes with conservation biology: Should empathy, compassion, and deontological moral principles drive conservation practice? *Frontiers in Psychology*, *11*. https://doi.org/10.3389/fpsyg.2020.01139

Gross, J. J. (1998). The emerging field of emotion regulation: An integrative review. *Review of General Psychology, 2*(3), 271–299. https://doi.org/10.1037%2F1089-2680.2.3.271

Grusin, R. A.(2017). *Anthropocene Feminism*. University of Minnesota Press.

Hamilton, L. C., Colocousis, C. R., & Duncan, C. M. (2010). Place effects on environmental views. *Rural Sociology, 75*(2), 326-347. https://doi.org/10.1111/j.1549-0831.2010.00013.x

Hickman, C., Marks, E., Pihkala, P., Clayton, S., Lewandowski, R. E., Mayall, E. E., ... & van Susteren, L. (2021). Climate anxiety in children and young people and their beliefs about government responses to climate change: a global survey. *The Lancet Planetary Health*, *5*(12), e863-e873. https://doi.org/10.1016/S2542-5196(21)00278-3

Houle, I., & Philippe, F. L. (2020). Is the negative always that bad? Or how emotion regulation and integration of negative memories can positively affect well-being. *Journal of personality, 88*(5), 965-977. https://doi.org/10.1111/jopy.12544

Ienna, M., Rofe, A., Gendi, M., Douglas, H. E., Kelly, M., Hayward, M. W., Callen, A., Klop-Toker, K., Scanlon, R. J., Howell, L. G., & Griffin, A. S. (2022). The relative role of knowledge and empathy in predicting pro-environmental attitudes and behavior. *Sustainability, 14*(8), 4622. https://doi.org/10.3390/su14084622

IPBES. (2019). *Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services* (S. Díaz, J. Settele, E. S. Brondízio E.S., H. T. Ngo, M. Guèze, J. Agard, A. Arneth, P. Balvanera, K. A. Brauman, S. H. M. Butchart, K. M. A. Chan, L. A. Garibaldi, K. Ichii, J. Liu, S. M. Subramanian, G. F. Midgley, P. Miloslavich, Z. Molnár, D. Obura, … C. N. Zayas (eds.) IPBES secretariat.

IPCC (2022). *Climate Change 2022: Impacts, Adaptation, and Vulnerability.* Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press. In Press.

Italian National Institute of Statistics (ISTAT). (2020). *Annual Report 2020.*

Jickling, B., Blenkinsop, S., Timmerman, N., & De Danann Sitka-Sage, M. (2018) *Wild Pedagogies: Touchstones for Re-negotiating Education and the Environment in the Anthropocene*. Palgrave Macmillan.

Landry, N., Gifford, R., Milfont, T. L., Weeks, A., & Arnocky, S. (2018). Learned helplessness moderates the relationship between environmental concern and behavior. *Journal of Environmental Psychology, 55*, 18-22. https://doi.org/10.1016/j.jenvp.2017.12.003

Lee, Y., Kim, S., Kim, M., & Choi, J. (2014). Antecedents and interrelationships of three types of pro-environmental behavior. *Journal of Business Research*, *67*(10), 2097-2105. https://doi.org/10.1016/j.jbusres.2014.04.018

Leiserowitz, A., Maibach, E. W., Roser-Renouf, C., Feinberg, G., & Howe, P. (2013). *Climate change in the American mind: Americans' global warming beliefs and attitudes in April 2013.* SSRN 2298705. http://dx.doi.org/10.2139/ssrn.2298705

Little, T. D., Cunningham, W. A., Shahar, G., & Widaman, K. F. (2002). To parcel or not to parcel: Exploring the question, weighing the merits. *Structural Equation Modeling: A Multidisciplinary Journal*, *9*(2), 151-173. https://doi.org/10.1207/S15328007SEM0902_1

Lloro-Bidart, T. (2015). A political ecology of education in/for the Anthropocene. *Environment and Society, 6*(1), 128–148.

Löffler, C. S., & Greitemeyer, T. (2021). Are women the more empathetic gender? The effects of gender role expectations. *Current Psychology*, 1-12. https://doi.org/10.1007/s12144-020-01260-8

Marsh, H. W., Hau, K. T., Balla, J. R., & Grayson, D. (1998). Is More Ever Too Much? The Number of Indicators per Factor in Confirmatory Factor Analysis. *Multivariate behavioral research, 33*(2), 181–220. https://doi.org/10.1207/s15327906mbr3302_1

McRae, K., & Gross, J. J. (2020). Emotion regulation. *Emotion, 20*(1), 1–9. https://doi.org/10.1037/emo0000703

Musitu-Ferrer, D., Esteban-Ibañez, M., León-Moreno, C., & García, O. F. (2019). Is school adjustment related to environmental empathy and connectedness to nature?. *Psychosocial Intervention*, *28*(2), 101-110. https://doi.org/10.5093/pi2019a8

Neaman, A., Otto, S., & Vinokur, E. (2018). Toward an integrated approach to environmental and prosocial education. *Sustainability, 10*(3), 583. https://doi.org/10.3390/su10030583

Nolan, J. M., & Schultz, P. W. (2013). Prosocial behavior and environmental action. *Oxford Handbooks Online.* https://doi.org/10.1093/oxfordhb/9780195399813.013.011

Nolan, J. M., & Schultz, P. W. (2013) Prosocial Behavior and Environmental Action. In D. A. Schroeder & W. G. Graziano (Eds.), *The Oxford Handbook of Prosocial Behavior* (pp 626–652). Oxford Library of Psychology. https://doi.org/10.1093/oxfordhb/9780195399813.013.011

Norgaard, K. M. (2011). *Living in denial: Climate change, emotions, and everyday life*. MIT Press.

Panno, A., Giacomantonio, M., Carrus, G., Maricchiolo, F., Pirchio, S., & Mannetti, L. (2018). Mindfulness, pro-environmental behavior, and belief in climate change: the mediating role of social dominance. *Environment and Behavior, 50*(8), 864-888. https://doi.org/10.1177%2F0013916517718887

Pelletier, L. G., Dion, S., Tuson, K., & Green-Demers, I. (1999). Why do people fail to adopt environmental protective behaviors? Toward a taxonomy of environmental Amotivation. *Journal of Applied Social Psychology, 29*(12), 2481-2504. https://doi.org/10.1111/j.1559-1816.1999.tb00122.x

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, 36*, 717–731. https://doi.org/10.3758/BF03206553

Puente-Martínez, A., Prizmic-Larsen, Z., Larsen, R. J., Ubillos-Landa, S., & Páez-Rovira, D. (2021). Age differences in emotion regulation during ongoing affective life: A naturalistic experience sampling study. *Developmental Psychology*, *57*(1), 126. https://doi.org/10.1037/dev0001138

Raymond, M. R., & Roberts, D. M. (1987). A comparison of methods for treating incomplete data in selection research. *Educational and Psychological Measurement*, *47*(1), 13-26. https://doi.org/10.1177%2F0013164487471002

Rocchi, G., Pileri, J., Luciani, F., Gennaro, A., & Lai, C. (2023). Insights into eco-anxiety in Italy: Preliminary psychometric properties of the Italian version of the Hogg eco-anxiety scale, age and gender distribution. *Journal of Environmental Psychology, 92*, 102180. https://doi.org/10.1016/j.jenvp.2023.102180

Rosseel, Y. (2012). lavaan: An R package for structural equation modeling. *Journal of statistical software*, *48*, 1-36. https://doi.org/10.18637/jss.v048.i02

Roth, G., & Assor, A. (2012). The costs of parental pressure to express emotions: Conditional regard and autonomy support as predictors of emotion regulation and intimacy. *Journal of Adolescence, 35,* 799–808. https://doi.org/10.1016/j.adolescence.2011.11.005

Roth, G., Assor, A., Niemiec, C. P., Ryan, R. M., & Deci, E. L. (2009). The emotional and academic consequences of parental conditional regard: Comparing conditional positive regard, conditional negative regard, and autonomy support as parenting practices. *Developmental psychology, 45*(4), 1119-1142. https://doi.org/10.1037/a0015272

Roth, G., Benita, M., Amrani, C., Shachar, B. H., Asoulin, H., Moed, A., … Kanat-Maymon, Y. (2014). Integration of negative emotional experience versus suppression: Addressing the question of adaptive functioning. *Emotion, 14*, 908–919. https://doi.org/10.1037/a0037051

Roth, G., Shane, N., & Kanat-Maymon, Y. (2017). Empathising with the enemy: Emotion regulation and support for humanitarian aid in violent conflicts. *Cognition and Emotion, 31*, 1511–1524. https://doi.org/10.1080/02699931.2016.1237348

Roth, G., Vansteenkiste, M., & Ryan, R. M. (2019). Integrative emotion regulation: Process and development from a self-determination theory perspective. *Development and psychopathology*, *31*(3), 945-956. https://doi.org/10.1017/s0954579419000403

Ryan, R. M., & Deci, E. L. (2001). On happiness and human potentials: A review of research on hedonic and eudaimonic well-being. *Annual Review of Psychology, 52*, 141–166

Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. Guilford Publications. https://doi.org/10.1521/978.14625/28806

Ryan, R. M., Deci, E. L., Grolnick, W. S., & La Guardia, J. G. (2006). The significance of autonomy and autonomy support in psychological development and psychopathology. In D. Cicchetti & D. Cohen (Eds.), *Developmental psychopathology: Vol. 1: Theory and methods* (2nd ed., pp. 795–849). Wiley. https://doi.org/10.1002/9780470939383.ch20

Ryan, R. M., Deci, E. L., & Vansteenkiste, M. (2016). Autonomy and autonomy disturbances in self-development and psychopathology: Research on motivation, attachment, and clinical process. *Developmental Psychopathology*, 1-54. https://doi.org/10.1002/9781119125556.devpsy109

Sanson, A., & Bellemo, M. (2021). Children and youth in the climate crisis. *BJPsych bulletin*, *45*(4), 205–209. https://doi.org/10.1192/bjb.2021.16

Sass, W., Pauw, J. B. D., Donche, V., & Petegem, P. V. (2018). "Why (Should) I Do Something for the Environment?" Profiles of Flemish Adolescents' Motivation Toward the Environment. *Sustainability*, *10*(7), 2579. https://doi.org/10.3390/su10072579

Satorra, A., & Bentler, P. (1988). *Scaling corrections for statistics in covariance structure analysis.* UCLA: Department of Statistics, UCLA. https://escholarship.org/uc/item/3141h70c

Schultz, P. W. (2000). New environmental theories: Empathizing with nature: The effects ofPerspective taking on concern for environmental issues. *Journal of Social Issues, 56*(3), 391-406. https://doi.org/10.1111/0022-4537.00174

Shahar, B. H., Kalman-Halevi, M., & Roth, G. (2018). Emotion regulation and intimacy quality: The consequences of emotional integration, emotional distancing, and suppression. *Journal of Social and Personal Relationships*, *36*(11-12), 3343-3361. https://doi.org/10.1177/0265407518816881

Sharma, S., Sharma, V., & Chatterjee, S. (2021). Microplastics in the Mediterranean Sea: sources, pollution intensity, sea health, and regulatory policies. *Frontiers in Marine Science, 8*, 634934.

Shrout, P. E., & Bolger, N. (2002). Mediation in experimental and non-experimental studies: New procedures and recommendations. *Psychological Methods, 7*, 422–445. https://doi.org/10.1037/1082-989X.7.4.422

Sjögren, H. (2020). A review of research on the Anthropocene in early childhood education. *Contemporary Issues in Early Childhood, 24*(1), 46-56. https://doi.org/10.1177/1463949120981787

Soper, D. S. (2024). *A-priori Sample Size Calculator for Structural Equation Models* [Software]. https://www.danielsoper.com/statcalc

Steffen, W., Crutzen, P. J., & McNeill, J. R. (2007). The Anthropocene: Are humans now overwhelming the great forces of nature. *AMBIO: A Journal of the Human Environment, 36*(8), 614-621. https://doi.org/10.1579/0044-7447(2007)36[614:taahno]2.0.co;2

Steg, L., & Vlek, C. (2009). Encouraging pro-environmental behaviour: An integrative review and research agenda. *Journal of Environmental Psychology*, *29*(3), 309-317. https://doi.org/10.1016/j.jenvp.2008.10.004

Stoknes, P. E. (2014). Rethinking climate communications and the "psychological climate paradox". *Energy Research & Social Science*, *1*, 161-170. https://doi.org/10.1016/j.erss.2014.03.007

Tam, K., Lee, S., & Chao, M. M. (2013). Saving Mr. Nature: Anthropomorphism enhances connectedness to and protectiveness toward nature. *Journal of Experimental Social Psychology, 49*(3), 514-521. https://doi.org/10.1016/j.jesp.2013.02.001

Taylor, N., & Signal, T. D. (2005). Empathy and attitudes to animals. *Anthrozoös, 18*(1), 18-27. https://doi.org/10.2752/089279305785594342

Thompson, R. A. (2019). Emotion dysregulation: A theme in search of definition. *Development and Psychopathology, 31*(3), 805–815. https://doi.org/10.1017/s0954579419000282

Vicente-Molina, M., Fernández-Sainz, A., & Izagirre-Olaizola, J. (2018). Does gender make a difference in pro-environmental behavior? The case of the Basque Country University students. *Journal of Cleaner Production, 176*, 89-98. https://doi.org/10.1016/j.jclepro.2017.12.079

Ward, P., Clark, T., Zabriskie, R., & Morris, T. (2012). Paper/pencil versus online data collection: An exploratory study. *Journal of Leisure Research, 44*(4), 507-530. https://doi.org/10.1080/00222216.2012.11950276

Wallis, H., & Loy, L. S. (2021). What drives pro-environmental activism of young people? A survey study on the fridays for future movement. *Journal of Environmental Psychology, 74*, 101581. https://doi.org/10.1016/j.jenvp.2021.101581

Waytz, A., Cacioppo, J., & Epley, N. (2010). Who Sees Human? *Perspectives on Psychological Science, 5*(3), 219–232. https://doi.org/10.1177/1745691610369336

Weinstein, N., Przybylski, A. K., & Ryan, R. M. (2013). The integrative process: New research and future directions. *Current Directions in Psychological Science, 22*(1), 69–74. https://doi.org/10.1177/0963721412468001

Westbury, H. R., & Neumann, D. L. (2008). Empathy-related responses to moving film stimuli depicting human and non-human animal targets in negative circumstances. *Biological Psychology, 78*(1), 66-74. https://doi.org/10.1016/j.biopsycho.2007.12.009

Westland, J. C. (2010). Lower bounds on sample size in structural equation modeling. *Electronic Commerce Research and Applications, 9*(6), 476-487. https://doi.org/10.1016/j.elerap.2010.07.003

Whitmarsh, L., & O'Neill, S. (2010). Green identity, green living? The role of pro-environmental self-identity in determining consistency across diverse pro-environmental behaviours. *Journal of Environmental Psychology 30*(3), 305-314. https://doi.org/10.1016/j.chb.2017.06.032

World Medical Association. (2013). World Medical Association Declaration of Helsinki: ethical principles for medical research involving human subjects. *Jama, 310*(20), 2191-2194.

Yu, T., Yu, T., & Chao, C. (2017). Understanding Taiwanese undergraduate students' pro-environmental behavioral intention towards green products in the fight against climate change. *Journal of Cleaner Production, 161*, 390-402. https://doi.org/10.1016/j.jclepro.2017.05.115

Yuan, K. H., & Bentler, P. M. (1998). Structural equation modeling with robust covariances. *Sociological Methodology, 28*, 363–396. https://doi.org/10.1111/0081-1750.00052

Zelenski, J. M., & Desrochers, J. E. (2021). Can positive and self-transcendent emotions promote pro-environmental behavior?. *Current Opinion in Psychology, 42*, 31-35. https://doi.org/10.1016/j.copsyc.2021.02.009