Towards an ethical consensus for sustainable development: the role of values, morals, and norms in shaping pro-environmental behaviour

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Towards an Ethical Consensus for Sustainable Development: The Role of Values, Morals, and Norms in shaping Pro-Environmental Behaviour

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Abstract

The aim of the review is to investigate the critical role of psychological and sociocultural factors in sustainable development. Unlike traditional approaches that prioritize mainly on technical and economic solutions, the novelty of this work lies in its reframing of sustainability through a deeply social and ethical lens. The paper introduces a multidimensional perspective on sustainable transformation through an extensive synthesis of behavioural theories, climatic-oriented psychological elements (e.g., eco-anxiety), and cultural practices (e.g., biomimicry). The three review's objectives are to: (i) incorporate psychological and sociocultural dimensions into sustainable development agenda; (ii) demonstrate how values, norms, and perceptions shape pro-environmental behaviours; and (iii) call for an ethical consensus across societal sectors. Essentially, this integrative approach seeks to build more inclusive, resilient, and ethically grounded pathways to sustainable development, as sustainable development is not only a techno-economic challenge, but also a deeply socio-ethical endeavour.

Keywords: environmental psychology, environmental sociology, environmental economics, sustainable consumer behaviour, sustainable employee behaviour, sustainable development, ethics

JEL Codes: Q01, Q5, D9, M14, Z1

Statement: Equal author contribution

Abbreviations

Big Five Personality Traits (BFPT)	Climate Change Anxiety Scale (CCAS)	Corporate Social Responsibility (CSR)
Ecologically Conscious Consumer Behavior (ECCB)	Environmental and Social Governance (ESG)	Ethically Minded Consumer Behaviour (EMCB)
Five Facet Mindfulness Questionnaire (FFMQ)	Five Factor Model (FFM)	Generalized Anxiety Disorder (GAD-7)
Goal-Framing (GFT)	Honesty-Humility, Emotionality, Extraversion, Agreeableness (versus anger), Conscientiousness, Openness to experience (HEXACO)	Leaving-No-One-Behind (LNOB)
Meta-theoretic Model of Motivation (3 M Model)	Nature relatedness (NR)	New Environmental Paradigm (NEP)
Norm-Activation Model (NAM)	Openness to Experience, Conscientiousness, Extraversion, Agreeableness, Neuroticism (OCEAN)	Pro-Environmental Behaviour (PEB)
Social Cognitive Theory (SCT)	Social, Habit, Individual self, Feelings and cognition, and Tangibility (SHIFT)	Stimulus-Organism-Response (STR)
Sustainable Development Goals (SDGs)	Theory of Normative Conduct (TNC)	Theory of Planned Behaviour (TPB)
Value Theory (VT)	Value-belief-norm (VBN)	Voluntary Environmental Behaviour (VEB)
United Nations (UN)	World Commission on Environment and Development (WCED)	

Ethics in Action[1] is an initiative designed to answer this question by assessing the degree of *consensus* … on the sustainable development goals (SDGs), and to mobilize this consensus into moral capital that can be deployed to help each nation-state and the collection of nation-states to achieve the SDGs.
– Jeffrey D. Sachs and Owen Flanagan

1. Introduction

Under the scope of sustainable development, policymakers and academics are increasingly calling for integrative approaches to monitor the complex interlinkages between socioeconomic, psychological, cultural and environmental factors. These factors can be understood through inner values (e.g., personal or communal), opinions, and general capacities (Wamsler et al., 2021, 2020), offering a conceptual framework that links psychological dimensions with nature, communal cohesion, and economic systems. The combination of internal and external factors would allow to formulate an adaptive and inclusive approach for an *ethical consensus* toward sustainable development

On a macro-scale perspective, one of the central debates in environmental science concerns the extent to which natural capital can be substituted by other forms of capital (Dasgupta, 2021). This ethical debate is shaped by diverse perspectives, including ecological, managerial, psychological, and ethical viewpoints. For example, this behavioural change can be also associated with the shift from the linear to a *circular economy*[2] concept (Geissdoerfer et al., 2017; Halkos, 1993; Halkos and Aslanidis, 2024; Halkos and Matsiori, 2018), and its schools of thought that assimilate the natural phenomena as a basis for the structure of a sustainable future, like biomimicry (Benyus, 2002) or as a closed loop economy that promotes novel ideas such as the cradle-to-cradle design for the production of goods (Braungart et al., 2007; McDonough and Braungart, 2002). In spite of that macro-scale perspective, it is important to identify the more covert parameters that belong to intrinsic psychological or socio-ethical aspects that compose the micro-scale perspective.

On a micro-scale perspective, the understanding and guiding of behavioural change is essential for promoting sustainable development. White et al. (2019) identified five key behavioural factors to uncover barriers and guide solutions in shifting people's mindsets toward pro-environmental behaviour (PEB). A growing influence on such behaviour is climate anxiety (or eco-anxiety) which primarily affects younger individuals, those with pre-existing generalized anxiety, and environmental information-seekers (Whitmarsh et al., 2022), hence, this emotional response, while challenging, can also serve as a catalyst for action. Wamsler and Bristow (2022) further explored the intersection of the "mind" and climate crisis from the perspective of policymakers, highlighting how shifts in conceptual frameworks can disrupt destructive cycles and create virtuous ones. Supporting this, Ecer et al. (2023) found a positive relationship between eco-anxiety and sustainable consumption, indicating that emotional engagement with climate issues may drive environmentally responsible behaviour. These interconnected insights culminate in what Azam et al. (2024) term "consumer psychological resilience," a concept that provides both conceptual and practical implications for green and social marketing, environmentally conscious consumption, and sustainable development[3].

The scope of the review is the integration the micro-scale (i.e., psychological and cultural) parameters with the macro-scale (i.e., economics) parameters, offering a more adaptive and inclusive approach that fosters an ethical consensus and accelerates the global transition toward sustainable development. By synthesizing behavioural theories (e.g., TPB, VBN), climate-related psychological factors such as eco-anxiety, and culturally rooted practices like biomimicry, to that end, the paper

introduces a novel multidimensional perspective on sustainable transformation. Moreover, the contribution is threefold: (i) the review highlights the importance of integrating psychological and sociocultural parameters into development strategies, (ii) advocates a collective ethical leadership across the fabric of the society (e.g., economic, social, cultural etc.), and (iii) demonstrates how human values, norms, and perceptions can shape PEBs and policy responses for a sustainable development. Overall, this integrative approach aims to foster more inclusive, resilient, and ethically grounded pathways toward sustainable development. The review is structured as: Section 2 presents the methodology, Section 3 categorises the different parameters of the external macro-scale environment that affects individuals' choices, whereas Section 4 delves into the internal micro-scale dimensions of individuals' behavioural aspects. Section 5 and Section 6 demonstrate the interlinkages between personality traits theoretically and practically, respectively. Section 7 concludes the paper and offers policy implications for an ethical consensus for sustainable development.

2. Methodology

A review compiles and assesses existing knowledge, providing well-founded policy recommendations supported by robust and comprehensive arguments that satisfy various eligibility criteria to address multiple research goals (see Fig. 1). As outlined earlier, the study aims to integrate and highlight the significance of sociocultural and psychological dimensions within environmental science, with a particular focus on ethical consensus for integrating individuals' values, norms, and perceptions.

Fig. 1. The methodological flow of the review.

An exhaustive review of representative publications is investigated in the present overview based on the Scopus, Web of Science, and Google Scholar databases. All the databases have been utilized in order to find the most relevant and credible studies are widely used in similar reviews because they provide a rich bibliography on psychological, social, cultural, and environmental issues.

Regarding the eligibility criteria, there is the synthesis of past and recent publications in order to show both historical and state-of-the-art trend in academic literature. The publications have undergone an extensive and independent cross-checking process by the authors, leading to dependable and precise outcomes. However, the databases were undergone an advanced screening, based on the exclusion of several papers for (i) being articles in press, (ii) due to being in different language than English, (iii) for being duplicate, and (iv) for not meeting the general selection criteria.

3. The macro-scale perspective: From weak to strong sustainability

"The protection and improvement of the human environment … is the urgent desire of the peoples of the whole world and the duty of all Governments" (UN, 1973, p.3). The foundations of sustainable development are traced in the Brundtlant report that raised awareness regarding intra- and inter-generational equity (WCED, 1987) that can be linked to Rawls' (1971) *intergeneration distributive justice* or the more recent leaving-no-one-behind (LNOB) idea (UNSDG, 2022). Environmental frameworks are based, according to Soto (1996), on two contradictions: the one is the *right* of each country to exploit its natural resources, the other is the *duty* to not damage its natural environment. However, aim of environmental economic framework through institutional lens is to disincentivize countries to become "*free-riders*" (Halkos, 1996).

Table 1. Differences in the spectrum from very weak sustainability to very strong sustainability

Dimension	Very Weak Sustainability	Weak Sustainability	Strong Sustainability	Very Strong Sustainability	References
Ecology	Abundance (Cornucopian)	Shallow Ecology	Eco-Modernism	Deep Ecology	(Genovese and Pansera, 2021; Grunwald, 2018; Jonsson, 2014; Naess, 1973; Spash, 2013)
Millenium Assessment Scenarios	Order from Strength	Global Orchestration	Adapting Mosaic	Technogarden	(MEA, 2005)
Economy	Linear Economy (Fordism)	Follows reluctantly Circular Economy	Follows Circular Economy	Circular & Green Economy	(Geissdoerfer et al., 2017; Halkos and Aslanidis, 2024; Pearse, 1992; Stahel, 2016)
Environment & Natural Resources	Over-exploitation	Stewardship	Conservation	Preservation	(Andersen, 2006; Barbier, 2011; Gowdy and O'Hara, 1997; Gutés, 1996; Loiseau et al., 2016; Murray et al., 2017; Pearce and Atkinson, 1993)
Managerial Approach	Obstinate Technocratic	Flexible Econocentric	Decoupling	Ecocentric	
Ethics	Techno-optimism (Environmental and Social)		Ecological Thresholds	Deep Ecological Ethics	(Danaher, 2022; Huesemann and Huesemann, 2011; McKeown, 2018; Richardson et al., 2023; Rockström et al., 2009; Spash, 2013; Trisos et al., 2021)
Conclusion	Full Substitutability	Substitutability is allowed	Substitutability is restricted	Substitutability is forbidden	

One of the most characteristics debates in the environmental economics literature is regarding the substitutability between natural (e.g., ecosystems), human (e.g., values and ethics), and man-made (e.g., machinery) capitals (Dasgupta, 2021). On the one hand, the supporters of this substitutability refer to the *weak sustainability* (or Solow-Hartwick[4] sustainability), on the other hand, the *strong sustainability* supports that there is no substitutability between these forms of capitals (Mancebo, 2013; Neumayer, 2013; Victor et al., 1994).

Overall, the reason why natural capital is distinguished from the other forms of capitals is the "critical natural capital" because of its uniqueness and significance for ecosystems stability (e.g., irreplaceability, multifunctionality, and natural hazards protection etc) (Andersen, 2006; Dasgupta, 2008; Gutés, 1996; Neumayer, 2013; Ott and Thapa, 2003; Payeur-Poirier and Nguyen, 2017). A brief overview of the differences between the very weak and very strong sustainability is presented in Table 1. The discussion on the substitutability between natural capital with other forms is developed under different, ecological, environmental economics and managerial, psychological, and ethical lens.

3.1. Ecological Aspects

Cornucopianism is the belief that human ingenuity and technological progress can overcome natural limits, ensuring continual economic growth and abundance (Jonsson, 2014), however, this view is historically rooted in myths of abundance tied to natural philosophy, frontier expansion, and industrial development, though these have proven temporary. *Neo-Malthusians*, in contrast, argue that unchecked economic growth risks surpassing environmental limits, potentially causing existential threats to humanity (Gleditsch, 2003; Naudé, 2023). They emphasize on the finite nature of Earth's resources and the challenges of climate change, pollution, and ecological degradation. The debate reflects a broader tension between "optimism in technological solutions" (or techno-optimism) and caution about ecological constraints on human survival. Therefore, the cornucopian theory can be linked to the very weak sustainability framework.

The *shallow ecology* movement aims to deal with environmental pollution and depletion of resources, by covering also some health-related issues mainly in developed countries (Naess, 1973), however there is the argument that other important social issues are neglected (e.g., social justice) (Spash, 2013). Thus, the shallow ecology includes aspects of weak sustainability framework. For the *eco-modernism* theory, there is ambivalence between ecological crisis and the revolution of technology, because technological (e.g., circular economy) solutions can alleviate several environmental challenges but technological progress is also linked to resource depletion (Genovese and Pansera, 2021; Grunwald, 2018). This is the reason why the eco-modernism can be linked to strong sustainability but not with a very strong sustainability framework. Lastly, again based on Naess' theory, *deep ecology* covers the ethical concerns on all parameters of sustainable development (i.e., social, economic, and environmental) challenges (Spash, 2013), this is the reason why deep ecology movement should be linked to very strong sustainability framework.

3.2. The four MEA scenarios

The Millennium Ecosystem Assessment (MEA, 2005) outlines four global scenarios: (i) *Order from Strength*, (ii) *Global Orchestration*, (iii) *Adapting Mosaic*, and (iv) *Technogarden* in order to explore future human-environment interactions across a sustainability spectrum. These scenarios differ based on their proactive or reactive stance, regional or global orientation, and demographic-economic projections.

From a weak sustainability perspective, the *Order from Strength* is reactive and regional-oriented, with low economic growth and high population increase, aligning with very weak sustainability. Additionally, *Global Orchestration*, though reactive and global, features high economic growth and low demographic change, representing weak sustainability. Moving on the strong sustainability frameworks, the *Adapting Mosaic* is proactive and regional, with moderate economic and high demographic trends, fitting strong sustainability, whereas the *Technogarden*, which is proactive and global can be linked with rising economic growth and moderate population increases and reflects the very strong sustainability.

These scenarios highlight the risks of over-relying on substituting natural capital with other capital forms, which can threaten ecological stability. They also offer insights into the potential for achieving the Sustainable Development Goals (SDGs), suggesting that proactive scenarios (i.e., *Adapting Mosaic* and *Technogarden*) are better aligned with long-term sustainability and environmental preservation than the reactive ones.

3.3. The transition from linear to Circular Economy

The transition from the *linear economy* model to the *circular economy* emerged gradually between the 1960s and 1990s, driven by economic crises, environmental warnings, and global policy shifts (Geissdoerfer et al., 2017; Halkos and Aslanidis, 2024). From this moment, the transition from a throwaway mentality towards an eco-conscious mentality was apparent (Stahel, 2016). Therefore, the linear economy is in essence a very-weak sustainability approach. Regarding the debate between weak and strong sustainability it is important to show the impact of circular economy (Mancebo, 2013; Neumayer, 2013; Victor et al., 1994). Essentially, the transition from linear to circular economy is burdened by different psychology-related or sociocultural aspects in terms of individuals' denial to change their mentality, this is the reason why circular economy is placed between the weak and strong sustainability framework on the level at which people really want to change their consumption mentality. Lastly, the combination of circular economy principles and *green economy* (Pearse, 1992) can lead to a very strong sustainability framework.

3.4. Environmental Economics and Managerial Decision Making

The interconnectedness between natural, man-made, and human capital can be pivotal for sustainable development. In the environmental economics literature, the weak sustainability allows the substitution between these forms of capitals (Andersen, 2006; Barbier, 2011; Loiseau et al., 2016; Pearce and Atkinson, 1993), without recognizing the uniqueness and importance of natural capital (Gutés, 1996). There is the notion of obstinate technocratic, focusing on *techno-optimism* as noted before and is linked to very weak sustainability. Moreover, weak sustainability supporters support that technological advancements can allow for the substitutability among these capitals (Murray et al., 2017), which is referred as an ''*econocentric*'' approach, and belongs to the frameworks of very weak and weak sustainability.

The *decoupling* of economic growth from environmental degradation is also an interesting debate in environmental economics, however criticism has been raised regarding the possibility of decoupling due to decisive factors as problems regarding augmenting prices for energy, rebound effects in markets, and the limited adoption of circular economy solutions (Parrique et al., 2019). Therefore, the decoupling approach could be placed in the strong sustainability framework due to its challenges. Nevertheless, in the some restriction in natural capital substitution, but this is not happening in the ''*ecocentric*'' approach (Gowdy and O'Hara, 1997), that is linked to the strong and

very strong sustainability framework. It should be noted that depending on the scale of econocentrism and ecocentrism, these approaches might belong to more than one category. To conclude, from a managerial perspective, a pure technocratic approach is linked to very weak sustainability, whereas a pure ecocentric approach is placed to the very strong sustainability framework.

3.5. Ethical and Psychological aspects

This chapter might not be fully extended, as the sociological and psychological factors are going to be developed in the next chapters. However, this specific chapter is going to present some more abstract ideas regarding the impact of ethics and psychology on the weak/strong sustainability debate. The denial as a copying mechanism seems to be based mainly on the overall uncertainty regarding the causes, impacts, and imminent risks due to climate change (Dunlap, 2013) that can be escalated into a general trust issue of people against the scientific community (Weart, 2011). Moreover, the sociology-driven climatic scepticism reflects the interplay between different emotions and climate denial that are driven mainly due to fear (i.e., ostrich effect) (Haltinner and Sarathchandra, 2018).

On an ethical level, *techno-optimism* follows the main idea of weak sustainability's proponents. Environmental techno-optimism can be as technological advances can alleviate at a significant extent the negative environmental externalities through three sub-categories of techno-optimism, i.e., economic, food, and resource (Huesemann and Huesemann, 2011; McKeown, 2018). In this sense, the techno-optimism can refer on the very weak sustainability based on two issues: (i) regarding its ability to overcome the carrying capacity of the Earth and establish long-term growth, and (ii) regarding its impact on the status quo through the entropy version. However, these statements may be responded on the basis that, on the one hand, the techno-optimism is not entirely connected with the growth model that affects the carrying capacity, and on the other hand, there are scientific limitations on the impact of techno-optimism on the entropy challenge (Danaher, 2022).

Next in order, the respecting of *ecological thresholds* is essential for sustainable management, as their exceedance can result in severe consequences such as biodiversity loss, climate deregulation, or the collapse of ecosystems that human societies depend on. For instance, one of the most influential ecological thresholds publications are regarding the nine planetary boundaries that regulate and maintain the planet's stability and resilience (Richardson et al., 2023; Rockström et al., 2009). The ecological thresholds framework can be developed under the strong sustainability approach because it demonstrates the reasons why natural capital is important.

As mentioned previously, environmental economics should tip the balance between the parameters of sustainable development by questioning the orthodox economic schools of thought that focus mainly on monetary aspects, ultimately leading to the creation of heterodox schools of thought that observe mainly the non-marketed aspects such as *deep ecology* (Spash, 2013). This inclusion of non-marketed criteria can expand the economics literature towards ethical ecology (Trisos et al., 2021). To conclude, the deep ecology approach assimilates at a greater extent the very strong sustainability in comparison with the also important approach of ecological thresholds.

4. The micro-scale perspective: Values, Norms, Ethics and Perceptions

Sustainable development is not solely based on tangible aspects, but it is highly connected with intangible issues such as sociocultural and psychological elements. In this sense, the personal and social values, morals and perceptions can create PEBs such as norms that can ultimately transform

into actions for sustainable development. In essence, the ethical and moral compasses are fundamental prerequisites of homo economicus.

The past decades, there were several aspects in environmental psychology and sociology that have paved the way for the inclusion of intangible characteristics in environmental science. An overview of this environmental psychology and sociology framework is presented at Table 2, whereas the categorisation of their cognitive/motivational issues, normative components, and behavioural outcomes are presented at Table 3. The following text is going to delve into the interconnectedness of psychological and communal elements that can create an ethical consensus for sustainable development.

The roots of the environmental science connection between sociology and psychology can be traced to three general strands: (i) the *Theory of Planned Behaviour (TPB)*[5], the *Norm Activation Model (NAM)*, and the *Value-Belief-Norm (VBN) Theory.* These frameworks have been widely used to explain human behaviour in environmental action context (Gkargkavouzi et al., 2019). Together, they provide a framework for understanding humanity's connection to the physical environment and the consequences of becoming disconnected from it.

Table 2. Framework overview for environmental, psychological, and social behaviours.

Model / Theory	Aim	Reference
Theory of planned behaviour (TPB)	The TPB can be utilized in measuring the benefits and disadvantages of behaviour aspects under the logical assumption that people make reasonable choices based on the highest potential benefit either for monetary (e.g., financial) or non-monetary (e.g., social approval) issues.	(Ajzen, 1991)
Value Theory (VT)	The "value theory" show that the PEB is highly linked to individuals that focus on more intellectual aspects (e.g., altruism, pro-social behaviour, and natural-related values as biospheric values).	(Schwartz, 1992; Stern et al., 1995)
New Environmental Paradigm (NEP)	Environmental concern is the epicentre of NEP, showing how higher environmental anxiousness (or related issues) can be linked with more PEB-focused action.	(Dunlap et al., 2000; Dunlap and Van Liere, 1978)
Norm-Activation Model (NAM)	The NAM showcases the importance of moral obligations on underpinning environmental action.	(Schwartz, 1977; Schwartz and Howard, 1981)
Value-Belief-Norm (VBN)	The VBN explains how people's (e.g., altruistic, biospheric, and egoistic) values influence their beliefs, which in turn shape their personal norms and ultimately drive their PEB.	(Stern, 2000, 1999; Stern et al., 1999)
Theory of Normative Conduct (TNC)	The TNC incorporates the injunctive and descriptive norms, the former is focused on how behaviours are acceptable or non-tolerant, while the latter refers the commonness of a norm in comparison with others.	(Cialdini et al., 1991, 1990)
Social Cognitive Theory (SCT)	The SCT is based on the "self-efficacy" concept that reflects an individual's belief and their capability on acting pro-socially and in extension pro-environmentally.	(Bandura, 1986, 1977)

Initially, the TPB provides the basis for comparing the benefits or costs under the scope of behavioural decision-making for both monetary (i.e., money-related) and non-monetary (e.g., social approval or tolerance) issues (Ajzen, 1991). This theory has detrimentally affected the environmental science by monitoring how beliefs, intentions, and attitudes can influence subjective norms and create an intentional behaviour to people such as the adoption of PEBs, ecologically conscious consumer behaviour (ECCB) or ethically minded consumer behaviour (EMCB) (Chen et al., 2022; Ishaq et al., 2025; Le and Kieu, 2019; Zollo et al., 2018).

Interesting are also the interconnectedness between the value theory, the NAM, and the NEP have led to the creation of VBN theory. The NEP has brought the environmental concern at the

epicentre of psychology and sociology literature, showing how higher eco-anxiety (or similar issues) can transform norms into actions (Dunlap et al., 2000; Dunlap and Van Liere, 1978). Moreover, the value theory presented how PEBs is affected by the personal altruistic, pro-social, or even environmental concerns (Schwartz, 1992; Stern et al., 1995), and additionally, the NAM further includes the moral obligation towards environmental action (Schwartz, 1977; Schwartz and Howard, 1981). All these have greatly influenced the so-called VBN theory which explains how people's (e.g., altruistic, biospheric, and egoistic) values influence their beliefs, which in turn shape their personal norms and ultimately drive their PEB (Stern, 2000, 1999; Stern et al., 1999).

Table 3. Conceptual similarities and differences in environmental, psychological, and social behaviours.

Model / Theory	**Cognitive & Motivational Issues**	**Normative Components**	**Behavioural Outcomes**
TPB	Beliefs, behavioural intentions & attitudes	Subjective norms	Intentional behaviour (e.g. PEB, EMCB, ECCB)
Value Theory	Values influence how people interpret environmental issues (e.g., seeing climate change as a moral concern).	Values activate personal norms (e.g., moral obligations to act) and serve as internal standards for appropriate behaviour regardless of external pressures.	Personal guide of behaviour across life, including PEBs (e.g., environmental activism and ethical consumption, etc.)
NEP	General pro-environmental worldview and moral concern	Underpins personal norms (VBN/NAM)	Belief foundation (input to VBN/NAM)
NAM	Awareness of consequences (e.g., personal responsibility)	Moral obligation	Altruistic/pro-social behaviour
VBN	Environmental beliefs (via NEP)	Personal moral norms	Norm-based PEB
TNC	Conformism to social expectations driven by the need for social acceptance or moral alignment.	Descriptive norms (what is done) and injunctive norms (what ought to be done) that may conflict or reinforce each other.	Behaviour aligned with individual's norms, either positive (e.g., recycling) or negative (e.g., littering).
SCT	External learning (mimicking others' behaviour) and internal learning (e.g., self-efficacy, capability to perform a PEB)	Social norms are internalized.	Behavioural change through learning (e.g., environmental and ethical actions)

Furthermore, two more theories have shed light on the environmental psychology and sociology regarding the need to focus more on environmental aspects. The social cognitive theory (SCT) presented the significance of a person's capacity to overcome its difficulties and ultimately adopt a pro-social and environmental conscious behaviour. This is achieved through a dual transformation, an internal that focuses on "self-efficacy" and external learning by observing and mimicking others' PEB, hence the SCT is pivotal in environmental education (Bandura, 1986, 1977). In addition, there is also the theory of normative conduct (TNC) that includes two forms of norms, i.e., the injunctive norm that is exercised through a trial-and-error process, and the descriptive norms that a person understands if its behaviour is common to the others', hence how a personal norm assimilates the broader social conformity (Cialdini et al., 1991, 1990).

The previous psychological and sociological theories have been expanded in the environmental science literature, recently the notions of voluntary environmental behaviour (VEB), stimulus-organism-response (STR) theory, goal-framing (GFT) theory, ethically minded consumer behaviour (EMCB), and Ecologically Conscious Consumer Behaviour (ECCB) have incorporated the frameworks in order to further boost sustainable development.

In the business sector, managerial decision-making has adopted the principles of corporate social responsibility (CSR) and environmental and social governance (ESG) that are focused both on internal (e.g., employees) or external (e.g., consumers) stakeholders. It has been proved, for example, that the employees' VEB can strengthen and support a company's strategy (Biswas et al., 2022).

Policymakers, academicians, and other stakeholders have raised concerns regarding the need of a socio-environmental consensus for ecological-focused and ethical-driven consumption. Under the scope of circular economy, the SOR theory has evaluated how ethical concerns can be raised through communication initiatives (i.e., media richness and content trustworthiness) and how can these affect consumers' plastic waste recycling behaviour (Mehmood et al., 2024). Moreover, the SOR theory has been used in accordance with the GFT regarding the raising of environmental concerns due to the impact of different factors (e.g., vividness) on eco-tourism (Wei et al., 2024).

An interesting ethical parameter is *collectivism* which has been show to influencing the EMCB of consumers in Vietnam (Le and Kieu, 2019). A study based on VBN, showed that the environmental and religious concerns play an important role on consumers' EMCB for fashion products in Pakistan; more specifically, the ethical concerns are based on the sentiments of *empowerment* and *self-transformation* (Ishaq et al., 2025). Another study focused on how TPB and NEP can affect ECCB regarding the measurement of ethical consumption, showing that policymakers and practitioners should include the impact of *moral intuition* (Zollo et al., 2018). Furthermore, under the scope of social responsibility, the impact of *pro-sociality* moderates the interlinkages between eco-responsibility, eco-attitude, and ecological purchasing behaviour (Chen et al., 2022).

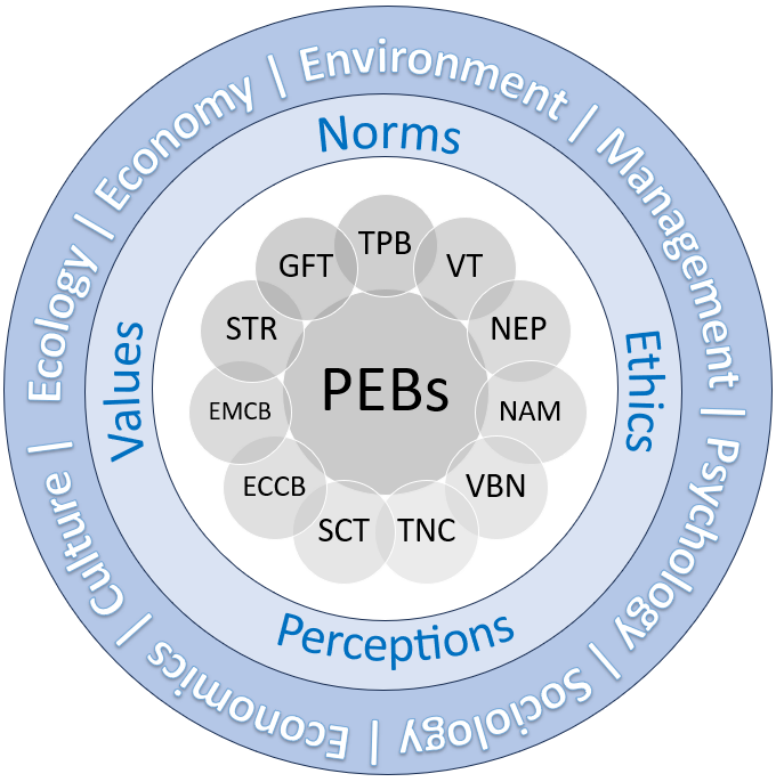

Fig. 2. The external and internal parameters that affect an individual's pro-environmental behaviours.

To recapitulate, theories like VEB, EMCB, and ECCB expand earlier models to promote sustainable development and ethical – employee and/or consumer – behaviour (see Fig. 2). Apparently, it is the role of CSR and ESG principles that now shape business strategies, with evidence

showing employees' VEB enhances corporate sustainability efforts. In essence, recent studies highlight the role of ethics, collectivism, religion, and pro-sociality in driving eco-conscious behaviour, urging policymakers to consider moral intuition and communication in fostering ecological responsibility for sustainable development.

5. The aspects of Big Five Personality Traits in Environmental Science

The basis of the Big Five Personality Traits (BFPT)[6] (or Five Factor Model, FFM) is based on Fiske's work that concluded that four aspects can be distinguished in a personality: (i) social adaptability, (ii) emotional control, (iii) conformity, and (iv) inquiring intellect (Fiske, 1949), and a fifth dimension that was not included in the Fiske's work, based on a later-published review, seems to be "will to achieve" (Digman, 1990; Digman and Takemoto-Chogk, 1981).

Other alterations of BFPT have been proposed that include emotionality and cultural as pivotal elements[7] (Norman, 1963; Tupes and Christal, 1961) or to include (i) neuroticism, (ii) extraversion, (iii) openness to experience, (iv) agreeableness, and (v) conscientiousness (i.e., the *OCEAN* framework) (McCrae and Costa, 1985a, 1985b) that is an extension of Eysenck's work on "the structure of human personality[8]. Therefore, the BFPT categorizes important factors of an individual's characteristics under the scope of pure psychological elements. However, these aspects do not cover entirely the so-needed environmental aspects; therefore, more recent publications have covered this need.

The last three decades, several publications have incorporated environmental-related aspects under the structure of human personality (see Fig. 3); for instance, the linkages of BFPT with environmental concern (Abdollahi et al., 1999), with consumerism or environmentalism (Hirsh and Dolderman, 2007), or environmental engagement (Milfont and Sibley, 2012).

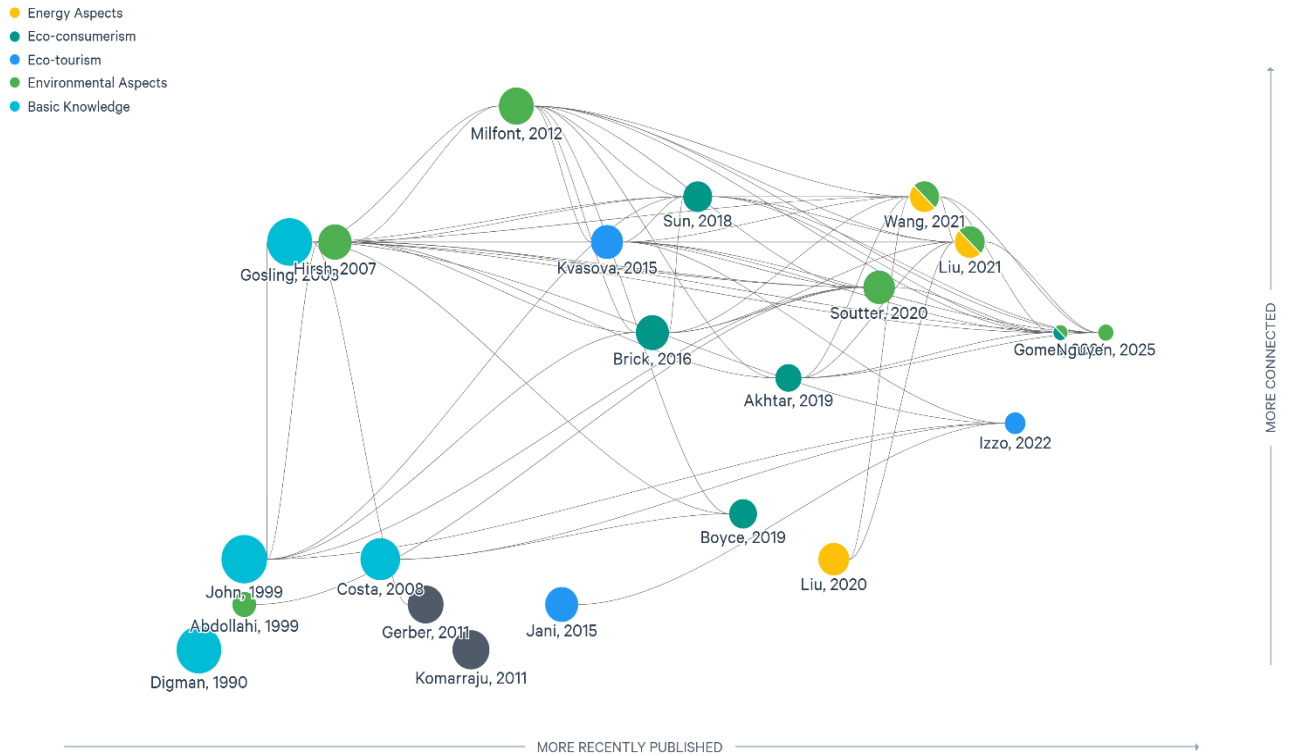

Fig. 3. Personality Traits in Environmental Science. Source: Figure created by the authors from litmaps.com

The influence of BFPT factors on household energy-saving behaviours has been studied in China, using an extension of the TPB framework, showing the complex interplay between personality and socio-psychological elements in shaping PEBs in order to enhance energy efficiency in residential settings (Liu et al., 2021, 2020; Wang et al., 2021).

Personality traits (i.e., particularly openness, conscientiousness, extraversion, and agreeableness) can significantly impact eco-consumerism, PEB, green finance choices, and circular economy engagement, with effects varying by age and gender. A study that employed the HEXACO personality traits in order to show the interlinkages between PEBs and the efforts to minimize greenhouse gas emissions, where from the HEXACO attributes the most influential factors were openness, conscientiousness, and extraversion (Brick and Lewis, 2016). Other interesting results showed that generation Y and mainly females are influenced mainly by agreeableness, conscientiousness, and attitude on intention to purchase eco-products, whereas people that belong to non-generation Y or males are affected mainly by extraversion and openness-to-experience attitude (Sun et al., 2018).

The OCEAN framework has been also applied in order to find how personality traits can explain non-marketed economic valuation of individuals' willingness to pay for environmental goods or services, showing the rising trend of combining psychological-related to environmental valuation studies (Boyce et al., 2019). Similarly, the BFPT can explain individuals' financial choices between traditional and green shares (Akhtar, 2022); therefore, practitioners in financial markets should observe more practically the eco-consumer attitudes. In a similar way, consumer's engagement to circular economy aspects seems to be higher when the consumers are younger people of women when the 3 M Model[9] is applied (Gomes, 2025), this study highlights the importance of changing an individual's mentality for the transition from linear to circular economy based on Stahel's (2019, 2016) proposition.

The psychological and sociocultural aspects can also impact eco-consumerism in specific sectors, for example in eco-tourism. An interesting study showed the extension of SOR theory based on BFPT factors, especially with the factors of extraversion, openness to experience and agreeableness (Jani and Han, 2015). Another study in Cyprus shed light on how BFPT can be linked to touristic environmentalism, more specifically, PEBs of tourists are influenced by agreeableness, conscientiousness, extraversion, and neuroticism, however openness did not show potential linkages with ecological action (Kvasova, 2015). In addition, the BFPT framework was combined with sentiment analysis and machine-learning models in order to show the tourists' personality trains (Izzo and Picone, 2022), revealing the potential advantages of using BFPT framework with other technical tools in order to improve decision making in tourism management.

6. Monitoring the structure of psychological-oriented frameworks: three cases

In the first case study, White et al. (2019) monitored primary and secondary barriers[10] of target-consumers regarding the five most impactful behaviour change challenges, i.e., energy conservation, transportation choices, food choices, waste disposal, and material purchases by observing 320 articles from which the 40 were used for introducing the need for such a scheme and the rest 280 for representing, analysing, and blueprinting the core SHIFT[11], factors.

Therefore, for each – primary and secondary – barrier a respective toolbox of solutions has been created by addressing each SHIFT category. Firstly, the ***social*** parameter contains issues such as the

boost of healthy competition, the reminding of descriptive[12] and injunctive social norms, and the impact of public commitments to behavioural change (inter alia: (Han and Stoel, 2017; Nolan et al., 2008; White and Simpson, 2013)).

Additionally, the ***habit***-related factor is linked to undoing bad habits (Walker et al., 2015) such as daily routine-related unwanted actions (Donald et al., 2014), to make the sustainable solution seem as the only logical and "default option" (Pichert and Katsikopoulos, 2008; Steg and Vlek, 2009), and promote the use of incentives or disincentives (inter alia: (Cairns et al., 2010; Walker et al., 2015)).

Moreover, the third ***individual***-oriented parameter contained solutions such as the appeal to self-interest (Griskevicius et al., 2012; Schuitema and de Groot, 2015), self-efficacy (White et al., 2011), and individual differences (Paul et al., 2016; Steg et al., 2014) of each consumer by highlighting how the personal choices can be pivotal or detrimental for consumer behaviour, for example, the women or younger people tend to have more agreeable and pro-environmental attitudes (Luchs and Mooradian, 2012; Semenza et al., 2008).

The fourth parameter of ***feelings and cognition*** can be also linked to the previous factors, as the feeling of guilt or especially the "collective guilt" (as disincentive or loss-frame) but with scrutiny might derail an unsustainable behaviour towards more pro-environmental ways of behaving (Ferguson et al., 2011; Luchs and Mooradian, 2012); similarly, the promotion of the feeling of pride or warm glow effects as forms of incentive (or gain-frame) can boost the acceptance of sustainable consumption (inter alia: (Bissing-Olson et al., 2016; Giebelhausen et al., 2016)**)**.

The ***tangibility*** factor is used to instil the core sustainability ideas of "future" and "long-lasting" mentality by providing solely practical solutions such as interventions such as realistic symbolism and well-known facts such as statistics (inter alia: (Arnocky et al., 2014; Marx et al., 2007; Reczek et al., 2018)). Therefore, the SHIFT framework can address the potential behavioural barriers by leveraging social norms, habit change, self-interest, emotions, and tangible interventions to promote sustainable consumer behaviour.

In the second case study, Whitmarsh et al. (2022) monitored a sample of 1338 participants regarding climate anxiety (or eco-anxiety) based on thirteen factors related to several demographic (e.g., income), psychological (e.g., nature connectedness), experiential (e.g., direct or indirect), mental health, environmental values, and pro-environmental behaviour (e.g., visiting nature) parameters as in Table 4. The findings shed light on different aspects, as inter alia, that climate anxiety affected more younger people, people with existing generalized anxiety, and environmental-related information-seekers; overall, the findings show how eco-anxiety can be a driving force for change and action. In essence, Whitmarsh et al. (2022) alerted for the need of prioritizing the understanding regarding the psychological implications of eco-anxiety by monitoring the liaisons between psychological health and the climate emergency.

In the third case study, Wamsler and Bristow (2022) conducted a survey based on 76 in-depth responses from high-level active or ex-policymakers, revealing different findings either on how the human-mind is perceived as a victim of climate crisis and how it can also be deemed as a key parameter of climate change as well as a barrier to action. In addition, the speculation of there is a vicious cycle between personal or communal choices (i.e., mind) and climate change is not mirrored in the present policymaking process that cannot follow sustainable development route. The conclusion is that policymaking process should focus also on the environmental aspects that affect

people and not solely on other, of course, important but widely acknowledged fields such as education and health.

Table 4. Measures in Whitmarsh et al. (2022) relying on previous studies

Notion	Reference
Climate change concern, energy reliably, and energy affordability (% very/extremely worried). Moreover, other issues covered in the specific references also included personal norms, self-efficacy, and outcome expectancy.	Poortinga et al. (2021)
13 constituted the climate change anxiety scale **(CCAS)**[13] (8 items represented cognitive-emotional impairment while 5 measured functional impairment), 3 items measured experience of climate change and; 6 items measured behavioral engagement.	Clayton and Karazsia (2020)
The generalized anxiety disorder (**GAD-7**)[14] is a valid and efficient tool for screening GAD and assessing its severity in clinical practice and research based on 7-item anxiety scale.	Spitzer et al. (2006)
The Five Facet Mindfulness Questionnaire (**FFMQ**)[15] is a widely used mindfulness measure that includes five subscales: Act with Awareness, Describe, Nonjudge, Nonreact, and Observe.	Medvedev et al. (2018)
Environmental values were measured with a short version of the New Environmental Paradigm (**NEP**)[16] scale.	Dunlap et al. (2000)
Nature relatedness was measured using the **NR-6**[17].	Nisbet and Zelenski (2013)
Pro-environmental behaviour (**PEB**) was measured by summing frequency of eight pro-environmental actions[18] and one more high-impact environmental regarding red meat consumption.	Authors' input (Whitmarsh et al., 2022) and only for red meat consumption: Ivanova et al. (2020)
Generic questions regarding: (1) visit to green space, (2) experience of climate impacts, (3) information exposure, and (4) information seeking.	Authors' input (Whitmarsh et al., 2022)

Wamsler and Bristow (2022) presented three categories regarding the intersection between mind and climate change, showing that mind (i) can be a victim of climate change, (ii) can be a root cause of climate change, and can be a barrier to climate action, resulting in a fourth category for the need to dismantle the vicious cycle of the first category.

The first category, i.e., mind as a victim of climate change, includes the aspect of "climate anxiety" as climate crisis can impact our inner lives by making people feel as powerless; moreover, this category also includes the implication of "burnout and overwhelm" including mainly the indirect mental effects as well as linkages to anxiety due to discontentment from current climate action. The second category, i.e., mind as a root cause of climate change, focuses on its "role" on destroying the environment as "heart of the climate crisis" and on the "disconnection" from it, as this alienation led to growing fear and inner crisis. Moreover, the previous two aspects can be linked to a third important phenomenon, i.e., "the current economic paradigm" in which the "endless pursuit of material possessions'' due to commercialization has further alienated people from their inner values and capacities. The third category, i.e., the mind as a barrier to climate action, sheds light on *biases* (e.g., interpersonal relations and bias towards specific social groups), *climate avoidance and denial* (e.g., people cannot accept the "climate crisis is the ultimate existential crisis"), and *short-term thinking* (e.g., inability to cope with long-term phenomena such as climate change, overconsumption, or pandemics).

The final category about the *vicious cycle* and how to disrupt it, there are powerful "feedback loops" such as that the "the sense that we're on the wrong track" can be explained by the structure of the current economic linear model that neglects the importance of environment and also the inability to change it into a circular model that respects the finite raw material stocks of earth.

Having all the parameters in mind, the shift from a vicious to a virtuous cycle of mind and climate change needs an integrating framework for dismantling mental-related barriers and boosting climate-related policies and actions. For example, the dealing with climate change or other social phenomena (e.g., poverty or social exclusion) can alleviate the sentiment of eco-anxiety, resulting in a virtuous cycle. Another example is also the mainstreaming of approaches from policymakers to the wide public in order to establish a common understanding regarding eco-anxiety, resulting in the revelation of social problem from the peoples' subconscious and make it apparent and easier to deal with it. It ought to be mentioned that this example has been proved to be extremely difficult to achieve due to inability to understand and denial reasons.

7. Conclusions and Policy Implications

The present review investigates the critical role of psychological and sociocultural variables in fostering sustainable development. It underlines the critical necessity for collaborative and responsible action to safeguard the environment while ensuring inclusive, equitable growth. Hence, it is high time that leaders from all sectors to react to the dual appeal of environmental preservation and social justice, with a focus on the LNOB idea. True progress requires a deep sociocultural and economic transformation, one that challenges (not blends with) the principles of orthodox economics. Environmental economics argues for moving beyond traditional models by embracing heterodox economics and other social or psychological sciences to foster meaningful personal and disciplinary change. Nevertheless, this shift demands a clear moral consensus from past frameworks and the ideologies that uphold them, as a new way of thinking.

Policy implications that can allow for an ethical consensus should focus on the three pivotal parameters for sustainable development, i.e., psychological, social, and economic factors. In the case of psychological dimension, it is important to constantly demonstrate eco-conscious and ethical values in environmental education (e.g., through campaigns) in order to create a common framework for sustainable development. Therefore, the people through internal (e.g., self-efficacy) or external (e.g., mimicking the others) stimuli can adopt PEBs and overcome present bias (i.e., short-term thinking) that is detrimental. In regard to the social dimension, having a proper educational framework and common information-communication campaigns is important; however, what does really matter is to raise awareness regarding environmental challenges by adopting a participatory governance that involves people from the fabric of the society. Hence, a participatory governance model would enable to focus on the intra- and inter-generational justice. Lastly, for the economic-related factors, financial disincentives can also affect consumers' behaviour based on principles such as the polluter-pays-principle in order to complement circular economy policies. The role of disincentives is not the best solutions, nevertheless it can influence people to follow more eco-conscious initiatives, as noted before.

The review focuses on how values, norms, ethics, and perceptions influence both individual conduct and wider environmental contexts, where these characteristics impact on how societies perceive environmental concerns, prioritize sustainable development goals, and respond to policy measures. In essence, sustainable development is more than just a technical or economic challenge; it is also an extremely social and ethical endeavour. As a result, the inclusion of psychological and cultural factors promotes a more inclusive and adaptable strategy that may bring together various stakeholders. In short, these principles serve as a moral compass that can promote an ethical consensus towards common morals for sustainable development.

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[1] Ethics in Action for Sustainable Development is an initiative that shows the importance of a moral consensus among people in order to achieve sustainable development goals (Sachs and Flanagan, 2022, p.1)

[2] Circular economy refers to an economic model that aims to minimize waste and make the most of resources by designing products and processes for reuse, repair, remanufacturing, and recycling. It contrasts with the traditional linear economy, which follows a "take-make-dispose" approach, by creating closed-loop systems that reduce environmental impact and promote sustainability (Geissdoerfer et al., 2017; Halkos and Aslanidis, 2024).

[3] Sustainable development is a development approach that meets the needs of the present without compromising the ability of future generations to meet their own needs (WCED, 1987); moreover, it balances economic growth, environmental protection, and social equity to ensure long-term well-being and resource sustainability.

[4] For more information, please see Neumayer (2013, p. 22) .

[5] For more information of TPB please refer to (Ajzen, 1991); regarding the NAM to (Schwartz, 1977); and for the VBN to (Stern et al., 1999).

[6] An interesting review for the BFPT has been presented in: (John and Srivastava, 1999), while important applications are: (Costa and McCrae, 2008; Digman, 1990; Gosling et al., 2003). It should be noted that the BFPT has been extended with the incorporation of individuals' traits of "honesty and humility" under the acronym HEXACO (Soutter et al., 2020)

[7] The BFPT have been presented as (i) surgency, (ii) agreeableness, (iii) dependability, (iv) emotional stability, and (v) culture (Tupes and Christal, 1961), or similarly, the BFPT aspects: (i) surgency, (ii) agreeableness, (iii) consciousness, (iv) emotionality, and (v) culture (Norman, 1963).

[8] For more information, please see: (Eysenck, 1970).

[9] The 3M Model (i.e., Meta-theoretic Model of Motivation), highlights how enduring personality traits influence motivation, which in turn affects attitudes and behaviours, including eco-consumerism and it gives emphasis on how deeper psychological traits. The 3 M Model is based on other theories in psychology literature, for more information please see: (Mowen, 2000, p. 6) .

[10] The terms *primary* and *secondary* barrier refer to the strongest and the next strongest avoidance response regarding the SHIFT scheme.

[11] ***SHIFT*** stands for behaviour aspects that can impact environmental consumer behaviour by targeting the *Social, Habit, Individual self, Feelings and cognition,* and *Tangibility* aspects of an individual.

[12] *Descriptive norm* responds to what other people are doing or commonly do and can be more influential than other parameters (e.g., self-interest) regarding sustainable consumer behaviour (Cialdini et al., 1990; Reno et al., 1993), whereas, *injunctive norms* refer to the behaviours that other people either approve or disprove (White and Simpson, 2013).

[13] The 22 items in ***Climate Change Anxiety Scale*** from (Clayton and Karazsia, 2020): (1) Thinking about climate change makes it difficult for me to concentrate; (2) Thinking about climate change makes it difficult for me to sleep; (3) I have nightmares about climate change; (4) I find myself crying because of climate change; (5) I think, "why can't I handle climate change better?; (6) I go away by myself and think about why I feel this way about climate change; (7) I write down my thoughts about climate change and analyse them; (8) I think, "why do I react to climate change this way?"; (9) My concerns about climate change make it hard for me to have fun with my family or friends; (10) I have problems balancing my concerns about sustainability with the needs of my family. (11) My concerns about climate change interfere with my ability to get work or school assignments done. (12) My concerns about climate change undermine my ability to work to my potential. (13) My friends say I think about climate change too much. (14) I have been directly affected by climate change (15) I know someone who has been directly affected by climate change (16) I have noticed a change in a place that is important to me due to climate change (17) I wish I behaved more sustainably (18) I recycle (19) I turn off lights (20) I try to reduce my behaviours that contribute to climate change (21) I feel guilty if I waste energy (22) I believe I can do something to help address the problem of climate change.

[14] The 4 scale ***GAD-7*** tool of (Spitzer et al., 2006) include the 7 following items: (1) Feeling nervous, anxious or on edge, (2) Not being able to stop or control worrying, (3) Worrying too much about different things, (4) Trouble relaxing, (5) Being so restless that it is hard to sit still, (6) Becoming easily annoyed or irritable, and (7) Feeling afraid as if something awful might happen.

[15] The ***18-item FFMQ*** from (Medvedev et al., 2018): ***Observe*** has three items: (1) I pay attention to physical experiences, such as the wind in my hair or sun on my face; (2) I notice visual elements in art or nature, such as colours, shapes, textures, or patterns of light and shadow; and (3) I notice the smells and aromas of things. ***Act*** has three items: (4) I find it difficult to stay focused on what's happening in the present moment; (5) I rush through activities without being really attentive to them; (6) It seems I am "running on automatic" without much awareness of what I'm doing. ***Nonjudge*** has three items: (7) I make judgments about whether my thoughts are good or bad; (8) I think some of my emotions are bad or inappropriate and I shouldn't feel them; and (9) I tell myself I shouldn't be feeling the way I'm feeling. ***Describe*** has five items: (10) I'm good at finding words to describe my feelings; (11) It's hard for me to find the words to describe what I'm thinking; (12) I can easily put my beliefs, opinions, and expectations into words; (13) Even when I'm feeling terribly upset, I can find a way to put it into words; (14) When I feel something in my body,

it's hard for me to find the right words to describe it. ***Nonreact*** has 4 items:(15) Usually when I have distressing thoughts or images I am able just to notice them without reacting; (16) When I have distressing thoughts or images, I feel calm soon after; (17) I watch my feelings without getting carried away by them; (18) When I have distressing thoughts or images, I don't let myself be carried away by them.

[16] The 15-item in the ***NEP*** from (Dunlap et al., 2000) are questions that can be responded based on agree or disagree that:(1) We are approaching the limit of the number of people the earth can support; (2) Humans have the right to modify the natural environment to suit their needs; (3) When humans interfere with nature it often produces disastrous consequences; (4) Human ingenuity will insure that we do NOT make the earth unliveable; (5) Humans are severely abusing the environment; (6) The earth has plenty of natural resources if we just learn how to develop them; (7) Plants and animals have as much right as humans to exist; (8) The balance of nature is strong enough to cope with the impacts of modern industrial nations; (9) Despite our special abilities humans are still subject to the laws of nature; (10) The so-called "ecological crisis" facing humankind has been greatly exaggerated; (11) The earth is like a spaceship with very limited room and resources; (12) Humans were meant to rule over the rest of nature; (13) The balance of nature is very delicate and easily upset; (14) Humans will eventually learn enough about how nature works to be able to control it; (15) If things continue on their present course, we will soon experience a major ecological catastrophe.

[17] The 6-item nature relatedness scale (NR-6) from (Nisbet and Zelenski, 2013) has four items that monitor self-identification reflected in spirituality and two items that represent individual differences in the need for nature and comfort with wilderness. The 6-items of **NR-6** are: (1) my ideal vacation spot would be a remote, wilderness area; (2) I always think about how my actions affect the environment; (3) my connection to nature and the environment is a part of my spirituality; (4) I take notice of wildlife wherever I am; (5) my relationship to nature is an important part of who I am; and (6) I feel very connected to all living things and the earth.

[18] The 8-item **PEB** from the authors (Whitmarsh et al., 2022) include as at the moment, roughly how many times per month do you do each of the following?; (1) eat organic, locally-grown or in season food; (2) encourage other people to save energy; (3) buy products with less packaging; (4) recycle household waste (e.g. glass); (5) avoid wasting food (e.g. by using leftovers); (6) buy second-hand items; (7) borrow or rent items (e.g. tools, toys); and (8) repurpose something for a different use, instead of throwing it away.