

Article

Exploring How Implicit and Explicit Attitudes Relate to Pro-Environmental Behaviors: The Mediating Role of Environmental Moral Disengagement

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Abstract

The present study aims to contribute to a better understanding of the attitude–behavior link in the sphere of environmental issues by taking into account the role of moral disengagement. Pro-environmental attitudes, at both the implicit and explicit levels, were considered under the hypothesis that they may have direct and indirect effects on pro-environmental behaviors (PEBs) through moral disengagement. The hypothesized relationships specified in the mediation model were tested by administering a cross-sectional online survey to a convenience sample of adult students enrolled in a digital university ($N = 176$; $M_{age} = 40.54$, $SD_{age} = 14$) via Millisecond Inquisit Web. The assessment included instruments measuring environmental moral disengagement and explicit attitudes toward the adoption of PEBs, together with an ad hoc Implicit Association Test designed to capture implicit attitudes toward sustainability, and the use of a pro-environmental behavior rating scale. While the sensitivity to model misfit was limited given the achieved sample size, the results from the path analysis show that implicit attitudes do not have a direct effect on PEBs, while explicit attitudes directly influence them. Moreover, as positive explicit and implicit pro-environmental and sustainability attitudes increase, moral disengagement decreases, which in turn negatively affects PEBs. Overall, the present findings confirm that moral disengagement plays a mediating role, and that attitudes can be targets for potential interventions aimed at promoting pro-environmental behaviors and addressing justificatory mechanisms that hinder their adoption.

Keywords: pro-environmental behavior; moral disengagement; attitudes; implicit; sustainability



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1. Introduction

When introducing the role of moral disengagement with environment and sustainability issues, Bandura [1] stated that “the global ecological problem is too serious and the time for corrective action too short to continue playing the skeptic game” (p. 20). Moral disengagement is the socio-cognitive process through which individuals distance themselves from environmental concerns by minimizing or even denying the effects of

their actions, including those on potential victims, by displacing and diffusing responsibility, and by reinterpreting what they do (or do not) for the environment. This occurs despite the increasingly evident costs of climate change for the planet, the most vulnerable ecosystems, and the poorest countries [2–4]. Nearly two decades after Bandura’s statement, the effective resolution of environmental issues remains far from achieved. Such a “skeptical game” persists, often sustained by economic and political logics that are largely beyond the influence of ordinary citizens.

Despite this, over recent years, several studies have shown that citizens themselves can also play an active and decisive role by adopting pro-environmental behaviors [5]. These are everyday actions that everyone can adopt and that can foster sustainable behavior [6]. Nonetheless, their adoption requires effort and a change in habits, which can be hindered by various barriers—including psychological ones [7]. In line with other studies in environmental psychology [8,9] and Bandura’s theory [10,11], we argue that moral disengagement may represent a barrier to pro-environmental behaviors in a person’s daily life, and that it is necessary to understand how it may hinder pro-environmental intentions by acknowledging the potential automaticity of these mechanisms as well as their intervening role between explicit beliefs and deliberate behaviors.

To this end, the present study examines the pathway from explicit and implicit attitudes to pro-environmental behaviors, considering moral disengagement in relation to environmental-related actions as a mediating factor—a relationship that, to the best of our knowledge, has not been simultaneously explored in previous research. The role of attitudes in determining pro-environmental behavior is well established, but it is also recognized that this influence may not be direct [7]. In line with findings from other areas of psychological research [12,13], we propose that moral disengagement may intervene in the attitude–behavior link in the case of pro-environmental behaviors. Specifically, we argue that positive attitudes toward pro-environmental behaviors can promote these behaviors not only directly but also indirectly by reducing moral disengagement, which otherwise hinders their enactment. Indeed, moral disengagement is shaped by individuals’ evaluative and motivational dimensions [12,14,15], and pro-environmental attitudes represent evaluative schemas that reflect the direction of individuals’ motivation in prioritizing (or not) issues related to preserving nature, biodiversity, and, more broadly, the transcendence of immediate human interests in favor of the well-being of the planet and others [16–18]. With regard to the role of implicit attitudes, these have been less frequently examined in the pro-environmental literature, whereas explicit attitudes have been widely investigated [19–22]. However, as suggested by Steiner and colleagues [23], it is necessary to address the potential incongruence and the different ways in which explicit and implicit attitudes operate. Explicit attitudes indeed can be influenced by social desirability; moreover, people’s evaluations are not always conscious and may operate automatically, irrespective of what they report. Therefore, assessing evaluative dimensions both explicitly and implicitly can provide valuable insights into the extent to which automatic and involuntary processes operate alongside deliberate and intentional processes driving pro-environmental behaviors.

In particular, the role of explicit and implicit attitudes in moral disengagement, and its potential mediating function with respect to pro-environmental behaviors, may indicate two ways through which environmental moral disengagement can hinder such behaviors: one grounded in the rationalization of a conscious stance toward environmental issues, and the other in post hoc justifications of implicit, associative evaluative schemas that could operate outside of conscious awareness.

More broadly, the present study intends to provide both theoretical and practical contributions to the existing body of research. Theoretically, it aims to enhance our un-

derstanding of how these mechanisms can be influenced by evaluative schemas, which, compared with other individual dimensions such as values or personality traits [15,24,25], remain relatively understudied. Specifically, we argue that moral disengagement is the mediating process through which conscious and automatic evaluative schemas jointly shape behavior within a single structural model. This integrative framework has been generally overlooked in the literature and, to our knowledge, has not yet been explored in the field of environmental issues. Moreover, focusing on implicit attitudes expands an emerging body of research suggesting that moral disengagement mechanisms may operate as self-serving heuristic processes [26,27]. The importance of such individual-level heuristics is increasingly recognized as a key driver of complex outcomes, not only in personal behavior but also in high-level organizational strategy [28]. From a practical standpoint, this type of investigation could provide guidance on how to promote pro-environmental behaviors and overcome the barrier posed by moral disengagement by designing interventions aimed not only at changing conscious attitudes but also at recognizing automatic processes that may be linked to external triggers, e.g., advertisements [4]. This dual perspective will help clarify how and why moral disengagement processes can be activated when pro-environmental choices are not made, even when such choices are explicitly evaluated as desirable.

1.1. Pro-Environmental Behaviors

On a global scale, numerous human behaviors exert a significant impact on the environment. Issues such as pollution, global warming, and biodiversity loss are closely linked to unsustainable practices and habits perpetuated by individuals and societies. In addition, global macroeconomic expansion fuels the ever-increasing exploitation of energy resources, thereby aggravating these challenges. In response, the concept of pro-environmental behavior has emerged as a central research paradigm [29,30].

Pro-environmental behavior can be broadly defined as a set of behaviors aimed at reducing or minimizing the ecological footprint of human activity. These actions are undertaken consciously by individuals to mitigate environmental damage or enhance ecological quality [7]. Steg and Vlek [31] refined this definition by emphasizing behaviors that “harm the environment as little as possible, or even benefit the environment”. In line with this, Kaiser and colleagues [32] identified six broad domains of pro-environmental behaviors: the consumption of goods, recycling, waste-related behaviors, energy use, transportation, and social activism. Examples range from environmental activism (e.g., participation in ecological organizations) to non-activist public actions (e.g., signing petitions), private practices (e.g., conserving energy or purchasing recycled products), and even organizational initiatives such as eco-sustainable product design [33].

Beyond these psychological and behavioral classifications, policy frameworks also provide useful lenses for categorizing pro-environmental behavior. The European Green Deal [34] identifies eight strategic areas (climate change, clean energy, circular economy, green building, smart mobility, farm-to-fork, biodiversity, and zero pollution) which represent collective targets for sustainable transitions. While distinct from psychological taxonomies such as those proposed by Kaiser and colleagues [32], these areas highlight the broader societal and institutional dimensions within which individual pro-environmental behaviors are situated [35,36].

Understanding the mechanisms underlying pro-environmental behavior requires analyzing both motivations and constraints. Kollmuss and Agyeman [7] introduced the concept of pro-environmental consciousness to describe the complex interplay of factors that foster or inhibit sustainable choices. According to Diekmann and Preisendörfer [37], adoption is more likely when behavioral costs (whether financial, temporal, or effort-related) are perceived as low. For instance, the provision of recycling bins in schools or universities

constitutes a low-cost practice that can foster wider engagement [38]. Once embedded into daily routines, such behaviors may become habitual, reinforcing automatic decision-making processes [39,40]. Indeed, habits can function both as facilitators and barriers: while they can strengthen sustainable practices, entrenched routines often represent major obstacles to behavioral change [41]. To address this, the authors of [42] recommend targeting habits directly through contextual changes and substitution strategies that reorient automatic responses.

Finally, pro-environmental behaviors are rarely motivated by environmental concern alone. As Bamberg and Möser argue [22], they often arise from a combination of personal benefits and prosocial motivations. Prosocial motives include concern for others or for nature as a whole, as in the case of cycling to work primarily to reduce air pollution and its health risks to others. Explicit attitudes also play a role as they shape individuals' evaluations of behavioral options and reflect underlying value orientations. However, motivational factors alone do not guarantee consistent pro-environmental action: psychological processes, contextual constraints, and non-deliberative mechanisms significantly mediate the translation of convictions into behavior [43,44].

1.2. Moral Disengagement with Environmental Harm

The concept of moral disengagement was introduced by Albert Bandura within his theory of moral agency [10,45]. According to Bandura, adopting moral behavior or refraining from harmful and immoral actions requires more than good principles and intentions. The gap between professing ethical values and acting accordingly is often bridged by self-exonerating processes that silence internal moral regulation, allowing individuals to engage in behaviors that they would otherwise judge as wrong or even reprehensible in different contexts or toward others. Based on Bandura [45,46], moral disengagement can be defined as a set of cognitive mechanisms, learned and transmitted through social interactions, through which individuals rationalize, normalize, justify, and absolve themselves of responsibility for unethical behavior enacted in pursuit of self-interested needs or goals. These mechanisms allow individuals to maintain their self-esteem and moral self-image even when engaging in actions that contradict their moral beliefs, without experiencing guilt, remorse, or embarrassment. More specifically, moral disengagement operates through a set of eight mechanisms that intervene at different levels of behavioral regulation: conduct, agency, outcome, and target. At the level of conduct, moral justification, euphemistic labeling, and advantageous comparison allow individuals to reinterpret their actions, making them morally acceptable, reducing their severity, or altering their meaning through the use of deceptive language. At the level of agency, displacement of responsibility and diffusion of responsibility enable individuals to externalize accountability (e.g., attributing it to group dynamics or authority figures), thereby weakening the role of personal intention and agency in executing the behavior and its consequences. At the level of outcome, minimizing or even denying the effects of one's actions reduces the perceived impact of harmful behavior. Finally, at the level of target, blaming the victims and dehumanizing them shifts the perceived cause of one's actions onto those who suffer from them, portraying them as instigators rather than as victims. These mechanisms can also operate at an implicit level, intervening automatically and influencing the adoption of real negative behaviors that individuals would not report [26]. They may be triggered by implicit cognitions that facilitate their use and translate them into actions [47].

The scientific literature on moral disengagement has significantly increased in recent decades, highlighting the disinhibitory power of this psychological process in various areas of life [48]. In the field of environmental issues, moral disengagement has recently received increasing attention, and Bandura's theory has been invoked to explain environmentally

damaging behaviors and systems, particularly those related to climate change [1,49]. It was Bandura himself who raised awareness about the importance of addressing this phenomenon, stating that “if we are to be responsible stewards of our environment for future generations, we must make it difficult to disengage moral sanctions from ecologically destructive practices” [1] (p. 32). Moral disengagement is one of the mechanisms invoked to understand the motivational gap in climate change, referring to the processes that explain the discrepancy between awareness of the effects of climate change and the lack of motivation and action aimed at reducing the threat of such impacts. These mechanisms allow individuals to continue maintaining harmful habits that damage the environment rather than engaging in fundamental lifestyle changes or policies to mitigate the threat of climate change [49]. It is this mechanism that makes it more difficult to resolve the inconsistency between people’s concern for the environment, animal welfare, and health on one hand and practices related to food choices, transportation, and behaviors that could be considered far from pro-environmental. By disengaging from guilt and self-censorship, the rationalizations generated by moral disengagement allow harmful and unsustainable consumer choices [8,50], consumerist lifestyles characterized by frequent air travel [4], and high greenhouse gas emissions [51] to persist, without individuals being held accountable for the climate damage resulting from their behaviors.

In the insightful work by Peeters and colleagues [49], it is highlighted that in discussions on climate change, which is framed as a moral issue, arguments can be raised that are not entirely invalid but misleading, and their application serves to exempt individuals from the consequences of their actions, facilitated by the use of moral disengagement mechanisms. Through these mechanisms, individuals can avoid confronting these issues, allowing them to sustain a consumptive lifestyle with high greenhouse gas emissions without feeling or being held accountable for the harmful effects, both immediate and long-term. To provide some examples of how moral disengagement operates in this context, some studies consider, for instance, that moral justification can be used to justify flying for work purposes, as seen in the case of academics who, ironically, often discuss how to teach others to be sustainable [52]. Another example, related to advantageous comparison, concerns dietary habits, where individuals compare their own practices to those of local contexts (e.g., the usual meat consumption in certain countries like the USA compared to others); however, the environmental issue is not local, but global [49]. Mechanisms related to agency are also quite prevalent, as it seems that individuals can excuse themselves from taking action to combat climate change by shifting the responsibility onto others (e.g., consumers blame industries, and industries justify their actions based on market demands tied to consumer habits).

Daily life choices, including electronic device usage, energy consumption, and dietary habits, have been investigated in recent research involving local communities from six European schools and universities in Italy, Spain, Finland, Serbia, Greece, and Romania [53]. These individual behaviors are generally perceived as easy to perform and do not require complex knowledge or skills. While participants recognized the positive impact of their pro-environmental behaviors, maintaining these actions as habits within their daily routines still required effort. Moreover, since most participants’ social contexts did not promote pro-environmental behaviors as social norms, they often felt unmotivated or unsupported in pursuing and adopting pro-environmental practices. In such situations, it is possible that individuals may engage in subtle forms of moral disengagement, for instance by rationalizing occasional lapses in this kind of behavior.

All of these processes suggest that no one needs to change until everyone else does first [49,54]. “Shifting of responsibility shows a quasi-circular dynamic of being shifted from all actors to all, [. . .] to consumers, politics, and economic forces” [55]. In terms of

consequences, there are institutional and popular communications aimed at minimizing or discrediting scientific evidence that warns about the consequences of not addressing the damage caused by industrialization, the market, and conditioned habits which are harming everyone, especially poorer and more vulnerable countries, future generations, and the ecosystems of which we are a part as temporary guests. A final example, thinking of potential victims of this process, is the dehumanization and denigration of youths who seek to address environmental issues and act morally, or, in relation to preserving biodiversity and other species, the perception of animals not as living beings but as inanimate objects devoid of emotions, pain, fear, or suffering [56].

As in other research fields, moral disengagement also acts as a mediator in the domain of environmental issues, functioning as an intermediary process between thought and action—in this case, between beliefs about the causes of climate change and pro-environmental behavior [9]. This suggests that it is a process that can be modified by altering its antecedents, such as individual and social conditions. However, if favorable conditions for moral disengagement persist, the chronic use of these mechanisms can progressively silence the moral problem, making it more acceptable and normalized, and reducing the discomfort associated with the discrepancy between what should be done and what is not being done [55]. As scholars in environmental psychology argue, non-pro-environmental behaviors are highly normalized within society, and moral disengagement helps to explain the passive avoidance of cognitive dissonance between knowledge and behavioral choices which are made according to the principle of minimal cognitive effort. When this process is repeated over time, it leads to a diminished perception of the immorality of behaviors harmful to the environment and all organisms inhabiting it, including humans [57]. Therefore, understanding how to counteract these mechanisms is both necessary and urgent.

1.3. Attitudes Towards Pro-Environmental Behavior

Attitudes are generally understood as evaluative tendencies directed towards objects, people, or situations, i.e., the tendency to attribute a positive, neutral, or negative valence to something or someone [58]. The explanatory and predictive role of attitudes toward behavior is well known in the relevant literature [20]. Attitudes toward a behavior are closely related to the behavioral beliefs held by the person, i.e., an individual's beliefs about the likely consequences of performing the behavior [20,21]. As shown by the example of De Leeuw and colleagues [59], a stronger positive attitude toward pro-environmental behaviors will also be associated with a stronger belief toward the actual possibility of causing positive effects as a result of adopting pro-environmental behaviors. In contrast, an individual's attitude will be primarily unfavorable if a certain behavior is associated with a belief related to predominantly negative consequences, outcomes, or effects. As demonstrated by Breckler [60], attitudes include affective, behavioral, and cognitive components, indicating that individuals with stronger attitudes also tend to have stronger beliefs about the attitude object. This suggests that high-strength attitudes are associated with more consistent and predictable behavioral manifestations and a correspondingly aligned cognitive belief system.

More recent research has confirmed that positive attitudes toward environmental conservation and sustainability strongly predict pro-environmental behaviors. For instance, favorable attitudes regarding recycling, energy conservation, and the purchase of environmentally friendly products have been linked to the likelihood that these actions will be carried out [19]. Cheung et al. [61] have shown that positive attitudes toward recycling directly improve rates of participation in this form of pro-environmental behavior. Similarly, studies by Fielding and Hornsey [62] and Bøhlerengen and Wiium [63] have linked

strong environmental attitudes to higher levels of environmental activism and sustainable behaviors in general, suggesting the effectiveness of targeting these attitudes in environmental education and policy-making to foster more sustainable lifestyles. Moreover, it is well known that when individuals perceive a particular pro-environmental behavior as favorable, positive, or beneficial, they are more likely to adopt it, even in situations that involve personal, economic, or time costs [22].

Attitudes have been assessed primarily through that set of deliberate and conscious evaluations made regarding a topic, person, or object in response to a specific and direct question [20]. However, these explicit attitudes are subject to social desirability and impression management biases, since it is known that people tend to respond in a way that reflects what they believe is expected of them [64]. In addition to this, the existence of a different type of evaluative process, known as implicit attitudes, has been hypothesized, which often operates outside of conscious awareness and is activated by a more automatic, heuristic, and fast information processing mechanism [65]. These attitudes, called implicit attitudes, have been (and still are) extensively studied in the relevant literature, as under certain conditions it is posited that they might influence behavior more significantly than explicit attitudes [65,66]. Such automatic evaluative tendencies are postulated to operate partially outside of awareness and are theorized to be much more resistant to self-presentation bias, which can occur when individuals wish to avoid social disapproval [67] or, for instance, project an image of environmental responsibility. In the context of environmental issues, it has already been argued that these implicit attitudes can influence a range of quick and unreflective behaviors for or against the environment [68]. For example, implicit evaluative tendencies might drive significant but quick choices, such as rapidly selecting products with sustainable packaging or buying local and organic products in the context of weekly grocery shopping [68]. In situations where consumers have to make decisions quickly, such as while shopping in crowded supermarkets, mental associations formed through exposure to previous experiences may lead individuals to prefer more or less environmentally friendly options without explicit deliberation: a consumer with a strong implicit pro-sustainability attitude might automatically opt for unpackaged fruits and vegetables while avoiding plastic-packaged options. Similarly, a positive implicit attitude toward energy efficiency may increase the likelihood that a person will turn off the lights automatically after leaving a room, a simple but effective behavior for reducing energy consumption. However, by definition of the construct, implicit attitudes cannot be measured by using direct questionnaires; therefore, specific instruments have been developed, the best known of which is the Implicit Association Test (IAT), to assess these attitudes under a weaker control of awareness [65]. The IAT is based on the premise that automatic responses may reveal preferences or biases that are more explanatory and predictive of some sensitive behaviors, which may not emerge clearly in self-report measures [67]. For this reason, the IAT assessment mechanism posits that people automatically form associations between concepts related to their cultural, social, and family experiences, and that these associations can influence behavior and decisions, often without the individual being fully aware of them [65]. Therefore, such an instrument measures mental associations between concepts and evaluations through a series of time-trialed rapid categorization exercises and is based on the hypothesis that people respond faster when they have to categorize two items perceived as related together; for example, if “sustainability” and “useful” are automatically related, their categorization will be faster than when “sustainability” is paired with “negative” [65,67,68].

Studies in other behavioral domains that examine the relationship between implicit attitude scores and their ability to predict behavior offer inconclusive results [69]. In addition, research on implicit attitudes toward sustainability presents mixed results when

assessing their relationship with explicit attitudes: In some cases, positive associations were observed with several explicit indicators, suggesting that individuals with strong explicit support for pro-environmental measures may also possess favorable automatic beliefs [68]. Other research indicates weaker or ambiguous correlations, suggesting a possible lack of alignment between conscious endorsements and automatic associations [23]. Some studies have concluded that implicit measures do not significantly predict actual pro-environmental actions or preferences, thereby indicating that explicit attitudes have greater explanatory power [70]. This apparent inconsistency reflects the complexity of interpreting the relationships among pro-environmental intentions and explicit and implicit attitudes, given that evaluations offered in response to specific sustainability questions may diverge from automatic, rapid responses that occur without extensive deliberation. Accordingly, these relationships may be mediated by more complex processes that merit further investigation.

1.4. Present Study: Aim and Hypotheses

The aim of the present study is to broaden our understanding of the role played by environmental moral disengagement in the process through which explicit and implicit attitudes toward sustainability relate to pro-environmental behaviors (Figure 1). First, in accordance with the extant literature focusing on the strong predictive power of explicit attitudes towards behavior [20,21], we hypothesize a direct positive link between favorable explicit pro-environmental attitudes and pro-environmental behaviors:

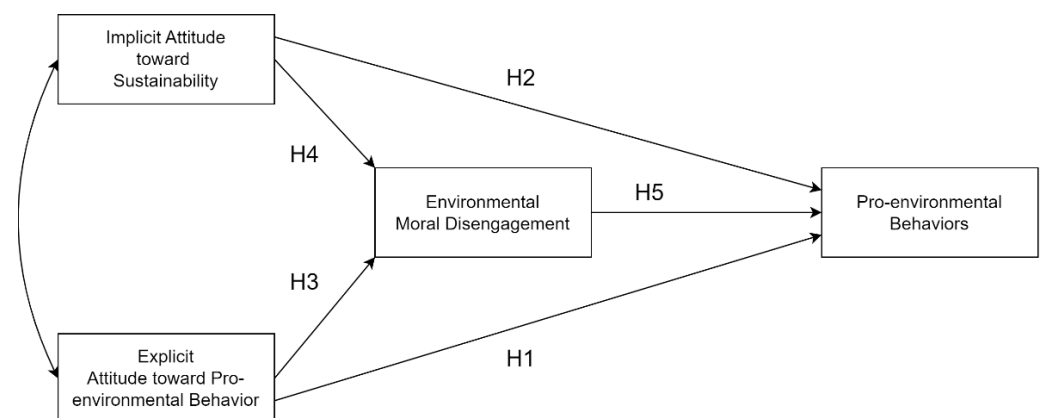


Figure 1. Hypothesized model. Single-headed arrows indicate proposed directional effects. Curved double-headed arrow indicates covariance.

H1. *As explicit positive attitudes toward pro-environmental behaviors increase, the frequency of pro-environmental behaviors increases.*

Furthermore, drawing upon previous findings that imply the influence of implicit attitudes on rapid and unexamined sustainable choices [68], we hypothesize that pro-environmental behaviors are directly positively associated with the automatic favorable associations evaluated by an implicit pro-sustainability attitude:

H2. *As implicit pro-sustainability attitudes increase, pro-environmental behaviors increase as well.*

These hypotheses are consistent with the attitude literature: people tend to act in line with what they prefer, whether those preferences are consciously endorsed or implicitly favored, including when shaped by cues or conditioning. Moreover, based on previous studies on moral disengagement and individual evaluative and motivational tendencies [12,14,15], we hypothesize that individuals who hold explicit positive attitudes

should also demonstrate a lower level of moral disengagement with the environment. Although the environmental literature has not yet reported findings on this specific link, by analogy with work on value orientations and behavioral dispositions, we expect that assigning importance to (and being generally oriented toward) prosocial behavior and collective well-being reduces reliance on moral disengagement mechanisms in the pro-environmental domain. Therefore, we hypothesize that those who hold positive views on environmental issues, i.e., those who explicitly declare them to be useful, meaningful, and important, are less likely to seek moral justification for harmful actions towards the environment:

H3. *As explicit positive attitudes toward pro-environmental behaviors increase, the level of disengagement with the environment decreases.*

Support for this hypothesis indicates that in interventions, it is important to address the foundations of attitudes, namely the values that guide individuals' evaluations.

Moreover, individuals with stronger automatic, involuntary associations between environmental sustainability and positive evaluations are likely to display lower moral disengagement with environmental issues. In other domains, research has identified an implicit dimension that can influence behavior through moral disengagement [26] and has also shown that moral disengagement can be explained by a heuristic processing style, such as a lack of cognitive reflection [27]. Although the literature is scarce in this area and the link between implicit attitudes and disengagement has not been studied in the environmental domain, it is likely that a stronger implicit positive attitude toward sustainability could, through such an automatic pathway, reduce the likelihood of resorting to cognitive justifications for the lack of pro-environmental behaviors.

H4. *An increase in positive implicit attitudes toward sustainability will result in a decrease in the use of moral disengagement with the environment.*

Support for this hypothesis suggests the need to address potential conditioning and situational cues that underpin evaluations that occur outside awareness, which may lead individuals to rely on moral disengagement mechanisms as post hoc justifications for feelings driven by implicit associations.

Furthermore, according to Bandura's theory [1,46], a negative link between environmental moral disengagement and pro-environmental behaviors is hypothesized to reflect the understanding that such cognitive self-exonerating mechanisms should, by definition, reduce moral obligations to the environment and impede pro-environmental action. Therefore, the more a person resorts to moral disengagement mechanisms to distort the moral implications of pro-environmental behaviors, the lower the likelihood of engaging in such behaviors.

H5. *As environmental moral disengagement increases, engagement in pro-environmental behaviors decreases.*

Finally, in line with the literature on moral disengagement [12,13,71], considering the entire process, we hypothesize that moral disengagement may play a mediating role in the relationship between implicit and explicit attitudes and pro-environmental behaviors. Specifically, as implicit and explicit attitudes increase, moral disengagement decreases, and this reduction is associated with more pro-environmental behaviors.

H6. *There is a significant indirect effect of explicit and implicit pro-sustainability attitudes, leading to higher pro-environmental behaviors through the reduction in environmental moral disengagement.*

Support for this hypothesis indicates that explicit and implicit attitudes operate on parallel routes under an equifinality principle, whereby they both act through the same mediating process to produce the same behavioral outcome. Evidence of mediation would strengthen the case for interventions that both counter environmental moral disengagement and promote pro-environmental behaviors by (i) targeting the determinants of proactive, deliberative action toward the environment (e.g., values, reasoning about consequences) and (ii) targeting determinants that create or activate implicit associations likely to yield more reactive, less intentionally controlled behavior (e.g., advertising-based conditioning; limited time for consumption decisions).

2. Methods

2.1. Participants and Procedure

Data collection for this study was conducted as part of the initial piloting phase within the GreenSCENT Horizon 2020 European project. Participants, students of a digital university, were recruited through convenience sampling, with recruitment conducted via institutional announcements on the university's online learning platform and email lists, resulting in a final sample of 176 subjects, of which 105 were female and the average age was 40.54 (SD = 13.91). Inclusion criteria were being of legal age, current enrollment at the university, the provision of informed consent, and the ability to complete the computer-based tasks. Data collection occurred online via the Millisecond Inquisit Web cloud platform, allowing participants to complete tests using their personal computers from their home. The administered questionnaire was entirely anonymous. Prior to participation, detailed information regarding the objectives and procedures of the study was provided, after which explicit consent to participate was obtained. Participants were clearly informed that their involvement was entirely voluntary, and that they were free to withdraw at any stage without any penalty. No participants refused participation or withdrew from the study. Upon completion of data collection, the researchers conducted a debriefing session, informing participants about the specific aims of the research and emphasizing the importance of environmental engagement. Data access was restricted exclusively to the researchers directly involved in the project. All collected data were securely stored on Millisecond's EU-based repository in Dublin. Ethical approval for this study was granted by the UAB Ethics Committee on Animal and Human Experimentation (CEEAH) under the reference number 5712 (2021).

2.2. Measures

2.2.1. Pro-Environmental Behaviors

Pro-environmental behavior was measured using a 13-item scale developed by de Leeuw and colleagues [59], chosen for its ease of administration and its content alignment with the eight areas outlined in the European Green Deal [34,35]. The items reflect different conditions under which individuals may or may not engage in specific pro-environmental behaviors in various life contexts, from routine actions to consumption styles. Examples of items are as follows: "When I'm cold, I put on a sweater instead of turning up the heat" (Zero Pollution); "I consume biological products" (From Farm to Fork); "I forget to turn off the light when I leave my room to go eat" (Climate Change). Participants rated each item on a 5-point Likert scale ranging from 1 ("Never") to 5 ("Always"). The scale demonstrated acceptable internal consistency, with a Cronbach's alpha of 0.76 and a McDonald's omega of 0.81.

2.2.2. Environmental Moral Disengagement

The scale assessing moral disengagement in environmental contexts was developed following the work of Bandura and colleagues [1,72]. To examine the mechanisms by which individuals selectively deactivate self-sanctions related to environmental harm, eight items were adapted from prior studies [25,72–74]. An example is “People cannot be accused of always using cars if public transportation services are poor.” Participants responded on a five-point Likert scale ranging from 1 (“Totally disagree”) to 5 (“Totally agree”). The scale demonstrated good internal consistency, with a Cronbach’s alpha of 0.80 and a McDonald’s omega of 0.84.

2.2.3. Explicit Attitudes Toward Pro-Environmental Behaviors

Explicit attitudes were assessed using eight items corresponding to the eight areas outlined in the European Green Deal [34]. Items were developed and adapted from prior research [59,75–77]. For example, one item stated that “For me, planting a tree would be. . .”, followed by three semantic differential scales. Participants provided their evaluations using a slider for each scale ranging from 1 to 10, with anchors ranging from unpleasant to pleasant, useless to useful, and not cool to cool. The measure demonstrated good internal consistency, with a Cronbach’s alpha of 0.88 and a McDonald’s omega of 0.93.

2.2.4. Implicit Attitudes Toward Sustainability

Implicit attitudes toward environmental sustainability were assessed using a shortened version of the Implicit Association Test (IAT) [65,78], a reaction time measure designed to evaluate the strength of automatic associations between target concepts and evaluative attributes. Participants were required to rapidly categorize stimuli and images by pressing keys that correspond to combined categories, with the underlying assumption that responses are faster and more accurate when two strongly associated concepts share the same response key (for instance, pairing a picture of a recycle bin with the word “good”), compared to when they are assigned to opposing categories (such as pairing a picture of a recycle bin with the word “bad”). In the present study, a brief version of the IAT (BIAT) [79] was used, and participants categorized a set of words carrying positive or negative valence alongside images representing either “sustainable” or “unsustainable” practices [68].

2.3. Data Analysis

First, multivariate outliers were identified by computing the Mahalanobis distance for each observation and comparing these values to the critical threshold derived from the chi-square distribution at an alpha level of 0.001. Observations with Mahalanobis distances exceeding the critical value were considered outliers and subsequently removed from the dataset [80]. Next, the distributional properties of the variables were assessed by computing descriptive statistics, including the third and fourth standardized moments, and by applying Mardia’s test for multivariate normality [81]. Zero-order correlations among the study variables were examined. Finally, the hypothesized model was evaluated using path analysis with full information maximum likelihood estimation (FIML) to assess the congruence of the proposed relationships with the empirical data.

A post hoc power analysis for the global χ^2 test of exact fit was conducted to evaluate the power, assuming a population misfit of RMSEA = 0.08. Using the specified model’s degrees of freedom ($df = 7$), sample size ($N = 176$), and significance level ($\alpha = 0.05$), the analysis yielded a critical $\chi^2(7)$ of 14.07, a non-centrality parameter of $\lambda = 7.84$, and a power of 0.49 ($\beta = 0.51$) in detecting the specified misfit. Repeating the analysis for RMSEA = 0.10 increased the non-centrality parameter to $\lambda = 12.25$ and the power to 0.72 [82].

All analyses were carried out in R using the packages *haven* [83], *dplyr* [84], *psych* [85], *mvnornalTest* [86], *lavaan* [87], *semPower* [88], and *lavinteract* [89].

3. Results

3.1. Data Screening, Descriptive Statistics, and Correlations

From the initial dataset, two observations were identified as multivariate outliers based on Mahalanobis distance criteria and were subsequently removed, resulting in a valid final sample of 174 observations. Although the univariate distributional parameters for all variables (see Table 1) were within the range of acceptability for normality, i.e., skewness and kurtosis within the cut-off of ± 1 [90,91], Mardia's test indicated significant deviation from multivariate normality for skewness (109.10, $p < 0.001$), but not for kurtosis (1.11, $p = 0.265$). The means and standard deviations are presented in Table 1, and zero-order correlations among the relevant variables are shown in Table 2.

Table 1. Descriptive statistics.

| | M | SD | Sk | K |
|-------|------|------|-------|-------|
| PEB | 3.84 | 0.55 | −0.56 | 0.27 |
| EnvMD | 2.12 | 0.60 | 0.72 | 0.55 |
| EAP | 8.18 | 1.33 | −0.77 | 0.07 |
| IAS | 0.59 | 0.48 | −0.43 | −0.62 |

Note. PEB = pro-environmental behavior; EnvMD = environmental moral disengagement; EAP = explicit attitude toward pro-environmental behaviors; IAS = implicit attitude toward sustainability; M = mean; SD = standard deviation; Sk = skewness; K = kurtosis.

Table 2. Zero-order correlations.

| | 1 | 2 | 3 | 4 | 5 |
|-----------|-----------|-------|-----------|-----------|------|
| 1. Gender | - | | | | |
| 2. Age | 0.12 | - | | | |
| 3. PEB | 0.19 * | 0.09 | - | | |
| 4. EnvMD | −0.29 *** | −0.08 | −0.50 *** | - | |
| 5. EAP | 0.26 ** | 0.13 | 0.49 *** | −0.49 *** | - |
| 6. IAS | 0.09 | −0.04 | 0.13 | −0.34 *** | 0.08 |

Note. PEB = pro-environmental behavior; EnvMD = environmental moral disengagement; EAP = explicit attitude toward pro-environmental behaviors; IAS = implicit attitude toward sustainability. * $p < 0.05$, ** $p < 0.01$, and *** $p < 0.001$.

3.2. Path Analysis

Due to the non-normal distribution of the observed variables, the path analysis was estimated using maximum likelihood estimation with robust Huber–White standard errors and a Yuan–Bentler scaled chi-square test statistic. The fit of the proposed model was evaluated against recommended cut-off values [92], showing a good fit: $\chi^2 = 7.76$, $df = 7$, and $p = 0.354$; a Comparative Fit Index (CFI) = 0.99; a Tucker–Lewis Index (TLI) = 0.99; Root Mean Square Error of Approximation (RMSEA) = 0.01, a 90% CI = [0.000, 0.109], and $p = 0.625$; and a Standardized Root Mean Square Residual (SRMR) = 0.05. Figure 2 shows the estimated path model with standardized coefficients and standard errors.

The path coefficients (see Table 3) indicate that environmental moral disengagement was significantly and negatively associated with pro-environmental behaviors (H5: $\beta = -0.34$, $SE = 0.08$, $p < 0.001$). Explicit attitudes were positively linked to pro-environmental behaviors (H1: $\beta = 0.32$, $SE = 0.07$, $p < 0.001$); however, implicit attitudes were not significantly associated with such behaviors (H2: $\beta = 0.01$, $SE = 0.07$, $p = 0.860$). Furthermore, implicit attitudes toward sustainability were negatively linked with envi-

ronmental moral disengagement (H4: $\beta = -0.32$, $SE = 0.07$, $p < 0.001$), as well as explicit attitudes (H3: $\beta = -0.46$, $SE = 0.07$, $p < 0.001$).

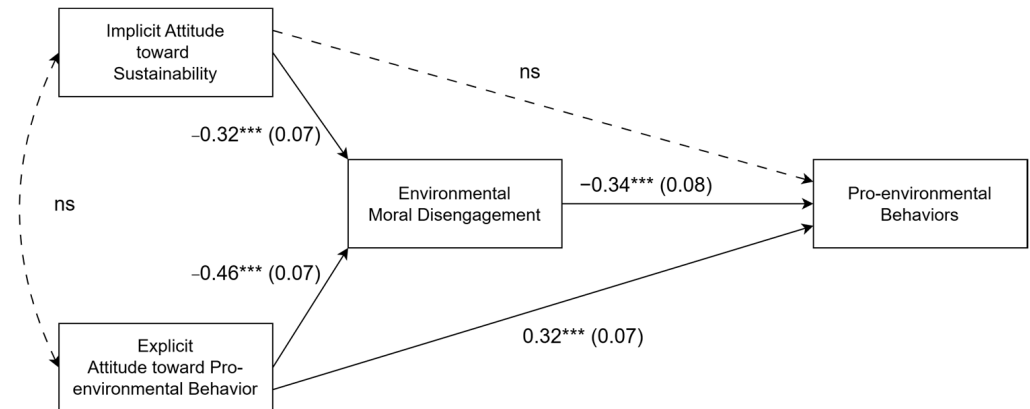


Figure 2. Path analysis using robust maximum likelihood estimation. Standardized coefficients are shown with standard errors in parentheses. Solid arrows indicate significant paths ($p < 0.05$); dashed arrows indicate non-significant paths. Estimates are adjusted for covariates; covariate nodes and paths are omitted from the diagram for clarity. $*** p < 0.001$.

Table 3. Unstandardized and standardized path coefficients for path analysis model.

| Outcome | Predictor | b | SE | z | p | 95% CI | β |
|---------|-----------|-------|------|-------|--------|------------------|---------|
| PEB | EnvMD | -0.31 | 0.08 | -3.95 | <0.001 | [-0.465, -0.157] | -0.34 |
| PEB | EnvMD | 0.13 | 0.03 | 4.19 | <0.001 | [0.071, 0.197] | 0.32 |
| PEB | IAS | 0.01 | 0.08 | 0.18 | 0.860 | [-0.140, 0.168] | 0.01 |
| EnvMD | IAS | -0.39 | 0.10 | -3.86 | <0.001 | [-0.587, -0.192] | -0.32 |
| EnvMD | EAP | -0.21 | 0.03 | -6.51 | <0.001 | [-0.268, -0.144] | -0.46 |

Note. b = unstandardized coefficient; β = standardized coefficient; SE = robust (Huber–White) standard error; CI = 95% confidence interval. PEB = pro-environmental behavior; EnvMD = environmental moral disengagement; EAP = explicit attitude toward pro-environmental behaviors; IAS = implicit attitude toward sustainability.

To assess the significance of the indirect effects of implicit and explicit attitudes on pro-environmental behaviors through environmental moral disengagement, the bias-corrected bootstrap method with 5000 resamples was employed to estimate 95% confidence intervals [93]. The analysis indicated significant indirect effects (H6) both from implicit ($\beta = 0.11$, 95% CI = [0.035, 0.179]) and explicit attitudes ($\beta = 0.16$, 95% CI = [0.067, 0.245]) (see Table 4).

Table 4. Indirect and total effects (bootstrap, 5000 resamples).

| Effect | b | 95% CI | β |
|-------------------|-------|-----------------|---------|
| IAS → EnvMD → PEB | 0.121 | [0.044, 0.215] | 0.107 |
| Total: IAS → PEB | 0.135 | [-0.034, 0.303] | 0.120 |
| EAP → EnvMD → PEB | 0.064 | [0.030, 0.107] | 0.155 |
| Total: EAP → PEB | 0.198 | [0.137, 0.263] | 0.479 |

Note. b = unstandardized coefficient; β = standardized coefficient; CI = 95% bootstrapped confidence interval. PEB = pro-environmental behavior; EnvMD = environmental moral disengagement; EAP = explicit attitude toward pro-environmental behaviors; IAS = implicit attitude toward sustainability.

The analysis of covariates showed that gender was significantly associated with explicit attitudes ($\beta = 0.25$, $SE = 0.08$, $p = 0.002$), with individuals identifying as female more likely to exhibit more positive attitudes toward the environment. Age was not significantly associated with any of the study variables.

To assess potential multicollinearity among predictors, variance inflation factors (VIFs) were calculated for all exogenous variables in each structural equation. For the pro-environmental behavior equation, VIF values were 1.51 for moral disengagement, 1.32 for explicit attitudes, and 1.16 for implicit attitudes. For the environmental moral disengagement equation, VIF values were 1.01 for both implicit and explicit attitudes. All values are well below conventional thresholds of 5 or 10 [94], indicating that multicollinearity was not a concern.

The overall structural model accounted for approximately 33.0% of the variance in pro-environmental behaviors and 33.1% of the variance in environmental moral disengagement.

The R Markdown code plan, anonymized dataset, Inquisit scripts, and knitted outputs are available on the Open Science Framework (OSF) at <https://osf.io/gfepx>.

4. Discussion

The findings of the present study show that pro-environmental attitudes play an important role in promoting pro-environmental behaviors, but their connection is not necessarily direct. In fact, environmental moral disengagement mediates the relationship between attitudes and pro-environmental behaviors for both explicit and implicit attitudes. Specifically, all hypotheses were supported except one: while a direct association emerged between attitudes measured at the explicit level and pro-environmental behaviors (H1), no significant link emerged in the case of implicit attitudes (H2). This finding supports theoretical models of planned behavior [20,21] and is in line with previous findings attesting to the importance of pro-environmental attitudes [19,22]. Individuals who evaluate these behaviors as positive also enact them; this reflects consistency between expressed intentions and reported actions. Such evidence is consistent with previous studies and underscores the importance of fostering positive pro-environmental attitudes, as these can promote intentionally directed actions in favor of the environment. In contrast, implicit attitudes do not exert a direct effect [23,70]. However, it is important to note that the behaviors considered here are self-reported intentional actions. It would therefore be valuable to consider other more spontaneous and rapid behavioral outcomes in everyday life, for instance in experimental scenarios where contextual conditions may hinder pro-environmental behaviors that individuals claim to routinely perform. Previous studies have shown that implicit measures do not align well with self-reported measures, emphasizing the need to investigate observed rather than self-reported behaviors [26].

As for the relationship between the two types of attitudes and moral disengagement, the results indicate that both explicit (H3) and implicit attitudes (H4) are associated with environmental moral disengagement. In the first case, this aligns with prior work highlighting the connection between individual evaluative tendencies and moral disengagement in other domains [12,15], confirming that reducing moral disengagement requires adherence to beliefs that counteract the tendency to bypass moral self-regulation. Attitudes are evaluative schemas grounded in personal judgment criteria: if an individual evaluates pro-environmental actions positively, they are more likely to consider such a reality desirable and to engage in behaviors that promote it. Notably, implicit attitudes also influence moral disengagement, suggesting that not only conscious beliefs but also automatic associations between an object (i.e., sustainability and pro-environmental behavior) and an attribute (i.e., positive vs. negative) can shape how individuals interpret their actions. This implies that the justifications, displacements, and distortions underlying pro-environmental behaviors may operate implicitly and automatically. In this study, positive implicit evaluations counteract the use of moral disengagement; however, the reverse may also occur. When evaluative beliefs are negative, moral disengagement may be automatically facilitated, functioning as a post-rationalization of intuitions that shape behavior. In other words,

individuals may intuitively experience states of pleasantness or unpleasantness associated with certain stimuli or behaviors and subsequently reason in ways that confirm what they intuitively feel is best or right.

These two relationships suggest that moral disengagement may operate through two pathways, in line with dual-process models [95]. The first pathway is deliberative, based on what people think and report they intend to do: if beliefs favor sustainability, moral disengagement will be low; conversely, if beliefs are unfavorable to the environment, moral disengagement will be high and used to rationalize choices that might otherwise produce cognitive dissonance between what is known to be desirable and what is actually done. The second pathway is more automatic, in which moral disengagement may intervene in decisions and behaviors that receive little conscious attention, for example, habitual purchasing decisions made quickly without deliberate decision-making. In such cases, automatic associations between an action and its implicit positive or negative attributes can make a difference: if an implicit stance is positively associated with a sustainable behavior, moral disengagement will be low; if the association is negative (or even positive toward non-pro-environmental behavior), disengagement will be high. This indicates that certain forms of conditional learning, such as associations formed through mere exposure or environmental priming cues, may influence the activation or inhibition of cognitive distortion processes, thereby shaping behaviors that are not always the result of deliberate decision-making.

Finally, regarding the negative link between environmental moral disengagement and pro-environmental behaviors (H5), the findings align with the emerging literature on moral disengagement: the more individuals rely on environmental moral disengagement, the lower the likelihood of engaging in pro-environmental behaviors. This confirms the importance of focusing on these mechanisms within the domain of environmental issues, and an increasing number of scholars are examining this topic and documenting its negative effects across multiple behaviors and areas of sustainability [4,8,49]. Moreover, in line with the psychological literature [12,13,45,46,71], moral disengagement operates as a mediator in the path from thought to action; as hypothesized, it mediates the relationship between explicit and implicit attitudes and behavior (H6). This finding invites consideration not only of broad personality dimensions, but also of specific cognitions as antecedents of moral disengagement, consistent with Bandura's theory that the process is contextual and selective. Of particular interest, the effect of implicit attitudes operates exclusively through moral disengagement, indicating the need to examine how implicitly acquired knowledge can influence rationalization and justification mechanisms when individuals engage in environmentally harmful behaviors.

4.1. Practical Implications

The findings suggest two complementary pathways for counteracting moral disengagement and promoting pro-environmental behaviors. The first pathway, focused on explicit awareness, highlights the importance of designing interventions that target attitudes by enhancing knowledge and the ethical and personal relevance of environmental issues. As Seabright argued [96], moral appeals are more effective when individuals perceive environmental issues as personally relevant rather than as abstract impersonal phenomena subject to distortions, reinterpretations, and selective information processing. Strengthening personal moral engagement with environmental issues through values that frame sustainability as a moral imperative can help individuals anchor their daily decisions in moral evaluations that guide attitudes and behaviors and reduce environmental moral disengagement. Interventions aimed at counteracting the tendency to disengage and at promoting pro-environmental behaviors could be designed to strengthen the personal

criteria and standards on which explicit evaluations are based. In this process, motivation can play a critical role: without sufficient interest in environmental issues, individuals are more likely to evaluate such behaviors as unfavorable or not useful and to resort to moral disengagement.

The second pathway focuses on implicit cognitions and the automatic processes that influence pro-environmental behaviors. This involves recognizing the role of mental shortcuts, contextual cues, and heuristic processes that shape decision-making outside of conscious awareness. It is essential to understand where and when these implicit associations are triggered. For example, a negative stance toward sustainability issues can facilitate moral disengagement and reinforce emotional detachment, allowing individuals to avoid the perceived responsibility of addressing large-scale problems that disrupt automatic, deeply ingrained habits. In this context, anxiety or distress may inadvertently increase reliance on moral disengagement as a defense mechanism. To directly counter disengagement, awareness-raising efforts should be paired with reassurance and emotional engagement [97,98].

In this regard, communication strategies, such as public campaigns, can help shape associations between behaviors and their positive value. For example, pairing pro-environmental behaviors with positive affective cues may facilitate adoption by reducing reliance on environmental moral disengagement processes. As Moser and Dilling note [97], rather than relying on fear or anxiety to convey urgency, communicators should emphasize agency, efficacy, and shared responsibility: “people want to know what they can do, that they are able to do it, and that others are doing their share as well” (p. 505).

In addressing pro-environmental behaviors and reducing moral disengagement, it is also important to consider that motivations, attitudes, and behaviors are influenced by public policies. As suggested by Rajapaksa, Islam, and Managi [99], public perceptions of higher quality infrastructure and public services increase individuals’ sense of attachment and responsibility toward their community, thereby promoting environmentally responsible actions; perceptions of social inequality and the presence of secure, equitable communities foster trust and civic engagement, further motivating pro-environmental behavior; better educated individuals possess a clearer understanding of the consequences of their actions. Educational programs and informational campaigns can enhance motivation toward pro-environmental behaviors while simultaneously reducing detachment and moral disengagement. These factors, while not directly addressed in the present study, represent important avenues for future research, particularly in terms of the role of the implicit processes and structures that shape pro-environmental attitudes and behaviors.

Overall, the findings of the present study suggest that policies designed to foster pro-environmental behaviors should be grounded in a deep understanding of what and how people think about environmental issues. Social change stems from shifts in people’s mindsets, and for this reason, structural and policy interventions should aim to foster moral engagement and willpower, enabling individuals to translate their intentions into concrete actions and to avoid moral disengagement.

4.2. Limitations and Future Studies

This study offers valuable insights, yet several limitations should be acknowledged and addressed in future research. First, this study was conducted using a national sample at a single point in time; thus, an important limitation is the limited scope of the data, which cover only one country and one time period. Recruitment relied on convenience sampling from a single digital university, so the sample is not representative of the general population. Moreover, the behavioral outcomes were self-reported and largely low-cost, everyday actions, limiting generalizability to markedly different populations and to high-cost or

peculiar PEBs. Accordingly, our inferences are bounded by an Italian sample and a cross-sectional design. Second, given the sample size, this study had limited sensitivity, increasing the risk of failing to identify meaningful mis-specification; accordingly, some discrepancies in overall fit and modest parameter effects may have gone unnoticed, making replication with larger samples and explicit, a priori sensitivity targets advisable. Therefore, causal claims and strong inferences are not warranted. Third, from a social–cognitive perspective, it is also important to integrate contextual variables into the model, as these play a key role in explaining pro-environmental behaviors. Moral disengagement mechanisms do not operate solely at the individual level; they also shape perceptions of others' behavior, contributing to the legitimization of widespread practices and policies. For example, when large groups display morally questionable behavior without discomfort, such behavior can become normalized [57]. In line with this, recent studies increasingly highlight the social and collective nature of moral disengagement [100]. Moreover, it is essential to distinguish between different types of pro-environmental behaviors. As indicated in the theoretical model proposed by Stern [101], there is a meaningful difference between high-impact direct behaviors, linked to individual actions such as energy consumption, and indirect behaviors, which influence the environment through collective decisions (e.g., activism), operating at both the individual and collective level [102,103].

While these limitations should be acknowledged, they also open up important avenues for future inquiry. A promising direction for future research lies in examining the role of educational technologies as potential mediators of change in pro-environmental attitudes and behaviors. Emerging evidence suggests that technology-enhanced learning (TEL) tools, such as virtual and augmented reality, digital games, and adaptive mobile applications, can foster affective engagement, perceived behavioral control, and environmental self-efficacy, thereby supporting the translation of implicit attitudes into concrete behaviors [104,105]. Yet current findings are fragmented and primarily limited to short-term outcomes, with few longitudinal designs assessing whether these effects persist over time [106]. In addition, the moderating role of moral disengagement within TEL contexts remains unexplored: immersive experiences may reduce psychological distance and elicit empathy, but disengagement processes could attenuate or distort their impact on actual behavior [107].

In sum, further research is needed to expand the theoretical framework, explore additional constructs, and adopt innovative methodological approaches to better capture the complexity of pro-environmental behaviors, with the aim of fostering positive change in both individual and collective behaviors.

5. Conclusions

Moral disengagement represents a critical barrier to addressing global environmental challenges. It can undermine commitment to everyday actions that contribute to reducing environmental ethical issues. Indeed, studying pro-environmental behaviors as conduct influenced by moral disengagement mechanisms implies that ecological challenges should not only be addressed as scientific or economic matters but also framed as ethical actions whose consequences affect others, particularly the most vulnerable populations, thereby exacerbating social injustices [108]. The findings of this study shed light on the dual pathway (implicit versus deliberative) through which moral disengagement operates, highlighting aspects that should be considered when designing effective interventions to promote pro-environmental behavior. Insights from psychology can offer valuable opportunities to integrate knowledge from other fields such as education, technology, economics, and policy in order to promote meaningful, large-scale changes in behaviors and habits that support pro-environmental behavior.

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References

- Bandura, A. Impeding Ecological Sustainability through Selective Moral Disengagement. *IJISD* **2007**, *2*, 8. [CrossRef]
- Feng, S.; Zhang, R.; Li, G. Environmental Decentralization, Digital Finance and Green Technology Innovation. *Struct. Change Econ. Dyn.* **2022**, *61*, 70–83. [CrossRef]
- Pörtner, H.-O.; Scholes, R.J.; Arneth, A.; Barnes, D.K.A.; Burrows, M.T.; Diamond, S.E.; Duarte, C.M.; Kiessling, W.; Leadley, P.; Managi, S.; et al. Overcoming the Coupled Climate and Biodiversity Crises and Their Societal Impacts. *Science* **2023**, *380*, eabl4881. [CrossRef] [PubMed]
- Stubenvoll, M.; Neureiter, A. Fight or Flight: How Advertising for Air Travel Triggers Moral Disengagement. *Environ. Commun.* **2021**, *15*, 765–782. [CrossRef]
- Rau, H.; Nicolai, S.; Stoll-Kleemann, S. A Systematic Review to Assess the Evidence-Based Effectiveness, Content, and Success Factors of Behavior Change Interventions for Enhancing pro-Environmental Behavior in Individuals. *Front. Psychol.* **2022**, *13*, 901927. [CrossRef]
- Zeng, Z.; Zhong, W.; Naz, S. Can Environmental Knowledge and Risk Perception Make a Difference? The Role of Environmental Concern and Pro-Environmental Behavior in Fostering Sustainable Consumption Behavior. *Sustainability* **2023**, *15*, 4791. [CrossRef]
- Kollmuss, A.; Agyeman, J. Mind the Gap: Why Do People Act Environmentally and What Are the Barriers to pro-Environmental Behavior? *Environ. Educ. Res.* **2002**, *8*, 239–260. [CrossRef]
- Graça, J.; Calheiros, M.M.; Oliveira, A. Moral Disengagement in Harmful but Cherished Food Practices? An Exploration into the Case of Meat. *J. Agric. Environ. Ethics* **2014**, *27*, 749–765. [CrossRef]
- Leviston, Z.; Walker, I. The Influence of Moral Disengagement on Responses to Climate Change. *Asian J. Soc. Psychol.* **2021**, *24*, 144–155. [CrossRef]
- Bandura, A. Selective Activation and Disengagement of Moral Control. *J. Soc. Issues* **1990**, *46*, 27–46. [CrossRef]
- Bandura, A. Moral Disengagement in the Perpetration of Inhumanities. In *Recent Developments in Criminological Theory*; Stuart, H., Scott, A.L., Eds.; Routledge: London, UK, 2017; pp. 135–152, ISBN 978-1-315-08908-9.
- Detert, J.R.; Treviño, L.K.; Sweitzer, V.L. Moral Disengagement in Ethical Decision Making: A Study of Antecedents and Outcomes. *J. Appl. Psychol.* **2008**, *93*, 374–391. [CrossRef]
- Zhao, H.; Zhang, H.; Xu, Y. Effects of Perceived Descriptive Norms on Corrupt Intention: The Mediating Role of Moral Disengagement. *Int. J. Psychol.* **2019**, *54*, 93–101. [CrossRef]
- Zasuwa, G. Why Do Environmental Wrongdoers Avoid Reputational Penalties? The Mediating Role of Moral Disengagement and the Effects of Green Values. *J. Clean. Prod.* **2025**, *490*, 144810. [CrossRef]
- Paciello, M.; Fida, R.; Cerniglia, L.; Tramontano, C.; Cole, E. High Cost Helping Scenario: The Role of Empathy, Prosocial Reasoning and Moral Disengagement on Helping Behavior. *Personal. Individ. Differ.* **2013**, *55*, 3–7. [CrossRef]
- Kaiser, F.G.; Scheutle, H. Two Challenges to a Moral Extension of the Theory of Planned Behavior: Moral Norms and Just World Beliefs in Conservationism. *Personal. Individ. Differ.* **2003**, *35*, 1033–1048. [CrossRef]
- Milfont, T.L. The Psychology of Environmental Attitudes: Conceptual and Empirical Insights from New Zealand. *Ecopsychology* **2012**, *4*, 269–276. [CrossRef]

18. Milfont, T.L.; Duckitt, J.; Wagner, C. A Cross-Cultural Test of the Value–Attitude–Behavior Hierarchy. *J. Appl. Soc. Psychol.* **2010**, *40*, 2791–2813. [[CrossRef](#)]
19. Kormos, C.; Gifford, R. The Validity of Self-Report Measures of Proenvironmental Behavior: A Meta-Analytic Review. *J. Environ. Psychol.* **2014**, *40*, 359–371. [[CrossRef](#)]
20. Ajzen, I. The Theory of Planned Behavior. *Organ. Behav. Hum. Decis. Process.* **1991**, *50*, 179–211. [[CrossRef](#)]
21. Fishbein, M.; Ajzen, I. Theory-Based Behavior Change Interventions: Comments on Hobbis and Sutton. *J. Health Psychol.* **2005**, *10*, 27–31. [[CrossRef](#)]
22. Bamberg, S.; Möser, G. Twenty Years after Hines, Hungerford, and Tomera: A New Meta-Analysis of Psycho-Social Determinants of pro-Environmental Behaviour. *J. Environ. Psychol.* **2007**, *27*, 14–25. [[CrossRef](#)]
23. Steiner, G.; Geissler, B.; Schreder, G.; Zenk, L. Living Sustainability, or Merely Pretending? From Explicit Self-Report Measures to Implicit Cognition. *Sustain. Sci.* **2018**, *13*, 1001–1015. [[CrossRef](#)]
24. Ogunfowora, B.T.; Nguyen, V.Q.; Steel, P.; Hwang, C.C. A Meta-Analytic Investigation of the Antecedents, Theoretical Correlates, and Consequences of Moral Disengagement at Work. *J. Appl. Psychol.* **2022**, *107*, 746–775. [[CrossRef](#)]
25. Moore, C. Moral Disengagement. *Curr. Opin. Psychol.* **2015**, *6*, 199–204. [[CrossRef](#)]
26. Fida, R.; Ghezzi, V.; Paciello, M.; Tramontano, C.; Dentale, F.; Barbaranelli, C. The Implicit Component of Moral Disengagement: Applying the Relational Responding Task to Investigate Its Relationship with Cheating Behavior. *Pers. Soc. Psychol. Bull.* **2022**, *48*, 78–94. [[CrossRef](#)]
27. Corbelli, G.; Paciello, M.; Sportelli, C.; Cicirelli, P.G.; D’Errico, F. Mitigating Ethnic Moral Disengagement: The Role of Inhibitory Control, Cognitive Reflection, and Growth-Oriented Personal Values from an Integrative Perspective. *Behav. Sci.* **2025**, *15*, 169. [[CrossRef](#)]
28. Vlas, C.O.; De Góes, B.B.; Vlas, R.E.; See, E. Competing in Innovation-Intensive Environments: The Role of Soft Power, Learning, and CEO Heuristics. *Adm. Sci.* **2024**, *14*, 169. [[CrossRef](#)]
29. Shrum, L.J.; McCarty, J.A.; Lowrey, T.M. Buyer Characteristics of the Green Consumer and Their Implications for Advertising Strategy. *J. Advert.* **1995**, *24*, 71–82. [[CrossRef](#)]
30. Mostafa, M.M. Antecedents of Egyptian Consumers’ Green Purchase Intentions: A Hierarchical Multivariate Regression Model. *J. Int. Consum. Mark.* **2006**, *19*, 97–126. [[CrossRef](#)]
31. Steg, L.; Vlek, C. Encouraging Pro-Environmental Behaviour: An Integrative Review and Research Agenda. *J. Environ. Psychol.* **2009**, *29*, 309–317. [[CrossRef](#)]
32. Kaiser, F.G.; Oerke, B.; Bogner, F.X. Behavior-Based Environmental Attitude: Development of an Instrument for Adolescents. *J. Environ. Psychol.* **2007**, *27*, 242–251. [[CrossRef](#)]
33. Homburg, A.; Stolberg, A. Explaining Pro-Environmental Behavior with a Cognitive Theory of Stress. *J. Environ. Psychol.* **2006**, *26*, 1–14. [[CrossRef](#)]
34. European Commission. Directorate General for Research and Innovation. In *European Green Deal: Research & Innovation Call*; Publications Office: Luxembourg, 2021.
35. Steinger, K.W.; Williges, K.; Meyer, L.H.; Maczek, F.; Riahi, K. Sharing the Effort of the European Green Deal among Countries. *Nat. Commun.* **2022**, *13*, 3673. [[CrossRef](#)]
36. Steffen, W.; Persson, Å.; Deutsch, L.; Zalasiewicz, J.; Williams, M.; Richardson, K.; Crumley, C.; Crutzen, P.; Folke, C.; Gordon, L.; et al. The Anthropocene: From Global Change to Planetary Stewardship. *AMBIO* **2011**, *40*, 739–761. [[CrossRef](#)]
37. Diekmann, A.; Preisendörfer, P. Green and Greenback: The Behavioral Effects of Environmental Attitudes in Low-Cost and High-Cost Situations. *Ration. Soc.* **2003**, *15*, 441–472. [[CrossRef](#)]
38. Runhaar, P.; Wagenaar, K.; Wesselink, R.; Runhaar, H. Encouraging Students’ Pro-Environmental Behaviour: Examining the Interplay Between Student Characteristics and the Situational Strength of Schools. *J. Educ. Sustain. Dev.* **2019**, *13*, 45–66. [[CrossRef](#)]
39. Klöckner, C.A.; Verplanken, B. Yesterday’s Habits Preventing Change for Tomorrow? About the Influence of Automaticity on Environmental Behaviour. In *Environmental Psychology*; Steg, L., Groot, J.I.M., Eds.; Wiley: Hoboken, NJ, USA, 2018; pp. 238–250, ISBN 978-1-119-24108-9.
40. Neal, D.T.; Wood, W.; Labrecque, J.S.; Lally, P. How Do Habits Guide Behavior? Perceived and Actual Triggers of Habits in Daily Life. *J. Exp. Soc. Psychol.* **2012**, *48*, 492–498. [[CrossRef](#)]
41. Gifford, R. The Dragons of Inaction: Psychological Barriers That Limit Climate Change Mitigation and Adaptation. *Am. Psychol.* **2011**, *66*, 290–302. [[CrossRef](#)]
42. Verplanken, B.; Orbell, S. Attitudes, Habits, and Behavior Change. *Annu. Rev. Psychol.* **2022**, *73*, 327–352. [[CrossRef](#)]
43. Phipps, D.J.; Hagger, M.S.; Hamilton, K. Evidence That Habit Moderates the Implicit Belief-Behavior Relationship in Health Behaviors. *Int. J. Behav. Med.* **2022**, *29*, 116–121. [[CrossRef](#)]
44. Wood, W.; Quinn, J.M.; Kashy, D.A. Habits in Everyday Life: Thought, Emotion, and Action. *J. Personal. Soc. Psychol.* **2002**, *83*, 1281–1297. [[CrossRef](#)]
45. Bandura, A. Social Cognitive Theory of Self-Regulation. *Organ. Behav. Hum. Decis. Process.* **1991**, *50*, 248–287. [[CrossRef](#)]

46. Bandura, A. *Moral Disengagement: How People Do Harm and Live with Themselves*; Macmillan Learning: New York, NY, USA, 2016; ISBN 978-1-4641-6005-9.
47. Tasa, K.; Bell, C.M. Effects of implicit negotiation beliefs and moral disengagement on negotiator attitudes and deceptive behavior. *J. Bus. Ethics* **2017**, *142*, 169–183. [[CrossRef](#)]
48. Chingwere, F.; Nicholls, N.; Yitbarek, E. Moral Disengagement and Charitable Giving: Experimental Evidence From South Africa. *Int. Soc. Sci. J.* **2025**, *75*, 361–381. [[CrossRef](#)]
49. Peeters, W.; Diependaele, L.; Sterckx, S. Moral Disengagement and the Motivational Gap in Climate Change. *Ethic Theory Moral. Pract.* **2019**, *22*, 425–447. [[CrossRef](#)]
50. Sharma, N.; Paço, A. Moral Disengagement: A Guilt Free Mechanism for Non-Green Buying Behavior. *J. Clean. Prod.* **2021**, *297*, 126649. [[CrossRef](#)]
51. Stoll-Kleemann, S.; O’Riordan, T.; Jaeger, C.C. The Psychology of Denial Concerning Climate Mitigation Measures: Evidence from Swiss Focus Groups. *Glob. Environ. Change* **2001**, *11*, 107–117. [[CrossRef](#)]
52. Higham, J.; Font, X. Decarbonising Academia: Confronting Our Climate Hypocrisy. *J. Sustain. Tour.* **2020**, *28*, 1–9. [[CrossRef](#)]
53. Giacobone, G.A.; Pollini, A.; Caforio, A. User Stories, Motivation for Behavioural Change and Educational Challenges. In *The European Green Deal in Education*; Routledge: London, UK, 2024; pp. 45–61, ISBN 978-1-003-49259-7.
54. Shue, H. Human Rights, Climate Change, and the Trillionth Ton. In *The Ethics of Global Climate Change*; Arnold, D.G., Ed.; Cambridge University Press: Cambridge, UK, 2011; pp. 292–314, ISBN 978-1-107-00069-8.
55. Schüßler, C.; Nicolai, S.; Stoll-Kleemann, S.; Bartkowski, B. Moral Disengagement in the Media Discourses on Meat and Dairy Production Systems. *Appetite* **2024**, *196*, 107269. [[CrossRef](#)]
56. Vollum, S.; Longmire, D.; Buffington-Vollum, J. Moral Disengagement and Attitudes about Violence toward Animals. *Soc. Anim.* **2004**, *12*, 209–235. [[CrossRef](#)]
57. Bastian, B.; Loughnan, S. Resolving the Meat-Paradox: A Motivational Account of Morally Troublesome Behavior and Its Maintenance. *Pers. Soc. Psychol. Rev.* **2017**, *21*, 278–299. [[CrossRef](#)]
58. Eagly, A.H.; Chaiken, S. Cognitive Theories of Persuasion. In *Advances in Experimental Social Psychology*; Elsevier: Amsterdam, The Netherlands, 1984; Volume 17, pp. 267–359, ISBN 978-0-12-015217-9.
59. De Leeuw, A.; Valois, P.; Ajzen, I.; Schmidt, P. Using the Theory of Planned Behavior to Identify Key Beliefs Underlying Pro-Environmental Behavior in High-School Students: Implications for Educational Interventions. *J. Environ. Psychol.* **2015**, *42*, 128–138. [[CrossRef](#)]
60. Breckler, S.J. Empirical Validation of Affect, Behavior, and Cognition as Distinct Components of Attitude. *J. Personal. Soc. Psychol.* **1984**, *47*, 1191–1205. [[CrossRef](#)]
61. Cheung, S.F.; Chan, D.K.-S.; Wong, Z.S.-Y. Reexamining the Theory of Planned Behavior in Understanding Wastepaper Recycling. *Environ. Behav.* **1999**, *31*, 587–612. [[CrossRef](#)]
62. Fielding, K.S.; Hornsey, M.J. A Social Identity Analysis of Climate Change and Environmental Attitudes and Behaviors: Insights and Opportunities. *Front. Psychol.* **2016**, *7*, 121. [[CrossRef](#)] [[PubMed](#)]
63. Böhlerengen, M.; Wiium, N. Environmental Attitudes, Behaviors, and Responsibility Perceptions Among Norwegian Youth: Associations with Positive Youth Development Indicators. *Front. Psychol.* **2022**, *13*, 844324. [[CrossRef](#)]
64. King, M.F.; Bruner, G.C. Social Desirability Bias: A Neglected Aspect of Validity Testing. *Psychol. Mark.* **2000**, *17*, 79–103. [[CrossRef](#)]
65. Greenwald, A.G.; McGhee, D.E.; Schwartz, J.L.K. Measuring Individual Differences in Implicit Cognition: The Implicit Association Test. *J. Personal. Soc. Psychol.* **1998**, *74*, 1464–1480. [[CrossRef](#)]
66. Greenwald, A.G.; Brendl, M.; Cai, H.; Cvencek, D.; Dovidio, J.F.; Friesse, M.; Hahn, A.; Hehman, E.; Hofmann, W.; Hughes, S.; et al. Best Research Practices for Using the Implicit Association Test. *Behav. Res.* **2022**, *54*, 1161–1180. [[CrossRef](#)]
67. Nosek, B.A.; Greenwald, A.G.; Banaji, M.R. Understanding and Using the Implicit Association Test: II. Method Variables and Construct Validity. *Pers. Soc. Psychol. Bull.* **2005**, *31*, 166–180. [[CrossRef](#)]
68. Panzone, L.; Hilton, D.; Sale, L.; Cohen, D. Socio-Demographics, Implicit Attitudes, Explicit Attitudes, and Sustainable Consumption in Supermarket Shopping. *J. Econ. Psychol.* **2016**, *55*, 77–95. [[CrossRef](#)]
69. Oswald, F.L.; Mitchell, G.; Blanton, H.; Jaccard, J.; Tetlock, P.E. Predicting Ethnic and Racial Discrimination: A Meta-Analysis of IAT Criterion Studies. *J. Personal. Soc. Psychol.* **2013**, *105*, 171–192. [[CrossRef](#)]
70. Brick, C.; Lai, C.K. Explicit (but Not Implicit) Environmentalist Identity Predicts pro-Environmental Behavior and Policy Preferences. *J. Environ. Psychol.* **2018**, *58*, 8–17. [[CrossRef](#)]
71. Luo, A.; Bussey, K. Moral Disengagement in Youth: A Meta-Analytic Review. *Dev. Rev.* **2023**, *70*, 101101. [[CrossRef](#)]
72. Bandura, A.; Barbaranelli, C.; Caprara, G.V.; Pastorelli, C. Mechanisms of Moral Disengagement in the Exercise of Moral Agency. *J. Personal. Soc. Psychol.* **1996**, *71*, 364–374. [[CrossRef](#)]
73. Wu, J.S.; Font, X.; Liu, J. The Elusive Impact of Pro-Environmental Intention on Holiday on pro-Environmental Behaviour at Home. *Tour. Manag.* **2021**, *85*, 104283. [[CrossRef](#)]

74. Wu, J.S.; Font, X.; Liu, J. Tourists' Pro-Environmental Behaviors: Moral Obligation or Disengagement? *J. Travel. Res.* **2021**, *60*, 735–748. [[CrossRef](#)]
75. Ateş, H. Merging Theory of Planned Behavior and Value Identity Personal Norm Model to Explain Pro-Environmental Behaviors. *Sustain. Prod. Consum.* **2020**, *24*, 169–180. [[CrossRef](#)]
76. La Barbera, F.; Ajzen, I. Control Interactions in the Theory of Planned Behavior: Rethinking the Role of Subjective Norm. *Eur. J. Psychol.* **2020**, *16*, 401–417. [[CrossRef](#)]
77. De Leeuw, A.; Valois, P.; Morin, A.J.S.; Schmidt, P. Gender Differences in Psychosocial Determinants of University Students' Intentions to Buy Fair Trade Products. *J. Consum. Policy* **2014**, *37*, 485–505. [[CrossRef](#)]
78. Greenwald, A.G.; Nosek, B.A.; Banaji, M.R. Understanding and Using the Implicit Association Test: I. An Improved Scoring Algorithm. *J. Personal. Soc. Psychol.* **2003**, *85*, 197–216. [[CrossRef](#)] [[PubMed](#)]
79. Sriram, N.; Greenwald, A.G. The Brief Implicit Association Test. *Exp. Psychol.* **2009**, *56*, 283–294. [[CrossRef](#)]
80. Yuan, K.-H.; Zhong, X. Outliers, Leverage Observations, and Influential Cases in Factor Analysis: Using Robust Procedures to Minimize Their Effect. *Sociol. Methodol.* **2008**, *38*, 329–368. [[CrossRef](#)]
81. Mardia, K.V. Measures of Multivariate Skewness and Kurtosis with Applications. *Biometrika* **1970**, *57*, 519–530. [[CrossRef](#)]
82. Moshagen, M.; Bader, M. semPower: General Power Analysis for Structural Equation Models. *Behav. Res.* **2023**, *56*, 2901–2922. [[CrossRef](#)] [[PubMed](#)]
83. MacCallum, R.C.; Browne, M.W.; Sugawara, H.M. Power Analysis and Determination of Sample Size for Covariance Structure Modeling. *Psychol. Methods* **1996**, *1*, 130–149. [[CrossRef](#)]
84. Wickham, H.; Miller, E.; Smith, D. *Haven: Import and Export "SPSS", "Stata" and "SAS" Files*, version 2.5.4; The R Project for Statistical Computing: Vienna, Austria, 2015.
85. Wickham, H.; François, R.; Henry, L.; Müller, K. *Dplyr: A Grammar of Data Manipulation*, version 1.1.4; The R Project for Statistical Computing: Vienna, Austria, 2022.
86. Revelle, W. *Psych: Procedures for Psychological, Psychometric, and Personality Research*; The R Project for Statistical Computing: Vienna, Austria, 2022.
87. Zhang, Y.; Zhou, M.; Shao, Y. *mvnormalTest: Powerful Tests for Multivariate Normality*, version 1.0.1; The R Project for Statistical Computing: Vienna, Austria, 2025.
88. Rosseel, Y. Lavaan: An R Package for Structural Equation Modeling. *J. Stat. Soft.* **2012**, *48*, 1–36. [[CrossRef](#)]
89. Corbelli, G. *Lavinteract: Post-Estimation Utilities for "lavaan" Fitted Models*, version 0.2.2; The R Project for Statistical Computing: Vienna, Austria, 2025.
90. Marcoulides, G.A.; Hershberger, S.L. *Multivariate Statistical Methods: A First Course*; Psychology Press: New York, NY, USA, 2013; ISBN 978-1-315-80577-1.
91. Muthén, B.; Kaplan, D. A Comparison of Some Methodologies for the Factor Analysis of Non-Normal Likert Variables. *Br. J. Math. Stat. Psychol.* **1985**, *38*, 171–189. [[CrossRef](#)]
92. Kline, R. *Principles and Practice of Structural Equation Modeling*, 4th ed.; The Guilford Press: New York, NY, USA, 2016; ISBN 978-1-4625-2335-1.
93. MacKinnon, D.P.; Lockwood, C.M.; Williams, J. Confidence Limits for the Indirect Effect: Distribution of the Product and Resampling Methods. *Multivar. Behav. Res.* **2004**, *39*, 99–128. [[CrossRef](#)]
94. O'Brien, R.M. A Caution Regarding Rules of Thumb for Variance Inflation Factors. *Qual. Quant.* **2007**, *41*, 673–690. [[CrossRef](#)]
95. Strack, F.; Deutsch, R. Reflective and Impulsive Determinants of Social Behavior. *Pers. Soc. Psychol. Rev.* **2004**, *8*, 220–247. [[CrossRef](#)] [[PubMed](#)]
96. Seabright, M.A. The Role of the Affect Heuristic in Moral Reactions to Climate Change. *J. Glob. Ethics* **2010**, *6*, 5–15. [[CrossRef](#)]
97. Moser, S.C.; Dilling, L. *Communicating Climate Change: Closing the Science-Action Gap*; Oxford University Press: Oxford, UK, 2011.
98. Moser, S.C.; Dilling, L. (Eds.) *Creating a Climate for Change: Communicating Climate Change and Facilitating Social Change*, 1st ed.; Cambridge University Press: Cambridge, UK, 2007; ISBN 978-0-521-86923-2.
99. Rajapaksa, D.; Islam, M.; Managi, S. Pro-Environmental Behavior: The Role of Public Perception in Infrastructure and the Social Factors for Sustainable Development. *Sustainability* **2018**, *10*, 937. [[CrossRef](#)]
100. Fida, R.; Skovgaard-Smith, I.; Barbaranelli, C.; Paciello, M.; Searle, R.; Marzocchi, I.; Ronchetti, M. The Suspension of Morality in Organisations: Conceptualising Organisational Moral Disengagement and Testing Its Role in Relation to Unethical Behaviours and Silence. *Hum. Relat.* **2025**, *78*, 959–994. [[CrossRef](#)]
101. Stern, P.C. New Environmental Theories: Toward a Coherent Theory of Environmentally Significant Behavior. *J. Soc. Issues* **2000**, *56*, 407–424. [[CrossRef](#)]
102. Bandura, A.; Caprara, G.-V.; Zsolnai, L. Corporate Transgressions through Moral Disengagement. *J. Hum. Values* **2000**, *6*, 57–64. [[CrossRef](#)]
103. Jugert, P.; Greenaway, K.H.; Barth, M.; Büchner, R.; Eisentraut, S.; Fritsche, I. Collective Efficacy Increases Pro-Environmental Intentions through Increasing Self-Efficacy. *J. Environ. Psychol.* **2016**, *48*, 12–23. [[CrossRef](#)]

104. Levstek, M.; Papworth, S.; Woods, A.; Archer, L.; Arshad, I.; Dodds, K.; Holdstock, J.S.; Bennett, J.; Dalton, P. Immersive Storytelling for Pro-Environmental Behaviour Change: The Green Planet Augmented Reality Experience. *Comput. Hum. Behav.* **2024**, *161*, 108379. [[CrossRef](#)]
105. Hurrell, C.; Chai, A.; Green, H.; Bradley, G. Virtual Reality Facilitates Pro-Environmental Behavioural Intentions. *Environ. Educ. Res.* **2024**, *30*, 1856–1883. [[CrossRef](#)]
106. Zhu, Y.; Long, Y.; Wang, H.; Lee, K.P.; Zhang, L.; Wang, S.J. Digital Behavior Change Intervention Designs for Habit Formation: Systematic Review. *J. Med. Internet Res.* **2024**, *26*, e54375. [[CrossRef](#)]
107. Sahabuddin, E.S.; Makkasau, A. Utilization of Virtual Reality as a Learning Tool to Increase Students' pro-Environmental Behavior at Universities: A Maximum Likelihood Estimation Approach. *EURASIA J. Math. Sci. Technol. Ed.* **2024**, *20*, em2540. [[CrossRef](#)]
108. Heald, S. Climate Silence, Moral Disengagement, and Self-Efficacy: How Albert Bandura's Theories Inform Our Climate-Change Predicament. *Environ. Sci. Policy Sustain. Dev.* **2017**, *59*, 4–15. [[CrossRef](#)]

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