



Managing climate crisis through the affects: a semiotic cultural perspective on improving pro-environmental behaviors

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Received: 23 August 2024 / Accepted: 10 October 2025

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Abstract

The urgent need for addressing the climate crisis calls for a transformation in human lifestyles. While technological and political interventions play a role, individual behavioral change is equally crucial. Pro-environmental attitudes are considered key influencers of such behaviors. However, studies have shown that having pro-environmental attitudes doesn't always translate into pro-environmental behaviors, and the reasons for this gap are not fully understood. This study aims to analyze the effect of the affective valence (i.e., connotation of the world in terms of good-bad) on the relationship between environmental attitudes and pro-environmental behaviors. Sample was composed of 1,724 Italian employees from various companies. Participants filled out self-report questionnaires aimed at measuring pro-environmental behaviors, environmental attitudes and the affective valence. A General Linear Model (GLM) was performed to analyze the relationship between environmental attitudes and pro-environmental behaviors, and the moderation effect of affective valence. Results revealed a positive association between pro-environment attitudes and pro-environment behavior and such relationship was found to be moderated by the good dimension of the affective valence and weakened by the bad dimension. This study highlights the importance of the good dimension of the affective valence in motivating pro-environmental behaviors, suggesting that environmental campaigns should focus on this aspect to effectively promote pro-environmental actions.

Keywords Pro-environmental behavior · Affect · Valence · Environmental attitudes · Climate change · Sensemaking

Introduction

Addressing the current climate crisis requires rapid changes in human lifestyles. While technological advancements and policy measures can drive systemic change by optimizing resource use through top-down interventions (Bradley & Hédren, 2015), sustainable transformation also requires bottom-up engagement through individual behavioral adaptation (Masson-Delmotte et al., 2022). Because individuals act within broader institutional and organizational contexts, workplaces are key setting for fostering and reinforcing pro-environmental behaviors (Costa et al., 2022; Hicklenton et al., 2019). These behaviors are defined as individual actions and choices that “harm the environment as little as possible, or even benefit the environment” (Steg & Vlek, 2009, p. 309) and include practices such as recycling, opting for low-emission transportation, reducing water and electricity consumption (Li et al., 2019).

Prior research showed that companies play a crucial role in climate change mitigation by shaping the ecological behaviors of their employees (Ballarotto et al., 2024a; Dibattista

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et al., 2025; Martin, 2024; Ren et al., 2024; Unsworth et al., 2021). However, less attention has been given to how these behaviors extend beyond the organizational context into employees' private lives (e.g., Abbas & Dogan, 2022). Although workplace culture can encourage green behaviors (Costa et al., 2022), observing these practices at work does not reveal how employees internalize and transfer sustainability principles to other domains of daily life.

This study aims to investigate the determinants of employees' pro-environmental behaviors in their private lives, contributing to a deeper understanding of the factors that can play a role in promoting sustainable behaviors even outside the work context.

Several factors have been identified as determinants of pro-environmental behavior (for a review, see van Valkenoged et al., 2022), including, for example, environmental knowledge (Liu et al., 2020), risk perception (Maartensson & Loi, 2022; Zhang et al., 2024), personal norms (De Groot et al., 2021) and self-efficacy (Razali et al., 2023). Among these, the attitude towards the environment has proven to be a particularly significant predictor of sustainable behavior (Batool et al., 2023; Cayolla et al., 2023; Miller et al., 2022), suggesting that the latter may be more effective by promoting pro-environmental attitudes (Abrahamse, 2019). However, the literature has shown that positive attitudes towards the environment does not always translate into an increase in pro-environmental behaviors (Ballarotto & Velotti, 2025; Wyss et al., 2022), and the causes of this discrepancy are still not fully understood (Gifford & Chen, 2017). Some studies have shown that the influence of pro-environmental attitudes on pro-environmental behavior depends on the intensity of the former (Casaló & Escario, 2018). Specifically, this relationship tends to strengthen when the personal costs associated with adopting environmentally friendly behaviors are reduced and when the environmental benefits are high (Wyss et al., 2022). Furthermore, the effectiveness of environmental attitudes in promoting pro-environmental behavior is greater when the actions taken generate positive personal consequences (Gansser & Reich, 2023).

Most studies in the literature rely on theoretical models such as the Theory of Planned Behavior (TPB; Ajzen, 1985) and the Norm Activation Model (NAM; Schwartz, 1977). However, the TPB has been criticized for its assumption of rationality, since pro-environmental behavior cannot be understood merely as the result of rational choices (Mehmood et al., 2024). On the other hand, NAM has been criticized for its emphasis on self-interest, neglecting external factors such as available resources, time and social influences (He & Zhan, 2018). Wang et al. (2018) emphasized the need to integrate unplanned, spontaneous or emotional elements into research, highlighting how the complexity of

pro-environmental behavior cannot be adequately explained by a single theoretical model (Zaidi & Azmi, 2024).

Compared to other approaches, the role of emotions in promoting behavioral change is still under-explored (Ballarotto et al., 2024b; Williamson & Thulin, 2022), despite growing evidence that emotions provide relevant internal information that favors effective human decision-making (Lerner et al., 2015) and play a crucial role in shaping individual responses to environmental issues (Clayton & Ogunbode, 2023; Lisboa et al., 2024). For example, it has been seen that negative emotions related to climate change, such as guilt, can promote sustainable behavior (Sari et al., 2024; Shipley & van Riper, 2022; Ullah et al., 2024). However, the relationship between emotions and behavior is not totally clarified. Some studies indicate that although negative emotions can increase pro-environmental intentions, they do not always translate into concrete actions (Russell et al., 2017).

Considering these discrepancies, some authors propose adopting a broader approach, considering general affective processes in the analysis of pro-environmental behaviors, rather than focusing exclusively on the influence of discrete emotions (Doell et al., 2021; Hahnel & Brosch, 2018). In fact, some studies have shown that affective valence - namely, the degree of pleasantness or unpleasantness of a stimulus (Itkes & Kron, 2019), which is a key component of experience (Barrett, 2006) - influenced the intention to purchase ecological products (Koenig-Lewis et al., 2014). Experimental evidence indicates that messages with a positive affective valence are more effective in encouraging pro-environmental behaviors than those with a negative valence, as they increase the propensity of individuals to adopt such behaviors (Chatelain et al., 2018). Similar results emerge from the use of visual stimuli, demonstrating that positively valenced images can encourage donations for environmental conservation (Ibanez et al., 2017). However, while some studies have found no evidence to support the effect of positive affect (Lange & Dewitte, 2020), other research have shown a significant impact of negative affect on individual propensity to engage in pro-environmental behaviors, such as the use of public transportation and domestic recycling (Xie et al., 2019; Carrus et al., 2008). The discrepancy between these results highlights the need for further investigation aimed at clarifying the role of affective valence in the promotion of pro-environmental behavior.

The present study adopts the Semiotic-Cultural Psychology Theory (Salvatore, 2016; Valsiner, 2007), which, in line with the Core Affect Theory (Barrett & Russell, 1998; Russell, 1980, 2003), conceives affects as fundamental and primitive forms of interpretation of experience and, consequently, of the social context in which individuals are embedded (Reho & Salvatore, 2024; Salvatore et al., 2022, 2024). According to SCPT, affective meanings do not refer

to specific objects or events in reality and therefore do not directly influence behavior. Their action is rather indirect, since, through the interpretation of the broader social context, they act as catalysts for attitudes (Carli & Paniccia, 1999; Salvatore & Freda, 2011; Weiss & Cropanzano, 1996), which in turn, being by definition oriented towards a specific object or event (Salvatore et al., 2022, 2024), impact behavior (Cremaschi et al., 2021). Thus, attitudes towards a particular object or event would exert a stronger influence on behavior when they are consistent with the dimension of affective valence (Salvatore et al., 2024). In other words, according to the Affective Pertinentization (APER) model (Salvatore et al., 2022, 2024), affective valence modulates the attitude–behavior relationship by shaping the pertinence of specific meanings within the experiential field. A positive valence does not directly impose pro-environmental action, but it makes pro-environmental attitudes more salient, accessible, and personally meaningful, thereby increasing the likelihood that they will be mobilized into behavior. Conversely, when the context is interpreted through a negative valence, attitudes tend to lose relevance and motivational power, which weakens their translation into concrete actions. In this sense, affective valence operates as a catalyst not by generating new attitudes, but by regulating the degree to which existing attitudes are activated and can guide behavior.

Empirical evidence supports this argument by showing that positive affects reinforce the value of self-attitudes, while negative affects tend to weaken it (Nasby, 1996). Furthermore, the consistency between affect and attitude has a significant impact on behavior (Forgas, 2008). For example, it has been observed that the congruence between a positive affective valence and a positive and commitment-oriented worldview moderated the relationship between the perception of wildfire risk and the adoption of preventive behaviors (Reho et al., 2024). Moreover, Doell and colleagues (2021) found that positive affect predicted the individual behavioral impact of intervention strategies based on positive emotions resulting from environmental messages.

The adoption of the SCPT theoretical framework, differently from other models based on the assumptions of rationality and self-interest (e.g., TPB and NAM), allows for the integration of the dimension of affective valence in the analysis of pro-environmental behaviors. Therefore, the present study aims to investigate the relationship between attitudes and pro-environmental behaviors, examining whether, to what extent and in which direction affective valence – understood in terms of a broader interpretation of the context – have an effect on this relationship. The objective is to contribute to clarifying the discrepancies that have emerged in the literature regarding the role of affect and attitudes in determining behavior, thus offering useful insights for the

development of effective interventions aimed at promoting pro-environmental actions.

Aim and hypotheses

This study focuses on employees of various Italian companies. Corporate employees represent a suitable group for testing the assumptions of the Semiotic-Cultural Psychology Theory (SCPT), which conceives affective sensemaking as a universal and primitive process. Investigating this mechanism in a relatively homogeneous context in terms of sustainability knowledge allows us to reduce potential confounding variables related to socio-economic or educational disparities, thus offering a clearer view of the affective processes underlying the attitude–behavior relationship. Therefore, a General Linear Model (GLM) was performed to test the following hypotheses:

H1: according to previous studies (e.g., Batool et al., 2023; Cayolla et al., 2023; Miller et al., 2022; Tamar et al., 2020) it is hypothesized that positive environmental attitudes will be associated with higher levels of pro-environmental behaviors.

H2: according to the view of valence as a primitive, basic, universal and ubiquitous way of making sense of experience (Barrett, 2006), the present study focuses on affective valence and, consistent with the SCPT for which the influence of affective meanings on behavior is indirect (Salvatore et al., 2024), it is hypothesized that valence moderates the relationship between attitude and behavior. Specifically, in line with studies that have shown that congruence between affect and attitude influences behavior (Forgas, 2008; Reho et al., 2024), a positive valence is expected to strengthen the relationship between pro-environment attitude and pro-environment behavior, while a negative valence is expected to weaken it.

Materials and methods

Participants and procedure

A sample of employees aged 18 and older was recruited in collaboration with several companies operating in Italy, representative of various sectors, including energy, technology and finance. These companies had expressed an interest in achieving sustainability goals within their organizations. Of the 15,000 employees invited to complete the questionnaire, 2,186 responded (response rate: 14.57). Inclusion criteria required participants to be over 18 years old and have a stable employment contract with the company. Individuals in internships or apprentice positions were excluded from

the sample. After excluding 462 participants with a missing response rate of more than 5%, the final sample consisted of 1,724 employees. This choice is based on the fact that some authors highlight how statistical analyses can maintain a high degree of robustness if the percentage of missing values doesn't exceed a reasonable threshold, typically less than 5% (Hair et al., 2021; Schafer, 1999). Participants took part in the study on a voluntary basis without receiving any monetary reimbursement or incentive.

The final sample consisted of 56% males, with a mean age of 44.94 years ($SD=9.92$). Among the participants, 19% resided in small towns (<10,000 inhabitants), 32.9% in medium-sized towns (11,000–100,000 inhabitants), and 48.1% in cities with more than 100,000 inhabitants. Additionally, 0.1% of the sample held an elementary school degree, 1.7% a middle school degree, 35.6% a high school diploma, 8.5% a bachelor's degree, 42.8% a master's degree, and 11.3% a post-graduate qualification.

All participants provided informed consent after receiving a detailed explanation of the study's objectives. The study received ethical approval from the Ethics Committee of the Department of Dynamic and Clinical Psychology, and Health Studies, Sapienza University of Rome (Protocol No. 0000595, 11/04/2022). Moreover, it adhered to the principles outlined in the Declaration of Helsinki, as established by the World Medical Association (WMA) during the 18th WMA General Assembly in Helsinki, Finland (June 1964), and subsequently revised at the 64th WMA General Assembly in Fortaleza, Brazil (October 2013).

Measures

Pro-environmental behaviors

Participants completed the Italian version of the Pro-Environmental Behaviors Scale (PEBS; Menardo et al., 2020). The PEBS is a self-report questionnaire composed of 15 items rated according to different response modalities. The instrument allows to calculate a total score of pro-environmental behaviors as well as the scores of four sub-dimensions: conservation (4 items; e.g., "How often do you switch off standby modes of appliances or electronic devices"), environmental citizenship (4 items; e.g., "Are you currently a member of any environmental, conservation, or wildlife protection group?"), food choices (4 items; e.g., "During the past year have you decreased the amount of beef you consume?"), and transportation (3 items; e.g., "During the past year how often have you used public transportation? h"). Due to insufficient internal consistency of most subscales (conservation $\alpha=0.49$; environmental citizenship $\alpha=0.48$; transportation $\alpha=0.29$) with the exception of food choices

($\alpha=0.69$), the total score of the PEBS was employed for the analysis ($\alpha=0.67$).

Environmental attitudes

One of the most used tools to measure environmental attitudes is the New Ecological Paradigm Revised (NEP-R; Dunlap et al., 2000), which was developed to reflect an implicit cognitive tendency to value and respect nature and to develop a pro-environmental orientation. In this study the Italian version of the instrument was used (Prati et al., 2011). The latter consisted of 15 items (e.g., "We are approaching the limit of the number of people the earth can support"; "Humans were meant to rule over the rest of nature") rated on a five-point Likert scale, ranging from 1 (strongly agree) to 5 (strongly disagree). Since even-numbered items reflect a non-ecological attitude, they are reversed so that a total score represents a pro-environmental attitude. In addition, it is recommended to use the total score because there is no consensus on how many and which sub-dimensions the NEP-R can identify (Dunlap et al., 2000). In the present study, the scale was found to be reliable ($\alpha=0.74$).

Affective valence

The short version of the View Of Context (VOC; Ciavolino et al., 2017) questionnaire was used to detect affective valence. The VOC is an instrument used to map cultural worldviews (operationalized in terms of symbolic universes) and, among others, the dimension of affective valence that organize them. The present study focuses on the latter aspect, specifically on the valence of affect, that is, the interpretation of the context related to the pleasantness-unpleasantness dimension, which previous applications of the VOC have systematically identified with the first factorial dimension extracted (Salvatore et al., 2019; Veltri et al., 2019).

In the VOC, the extraction of the factorial dimensions is done performing a Multiple Correspondence Analysis (MCA) on the 29 items (e.g., "Sometimes one has to break the rules to help one's loved ones"; "Those who succeed in life have luck on their side") and the 4 response modalities of the instrument (from 1 = strongly disagree to 4 = strongly agree).

The items of the VOC act as proxies of deeper, pre-reflective affective meanings (Salvatore et al., 2024; Valsiner, 2007). According to the SCPT and the Affective Pertinization (APER) model (Salvatore et al., 2024), affective valence is not a discrete emotion but a basic, embodied form of sensemaking that grounds and structures our entire experience of the world (Salvatore et al., 2024). It is a global interpretation of the context as being essentially "good"

(supportive, trustworthy, meaningful) or “bad” (threatening, chaotic, unreliable). This fundamental interpretation in terms of affective valence is not directly accessible through self-report questions about affect. Instead, it is expressed and can be inferred through the way individuals characterize their broader reality. Therefore, agreement with statements like “Trying hard is useless because you cannot affect what will be” or “These days a person doesn’t really know whom he can count on” is not interpreted here as a cognitive belief. Rather, it is seen as an expression of a pervasive, negative affective valuation of one’s context (i.e., the “bad” pole of the affective valence dimension). Conversely, endorsing items indicating trust, control, and reliability reflects the positive (“good”) pole of this same affective valence dimension.

The VOC has already been used with the purpose of detecting and analyzing the effect of affective dimensions. Specifically, a previous study showed that negative valence discriminated among regions with a higher percentage of “leave” votes in the Brexit referendum (Veltri et al., 2019). Overall, the VOC questionnaire was found to have satisfactory construct validity and internal consistency ($\alpha=0.70$) (Ciavolino et al., 2017).

Data analysis

To identify the affective dimension corresponding to valence, an MCA was performed on the participants’ responses to the VOC questionnaire. In this study, attention was paid to the first factorial dimension extracted, which, consistent with previous work, was found to correspond to the interpretation of context in terms of affective valence. Each participant’s coordinate on this first dimension was extracted and used as their individual score for the Affective Valence (AV) variable in all subsequent analyses. It follows that the more an individual’s coordinate saturates (i.e., is located toward) a given factorial pole, the more they are characterized by and represent that specific affective valence. This analysis was performed using SPAD software (version 5.5).

To test the hypotheses, a GLM was performed with pro-environmental behaviors as dependent variable, environmental attitudes as independent variable and affective valence as moderator. Data analyses were conducted using Jamovi statistical software (version 2.5.4).

Results

The first dimension extracted from the MCA (Table 1), which explained 44.08% of inertia (cf. Benzecri, 1992), corresponded to the affective valence (AV) in that the

Table 1 Item and respective characteristic modalities of the affective connotation of the context in terms of Valence

Negative pole (-): Good		
Item	Modality	Test value
For success in life, how important is: Sharing	Very	-16.79
Trying hard is useless because you cannot affect what will be	Strongly disagree	-15.19
It’s hardly fair to bring children into the world, the way things look for the future	Strongly disagree	-14.88
People are unable to change	Strongly disagree	-14.09
These days a person doesn’t really know whom he can count on	Quite disagree	-13.99
To a great extent, my life is controlled by accidental happenings	Strongly disagree	-13.99
How reliable is: Health care services	Very reliable	-13.88
For success in life, how important is: Having few scruples	Not at all	-13.76
My life is chiefly controlled by powerful others	Strongly disagree	-13.72
How reliable is: Schools	Very reliable	-13.51
Central zone		
How will the place you live in be in next 5 years	Much worse	13.52
For success in life, how important is: Sharing	A little	14.17
Trying hard is useless because you cannot affect what will be	Quite agree	14.75
Nowadays a person has to live pretty much for today and let tomorrow take care of itself	Strongly agree	15.06
There’s little use in writing to public officials because often they aren’t really interested in the problems of the average man	Strongly agree	15.32
How reliable is: Public Administration	Not at all reliable	16.47
In spite of what some people say, the lot of the average man is getting worse, not better	Strongly agree	16.49
For success in life, how important is: Forming alliances with stronger people	Very	17.54
These days a person doesn’t really know whom he can count on	Strongly agree	17.89
For success in life, how important is: Having few scruples	Very	18.65
Item	Modality	Test value

Positive pole (+): Bad

^a Each pole contains the 10 most representative items. The table should be seen as a continuum from the negative to the positive pole

combination of the VOC items and the response modalities referred to the affective connotation of the world in terms of good-bad.

By checking the necessary assumptions to perform the GLM, it was found that the Breusch-Pagan test for the homogeneity of the variance of the residuals was not significant, indicating no heteroschedasticity ($\chi^2[3]=1.29$,

$p=0.732$). The dependent variable followed a normal distribution and the levels of VIF and Tolerance indicated no collinearity between NEP-R (VIF=1.03; Tolerance=0.97), AV (VIF=1.00; Tolerance=1.00) and the NEP-R*AV interaction term (VIF=1.03; Tolerance=0.97).

The results of the moderation analysis performed with NEP-R as independent variables, PEBS as dependent variable, and AV as moderator showed that the model was statistically significant ($R^2=0.07$, $F[3]=40.47$, $p<0.001$). The AV was able to increase the explanatory power of the model, as the change in R^2 values and the associated F were significant ($\Delta R^2=0.02$, $F[2]=22.0$, $p<0.001$).

As shown in Table 2, a significant relationship emerged between NEP-R and PEBS ($\beta=0.217$, 95% CI [0.216, 0.333], $p<0.001$), between AV and PEBS ($\beta = -0.144$, 95% CI [-3.832, -1.988], $p<0.001$), and between the NEP-R*AV interaction term and PEBS ($\beta = -0.043$, 95% CI [-0.229, -0.019], $p=0.020$).

As shown in Table 3; Fig. 1, for mean values of the moderator, the relationship between NEP-R and PEBS was significant ($\beta=0.217$; $p<0.001$), and for each one standard deviation decrease in the value of the moderator (i.e., the greater salience of the good dimension corresponding to the negative pole of the factor), this relationship strengthened significantly ($\beta=0.260$; $p<0.001$), while it weakened ($\beta=0.174$; $p<0.001$) for each one standard deviation increase in the moderator value (i.e., the greater salience of the bad dimension corresponding to the positive pole of the factor)..

Discussion

The present study analyzed the determinants of pro-environmental behaviors adopted by company employees in their private life, aiming to identify the factors that promote

sustainable practices beyond the workplace. Specifically, the research examined the relationship between pro-environmental attitudes and behaviors, and whether affective valence - conceived as a primitive and basic mode of sense-making - had an effect on this relationship (Barrett, 2006; Salvatore et al., 2024).

To this end, two hypotheses were formulated and tested. The first hypothesis (H1) expected that positive environmental attitudes would be associated with higher levels of pro-environmental behavior. The second hypothesis (H2) assumed that the relationship between attitudes and behaviors would be moderated by affective valence.

The results of the analysis conducted using a general linear model confirmed the first hypothesis, showing that high levels of environmental attitudes are significantly associated with an increase in pro-environmental behavior. This finding is in line with evidence from previous studies, which have reported a positive relationship between ecological attitudes and sustainable behavior. Indeed, such association has been found not only within local communities (Batool et al., 2023), but also in different social groups, such as football fans (Cayolla et al., 2023) and university students (Cayolla et al., 2023; Tamar et al., 2020) and in cultural contexts even very different from each other (Miller et al., 2022).

The findings confirmed the second hypothesis of our study. It emerged that affective valence significantly moderated the relationship between pro-environmental attitudes and behaviors. In particular, the analysis showed that a positive valence (i.e., good polarity), strengthened the effect of attitude on behavior. On the contrary, a negative valence (i.e., bad polarity) weakened this relationship.

This result aligns with previous research underscoring the role of affect in promoting or hindering pro-environmental behavior. For example, experimental studies have shown that the positive effect predicted the individual behavioral

Table 2 Parameter estimates of the tested model

	B	SE	95% Confidence Intervals		β	df	t	p
			Lower	Upper				
(Intercept)	44.699	0.206	44.295	45.103	0.001	1720	216.929	<0.001
NEP-R	0.274	0.030	0.216	0.333	0.217	1720	9.166	<0.001
AV	-2.910	0.470	-3.832	-1.988	-0.144	1720	-6.190	<0.001
NEP-R*AV	-0.124	0.053	-0.229	-0.019	-0.043	1720	-2.325	0.020

^a NEP-R: environmental attitude, *PEB* pro-environmental behavior, *AV*: affective valence

Table 3 Parameter estimates for the simple effects of NEP-R on PEBS at different levels of affective Valence

Moderator	Effect	B	SE	95% Confidence Intervals		β	df	t	p	
				Lower	Upper					
AV	Mean - 1SD	NEP-R	0.329	0.041	0.248	0.410	0.260	1720	7.972	<0.001
	Mean	NEP-R	0.274	0.030	0.216	0.333	0.217	1720	9.166	<0.001
	Mean + 1SD	NEP-R	0.220	0.035	0.152	0.287	0.174	1720	6.366	<0.001

^a AV: affective valence; SD: standard deviation

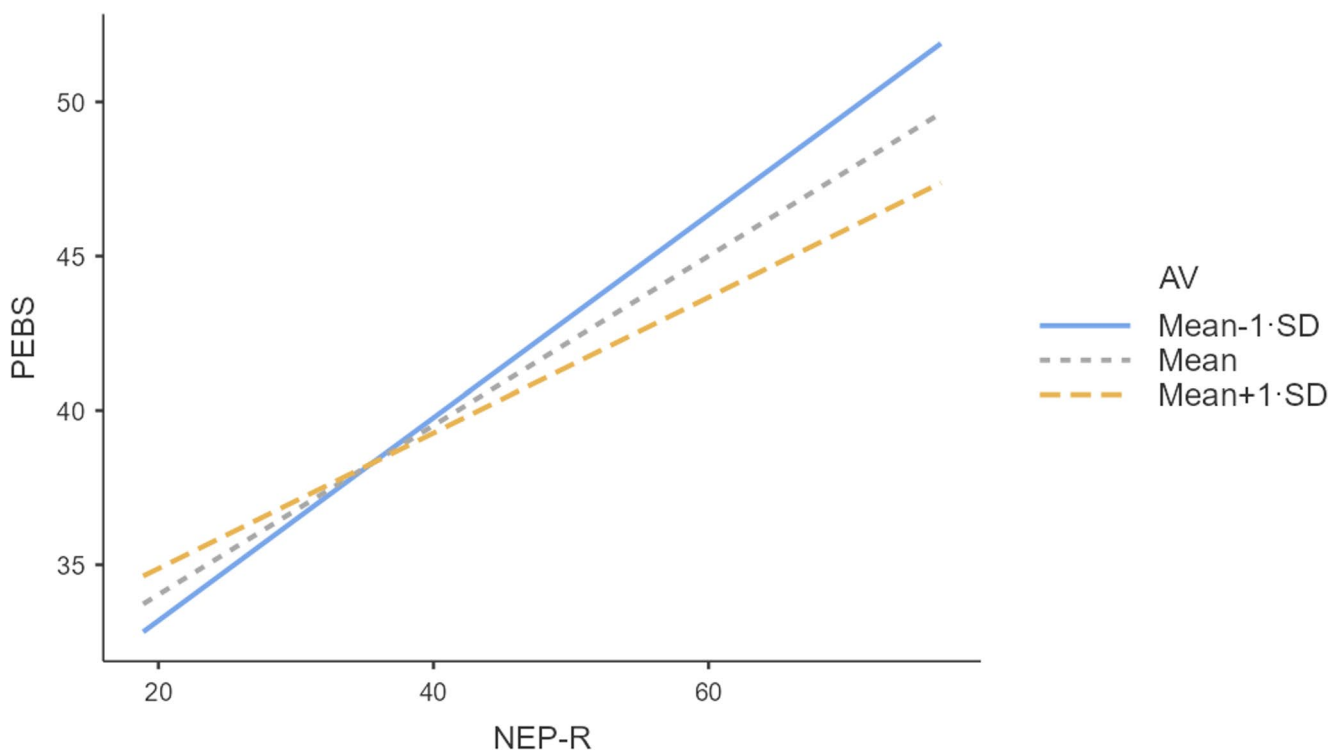


Fig. 1 Simple slope plot of the relationship between NEP-R and PEBS for different values of affective valence. *Note.* NEP-R: environmental attitude; PEB: pro-environmental behavior; AV: affective valence. The X-axis is in the NEP-R original scale

impact of intervention strategies based on the positive emotions derived from environmental messages (Doell et al., 2021). Chatelain et al. (2018) showed that participants exposed to awareness messages formulated in affectively positive terms showed a greater propensity to adopt pro-environmental behaviors than those who received messages with negative connotations. Similarly, Huoponen (2024) showed that, in a school context, negative affect represents an obstacle, inhibiting the adoption of pro-environmental behavior among adolescents.

An alternative explanation to our findings concerns the role of discrete negative emotions, such as guilt or eco-anxiety, which previous studies have shown to sometimes promote pro-environmental intentions and behaviors (e.g., Shipley & van Riper, 2022; Sari et al., 2024). From the perspective of the SCPT and the APER model, this does not contradict our results. Affective valence is not equivalent to discrete emotions but represents a pre-reflective interpretive ground that regulates the pertinence of attitudes. A negative affective valence weakens the translation of pro-environmental attitudes into behavior because it reduces their salience and motivational power. However, discrete negative emotions may act through different pathways - such as moral obligation or urgency - independently of attitudes. This distinction helps to clarify why, in our data, negative valence attenuated the attitude-behavior link, while in other

contexts discrete negative emotions can nonetheless stimulate sustainable actions.

From a theoretical point of view, this result is in line with the SCPT framework, according to which the consistency between attitudes and the dimension of affective valence increases the ability of the former to act as a driver of behavior (Cremaschi et al., 2021). In this sense, the affective valence does not directly guide the interpretation of a specific object, but influences its salience, making attitudes more relevant in determining behavior.

Overall, these findings have important practical implications for the promotion of pro-environmental behavior in companies. Traditionally, such initiatives have been based on information campaigns, workshops or feedback interventions (Nguyen et al., 2024). However, our results – in line with experimental studies showing that responsiveness to messages is influenced by positive affect (Doell et al., 2021; Chatelain et al., 2018; Ibanez et al., 2017) – emphasize the importance of giving the messages of awareness campaigns a positive affective valence to effectively encourage the adoption of sustainable behaviors.

This evidence supports the Broaden-and-Build theory (Fredrickson, 2001), which posits that positive affect broadens thought patterns and fosters the exploration of new perspectives and behavioral strategies. Furthermore, recent studies indicate that some people experience positive

emotions after adopting sustainable behaviors, which reinforces their motivation to repeat these actions to obtain internal gratification (Doell et al., 2021). This mechanism triggers a positive feedback loop, consolidating the expectations of well-being associated with pro-environmental behaviors and incentivizing their repetition over time.

In addition, exposure to the sustainable behavior of others can generate positive affective changes, helping to further spread these practices (Doell et al., 2021). This suggests that promoting positive affect could not only directly incentivize those already inclined toward sustainable behavior, but could also indirectly act on less-inclined individuals through the social influence exerted by those who adopt such practices.

This study has some limitations. In particular, the cross-sectional design of the study does not allow the effect of attitudes on pro-environmental behaviors to be assumed as predictive. However, this relationship is consistent with a large literature that has shown the influence of pro-environmental attitudes on behaviors (Batool et al., 2023; Casaló & Escario, 2018; Cayolla et al., 2023; Miller et al., 2022; Tamar et al., 2020).

Another limitation concerns the reliability of the instruments used. The Pro-Environmental Behaviors Scale showed low internal consistency in most subscales ($\alpha < 0.50$), preventing a detailed analysis of specific behavioral domains. Consequently, only the total score was used ($\alpha = 0.67$). While this value is marginally acceptable (Hair et al., 2021), it requires caution in interpreting and generalizing the findings. In addition, an important limitation concerns the use of self-report instruments, which can be influenced by social desirability bias (Durmaz et al., 2023). Although Milfont (2009) has shown that social desirability has a limited direct impact on environmental attitudes and not on ecological behaviors, the use of self-reported measures nevertheless leads to a reduction in the ecological validity of the results, since there is evidence that self-reported pro-environmental behavior in hypothetical scenarios does not always accurately predict actual behavior (Lange et al., 2023). To overcome this limitation, future studies could integrate self-report instruments with other methods, such as direct observations, implicit measures or field experiments, in order to improve the accuracy in measuring pro-environmental behaviors.

A further limitation concerns the nature of the sample. The study was conducted with employees of Italian companies, recruited through convenience sampling, with a response rate of about 15%. This context offered the advantage of a relatively homogeneous group in terms of sustainability knowledge, which allowed us to reduce potential confounding factors and better test the theoretical assumptions of SCPT. However, this strength also represents a limitation: the focus on corporate employees may restrict

the generalizability of the findings to the broader population, where variability in socio-economic conditions, education, and cultural background could have an effect in the processes under investigation. In addition, the voluntary participation and relatively low response rate may have introduced a self-selection bias, with individuals more sensitive to environmental issues being more likely to take part in the study. Future research should therefore replicate these analyses with more diverse and representative samples to assess the robustness and generalizability of the observed effects across different populations and contexts.

Despite these limitations, the present study has several strengths. First, while most research has focused on the direct influence of affect on behavior, this work highlights the role of positive affective valence as an indirect factor in promoting pro-environmental behaviors. Furthermore, the study is based on a large sample and diverse sample of employees of companies operating at a national level, characterized by a high heterogeneity in terms of demographic variables such as level of education, place of residence and marital status.

These findings provide valuable guidance for future research. It would be desirable to conduct longitudinal studies in order to investigate causal relationships within the tested model. Furthermore, a more in-depth analysis of the complex interaction between the dimension of affective valence, psychological factors, socio-demographic variables and contextual characteristics could contribute to a more comprehensive understanding of the determinants of pro-environmental behavior. Finally, future research could investigate if and how affective valence influences specific attitudes toward different types of sustainable actions, as well as their translation into concrete behaviors.

Acknowledgements The authors thank all the firms (A2A, Almaviva, Autostrade per l'Italia, Automobili Lamborghini, Banco BPM, BNP Paribas, Cassa Depositi e Prestiti, CELLNEX Italia, DAB Pumps, ENI Plenitude, Ericsson, Fastweb, Gruppo Hera, Gruppo IREN, NTT Data, Philips, Telepass, TIM, Tinexta, WindTre) that participated in this study. The author Giulia Ballarotto acknowledges PON "Ricerca e Innovazione" 2014–2020 (PON R&I FSE-REACT EU), Azione IV.6 "Contratti di ricerca su tematiche Green" to fund and support the research, and the company Bloom Ltd that participated with co-funding.

Author contributions Conceptualization: GB, PV and SS; Data collection: GB and PV; Methodology: SS; Formal analysis: GB and MR; Supervision: PV and SS; Visualization: MR; Writing—original draft: GB and MR; Writing—review & editing: all authors. All authors have read and agreed to the published version of the manuscript.

Funding PON "Ricerca e Innovazione" 2014–2020 (PON R&I FSE-REACT EU), Azione IV.6 "Contratti di ricerca su tematiche Green", and the company Bloom Ltd funded and supported the research.

Data availability The datasets generated during and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Declarations

Competing Interests The authors report there are no competing interests to declare.

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