sustainability

MDPI

Review

Why Knowing about Climate Change Is Not Enough to Change: A Perspective Paper on the Factors Explaining the Environmental Knowledge-Action Gap

Serena L. Colombo [1], Salvatore G. Chiarella [1,2], Camille Lefrançois [3], Jacques Fradin [3], Antonino Raffone [1,4] and Luca Simione [5,6,*]

[1] Department of Psychology, Sapienza University of Rome, 00185 Rome, Italy; antonino.raffone@uniroma1.it (A.R.)
[2] International School for Advanced Studies (SISSA), 34136 Trieste, Italy
[3] Laboratoire de Psychologie et de Neurosciences, Institut de Médecine Environnementale (IME), 03700 Serbannes, France
[4] School of Buddhist Studies, Philosophy, and Comparative Religions, Nalanda University, Rajgir 803116, India
[5] Dipartimento di Scienze Umane e Sociali Internazionali, UNINT Università degli Studi Internazionali, 00147 Rome, Italy
[6] Institute of Cognitive Sciences and Technologies (ISTC), National Research Council (CNR), 00185 Rome, Italy
* Correspondence: luca.simione@unint.eu

Abstract: A successful transition to a lower-emission society may require major changes in the patterns of individual behaviours. Yet, whilst awareness and concern about climate change have increased in recent years among the global population, global greenhouse gases emissions have not ceased to rise. This paper discusses potential reasons underlying the gap between individual knowledge of climate change and the actions implemented to contain greenhouse gas emissions. To investigate this phenomenon, we look at the scientific literature exploring the factors influencing pro-environmental behaviour. First, we highlight how an individual's environmental knowledge is not only approximate but also biased by cognitive, affective, and cultural factors, influencing their appraisal of climate information and their motivation to act. Second, we discuss three major models of pro-environmental behaviour, such as the Theory of Planned Behaviour (TPB), the Norm-Activation Model (NAM), and the Value-Belief-Norm (VBN), to highlight their failure to account for automatic cognitive and affective factors influencing an individual's ability to implement pro-environmental intentions. Then, we discuss the Comprehensive-Action-Determination Model of pro-environmental behaviour (CADM), and its efforts to overcome the limits of the previous models. Finally, we examine the dispositional traits associated with pro-environmental engagement to highlight how the relationship between dispositions and pro-environmental behaviour performance appears related to self-regulation processes, supported by executive functioning; increased self-regulation would enable alignment of pro-environmental intentions and behaviours, and anticipation of the long-term consequences of present behaviours. We conclude by calling for more research to be carried out on the effect of enhanced self-regulation, and of self-regulation training, on individual reactions to the climate crisis.

Keywords: pro-environmental behaviour; knowledge-action gap; self-regulation; executive functions

Citation: Colombo, S.L.; Chiarella, S.G.; Lefrançois, C.; Fradin, J.; Raffone, A.; Simione, L. Why Knowing about Climate Change Is Not Enough to Change: A Perspective Paper on the Factors Explaining the Environmental Knowledge-Action Gap. *Sustainability* **2023**, *15*, 14859. https://doi.org/10.3390/su152014859

Academic Editor: Renata Dagiliute

Received: 10 August 2023
Revised: 8 October 2023
Accepted: 9 October 2023
Published: 13 October 2023

1. Introduction

The latest provisional report by the World Meteorological Organisation [1] provides a perspective on the state of the environment, which supports the acknowledgement of the anthropogenic origins of the recent acceleration of climate change. In 2022 the global mean temperature was about 1.15 °C above pre-industrial levels, and the years 2015 to 2022 were the warmest on record. In the past year, ocean heat content reached new record highs, accelerating cryosphere melting and sea level rise, and extreme weather events

became more common across the globe. During the same time, global greenhouse gases emissions continued to increase despite the call for action launched by climatologists of the International Panel on Climate Change [2].

It is understood that a successful transition to a lower-emission society, along with the crucial intervention of political and economic stakeholders, also requires major changes in the patterns of individual behaviours. Evidence shows that households account for over 60% of global greenhouse gases emissions, either through direct energy use (used in the home and in transportation) or indirect energy use (related to the production, use, and disposal of the products and services consumed) [3–5]. Furthermore, studies have shown that individuals' emissions (e.g., their "carbon footprint") [6] are strongly related to behaviours, lifestyles, and routines over which they have a relatively large degree of control [6–12]. That is why the importance of educating individuals on the state of climate change, and on their role in curbing emissions, appears indisputable. However, paradoxically, whilst awareness and concern about climate change have increased in recent years among the global population (e.g., two thirds of the +14 population among fifty countries consider climate change a global emergency needing urgent response) [13], global greenhouse gases emissions have not ceased to rise, even in countries where such increases are not justified by a welcomed improvement of living conditions [2,14]. This would suggest that holding more knowledge and awareness about climate change does not necessarily lead to a steady change in individuals' behaviours.

To try to shed a light on this apparent contradiction, we review the contributions of environmental, social, and cognitive psychology literature, in investigating what appears to either drive or obstruct pro-environmental behaviour (PEB), i.e., behaviour that seeks to minimize the negative impact of one's actions on the environment [15], to try to answer to the following question: why, though increasingly aware of the environmental crisis and of the threats it poses to humanity, individuals are struggling to embrace the behavioural changes needed to prevent extensive damage to humans and nature? Specifically, our article wishes to highlight the flaws of an "information deficit" explanation of climate inaction [16] and of the perspective of a linear relationship between knowledge, motivation, and action, at the root of some of the most widespread models of pro-environmental behaviour used in environmental psychology. To do so, we discuss:

1. The characteristics of environmental knowledge underlying its limited effects on pro-environmental behaviour (Section 2);
2. The role of motivational factors (i.e., intentions) and their limits in explaining pro-environmental behaviour (Section 3);
3. The interfering effects of cognitive and affective factors with regards to the behavioural implementation of pro-environmental intentions (Section 4);
4. The (seemingly) enabling role of specific cognitive factors (e.g., self-regulation and executive functioning) underlying individual dispositions to engage in pro-environmental behaviour (Section 5).

Finally, we conclude by suggesting avenues of research that could be explored to enhance our understanding of the environmental knowledge-action gap.

2. Why Environmental Knowledge Fails to Explain Pro-Environmental Engagement

The direct relationship between environmental knowledge and pro-environmental behaviour appears to be challenged in research. Though some studies suggest that knowledge about climate change issues would have a direct impact on individuals' likelihood to act in favour of the environment [17–24], others seem to point out that knowledge is necessary but insufficient to bring about behavioural change in the environmental domain [15,21,25–27]. Multiple potential explanations of the knowledge-behaviour discrepancy can be found, referring either to the abstract and imprecise nature of individuals' environmental knowledge or to the biases affecting it.

The first potential explanation relates to the nature of individuals' environmental knowledge: even though knowledge of the environmental crisis is more widespread nowa-

days compared to the past, such knowledge is often approximate. For instance, people might have a generic understanding of the issue of climate change but lack know-how regarding what they can do about it, or about the benefits of specific behaviours. Scientific findings point out that only action-related knowledge (i.e., knowing what can be done about environmental problems) and effectiveness knowledge (i.e., knowing the benefits of environmentally friendly behaviours) would exert a direct effect on pro-environmental behaviours, whilst system knowledge (i.e., theoretical knowledge of climate change) would only exert an indirect influence [17,28,29]. Similarly, Shi et al. [30] differentiate between knowledge of the causes of climate change and knowledge of the physical characteristics of the phenomenon, and indicate that only the knowledge of the causes increases individual concern about the issue. Moreover, people's knowledge of the environmental impact of their everyday decisions appears often inaccurate [31]: a phenomenon referred to as "carbon innumeracy" [32], which regards, in particular, emissions that are "embedded" in the products and services we consume [33]. For example, there is a tendency to underestimate the mitigation potential of certain high-emissions behaviours, like reducing meat consumption [31,34–36], switching to more efficient energy appliances [37], or reducing car travel [32], or air travel [31]. On the other hand, the benefits of recycling and using canvas bags appear often overestimated [38]. As a matter of fact, whilst generic knowledge on climate issues and environmental deterioration appears rather widespread, action-related knowledge on desirable consumption behaviours appears less common even among highly educated populations [19].

Whilst one could think that carbon innumeracy would be at the origin of the collective inertia in front of the climate crisis, recent studies indicate that more accurate knowledge about the environmental crisis does not necessarily lead to more mitigative action [39,40]. For instance, a study by Taube et al. [39] explored the role of environmental knowledge on the perception of the causes of global warming among the general population. The results indicate that having state-of-the-art information on the origins of climate change does not increase individuals' acceptance of human responsibility for it, suggesting that more accurate environmental knowledge would not directly translate into an increased acknowledgement of one's own role in the crisis. This viewpoint appears to be supported by data showing that scepticism about human responsibility for climate warming has been rising among certain populations, like those who adhere to right-wing ideology, despite the overwhelming scientific consensus on the anthropogenic origins of the climate crisis reached in recent years [41].

A more consistent explanation of the discrepancy between environmental knowledge and pro-environmental actions can be found when looking at another characteristic of such knowledge, i.e., its subjective nature [42,43]. As it happens, what people know about climate change is rarely the result of a deliberate analysis of the environmental information received, but most often the outcome of fallible heuristic processes [43]. Individual judgement of the climate crisis, a highly complex process involving multiple causes and consequences often distant in time and place, appears biased by cognitive, affective, and cultural factors. For example, findings from recent research have pointed out that cognitive bias would affect how individuals understand climate information, as attention is skewed to details that confirm existing beliefs about the environmental crisis [40,44]. This would suggest that socio-cultural characteristics (e.g., demographics, values, education, political orientation) affecting how individuals form beliefs about the relationship between humans and the natural ecosystem (i.e., their ecological worldview) [45] may influence the information people retain about the climate crisis, as well as their perception of climate change risks. This perspective seems supported by research findings, indicating that people low on traditional values and high on altruism tend to perceive greater global environmental risks [42,46]. Also, research findings show that people endorsing biospheric values (which reflect a concern for the quality of nature and the environment for its own sake) [47] would be more aware of the environmental crisis, compared with people endorsing egoistic or hedonistic values [21,48–50]. Besides, environmental risk perception has been found to be

related to socio-demographic characteristics such as political affiliation [40,41], place of residence [51], education [52,53], or socio-economic background [53–55]. Finally, besides cultural factors, cognitive appraisal of environmental information appears also affected by emotions: how people feel about climate change would, indeed, affect how environmental risks are perceived [56]. Moreover, evidence shows that individuals tend to be more concerned about climate change on days that are perceived as warmer than usual [57,58] or when extreme meteorological events, triggering negative emotions, are more salient [59–63]. This could be explained by the fact that humans tend to rely on experiences that can be readily brought to mind (i.e., availability heuristic) [64] and on emotions (i.e., affect as information heuristic) [65,66] to simplify the evaluation of complex phenomena.

Nevertheless, whilst objective knowledge has been associated with increased engagement in high-impact mitigative actions, indicating that knowledge accuracy would affect the effectiveness of one's environmental engagement, subjective knowledge (i.e., what people think they know) has been found to be a better predictor of pro-environmental behaviour [26,67–70]. As a result, despite their potential unreliability due to biased information processing, the inaccurate perceptions that people have of the environmental crisis would have a stronger influence on environmental action than more accurate perceptions, which instead affect the type of action embraced. This would mean that the subjective (e.g., cognitive, emotional, and cultural) factors influencing individual appraisal of environmental knowledge would be as important as the knowledge itself in determining individual likelihood to act for the climate.

Hence, if higher environmental proficiency is supposedly necessary to improve the mitigative impact of individual behaviours, it is not sufficient to motivate individuals to engage in pro-environmental action.

3. The (Limited) Role of Motivation

There is a large amount of scientific literature, across different disciplines, that tries to investigate what motivates people to engage in pro-environmental behaviour. Some explanations find their origins in rationalist models of human behaviour, which see humans as rational decision-makers, who ponder their behavioural choices based on the information they have about alternative options, with the aim of maximising benefits and minimising losses [15,71]. In this perspective, adopting environmentally friendly behaviour would be the outcome of a purposeful cognitive process designed to discover and balance the advantages and disadvantages of taking environmental protection measures [72]. In consonance with this view, the Theory of Planned Behaviour (TPB) [73,74] conceptualises environmental decision-making as a rational process through which individuals evaluate behaviours based on behavioural beliefs (i.e., attitudes, or the extent to which engaging in the behaviour is evaluated positively or negatively), normative beliefs (i.e., subjective norms, or the extent to which the person believes that relevant others would approve of their behaviour), and control beliefs (i.e., perceived behavioural control, or the extent to which the person perceives themselves able to perform the behaviour). According to the TPB, one of the most widespread models used to explain pro-environmental behaviour, attitude, personal norms, and perceived behavioural control, would determine pro-environmental intentions, considered to be direct predictors of pro-environmental behaviours. Across multiple studies, the TPB, in its original or extended form, has successfully explained specific environmental behaviours, like transportation choice [75–77], meat consumption [78,79], and energy-saving behaviours [79–82]. Yet, the rationalistic view of human decision-making in the original TPB model fails to provide a coherent explanation of why most people do not embrace an environmentally friendly life, despite being aware of the necessity of acting in front of the climate crisis, and despite having adequate means to do so [83]. This phenomenon has been referred to as the environmental intention-behaviour gap, or attitude-behaviour gap [15]. Studies have revealed that intentions would explain only 30% of the variance in actual behaviour [83–85]. Also, it can be observed that certain people seem to act pro-environmentally even when it involves higher costs for the indi-

vidual compared to less environmentally friendly alternatives, challenging the predictive power of rationalist models altogether [21]. As a matter of fact, recent usages of the TPB in applied research (e.g., in social marketing, consumer psychology, and management) have integrated ad hoc variables to the model in order to increase its predictive power of specific pro-environmental behaviour like, for instance, green consumption [86,87], garbage sorting [88], travel choices [89,90], emissions reduction [91,92], and eco-entrepreneurial behaviour [93]. Also, social marketing researchers have suggested that the concept of consumer value-in-behaviour (i.e., the subjective functional, social, emotional, economic, and ecologic values individuals attach to the performance of a certain behaviour) [94] could be a more precise attitudinal predictor of pro-environmental action than generic attitudes towards the environment [95].

Contrary to rationalist models, which explain people's behaviour facing the climate emergency in terms of computation of utility, normative models of environmentalism, like the Value-Belief-Norm theory of environmentalism (VBN theory) [96] and the Norm-Activation Model (NAM) [97], highlight the role played by moral considerations. Normative models suggest that individuals would perform pro-environmental behaviours because they feel it is right to do so, i.e., because a personal norm (i.e., the feelings of moral obligation to perform or refrain from certain actions) is activated. According to both the VBN and NAM models, such moral obligation would stem from individuals' awareness of the environmental consequences of their behaviour, prompting them to recognize and embrace their responsibility for them [96,97]. This process, according to the VBN, would be determined by individuals' values (i.e., desirable trans-situational goals serving as guiding principles in the life of a person) [47,98] responsible for forging generic beliefs about the legitimate role of humans in the ecosystem (e.g., their ecological worldview) [45]. In line with the VBN explanation of pro-environmental engagement, several studies have pointed out how people endorsing strong biospheric values (who judge phenomena on the basis of costs or benefits to ecosystems or the biosphere) [50] and, to a lesser extent, people endorsing altruistic values (who are motivated to contribute to the well-being of others and of society as a whole) [99], are not only more aware of the climate crisis (as suggested above) but they also tend to engage more in pro-environmental behaviours [88,100–104]

Like the TPB, the NAM and the VBN models have received empirical support in explaining different types of pro-environmental behaviour [105–113], yet their predictive power appears higher for low-cost pro-environmental behaviours compared to behaviours implying high behavioural costs [75,114]. Moreover, just like the TPB, the VBN has been challenged for predicting intentions rather than actual pro-environmental behaviour [83,115] and for falling short of explaining repeated behaviours [116]. Contextual factors and lack of access to environmentally friendly alternatives to current behaviour certainly contribute to explain why the above models tend to better predict pro-environmental intentions rather than their behavioural implementation. Yet, other intra-individual factors, like automatic cognitive processes and affects, seem to also play a role in explaining whether we engage (or not) in actual pro-environmental behaviour when we are motivated to do so.

4. How Automatic Cognitive and Affective Factors Interfere in the Implementation of Pro-Environmental Intentions

To overcome the limits of the TPB, the NAM, and the VBN, and to provide a framework able to explain both sporadic and recurrent behaviour, Klöckner and Blöblaum [117] have proposed a model of pro-environmental behaviour called the Comprehensive-Action-Determination Model (CADM). The model sees pro-environmental behaviour as determined by intentions, perceived behavioural control and habits, with personal and social norms acting as modulating variables on intentions, and with values modulating personal norms. As such, in addition to incorporating intentional and normative influences from the previous models, the CADM emphasises the role of automatic processes, like habits (i.e., cognitive structures that automatically determine future behaviour by linking specific situational cues to behavioural patterns), in determining individuals' likelihood to perform

pro-environmental behaviour [118]. The model also emphasises that subjective situational constraints, evoking feelings of self-efficacy, would be as important as intentions and habits in determining pro-environmental action by introducing perceived behavioural control as a direct determinant of such behaviour. This would indicate that affective factors would also play a role in determining whether a person performs pro-environmental behaviour or not.

Evidence from multiple studies appear to support the view that automatic cognitive and affective processes would affect whether individuals implement pro-environmental intentions. First of all, the CADM has received good empirical support in explaining pro-environmental behaviour across different domains [119–124]. Furthermore, findings from other studies indicate that habits would modulate the effects of intentions and personal norms on pro-environmental behaviours [77,81,125–128]. Habits appear, indeed, to interfere with the pursuit of goal-directed behaviour [129,130], and to hinder individuals' ability to change, by reducing the attention that individuals pay to behavioural options that are alternatives to the automatic ones [128,131]. Also, the implementation of pro-environmental behaviour has been found to be affected by techniques aimed at eliciting heuristics (i.e., automatic mental shortcuts), such as nudging [132–134], attribute translations [135], or priming [136,137].

Finally, scientific evidence points out that feelings modulate whether and how individuals react to the climate crisis and engage in pro-environmental behaviour [138,139]. For instance, high levels of eco-anxiety, e.g., anxiety experienced in relation to the climate crisis [140,141], and climate change information eliciting feelings of personal helplessness, would lead to defensive responses characterised by apathy and by demoralization towards environmental issues, rather than to pro-environmental action [142–144]. Contrarily, eco-anger would lead to greater engagement in both personal and collective pro-environmental behaviours [139]. Similarly, maladaptive coping strategies (like avoidance, denial, unrealistic optimism, and wishful thinking) have been identified as major barriers towards engaging in pro-environmental behaviour [138]. Self-regulation skills, on the other hand, would positively influence individuals' ability to implement pro-environmental behaviour by increasing individuals' ability to comply with their intention and to refrain to perform potentially unsustainable automatic behaviours [145–150].

These findings suggest that, whilst being a fundamental factor to explain pro-environmental engagement, motivation alone cannot explain why some individuals are more likely to perform pro-environmental behaviours than others. Intrinsic dispositional abilities and cognitive functions, enabling better behavioural and emotional regulation, would also play a role in determining whether we engage (or not) in pro-environmental behaviour when we intend, and are enabled, to do so.

5. The (Enabling) Role of Dispositions and Cognitive Processes

Multiple studies have pointed out that individual propensity to engage in pro-environmental behaviours, across situations and over time, would be related to dispositions [151] (i.e., intrinsic individual characteristics which distinguish an individual from others and determine recurrent behavioural, cognitive, or affective tendencies) and to higher-order cognitive processes related to executive functioning [150].

Specifically, dispositions seem to relate with pro-environmental behaviours at two levels, predicting either an increased motivation to act in favour of the environment or an enhanced ability to enact pro-environmental intentions. For instance, studies have found pro-environmentalism to be positively related with the traits of honesty and humility—i.e., the tendency to embrace sincerity, fairness, greed avoidance, and modesty, and to cooperate and not exploit others [151–153]; with connectedness to nature—i.e., the tendency to feel connected to the natural world and in symbiosis with other living organisms [154–159]; with global identity—i.e., the tendency to feel connected with people all over the world and concerned for their wellbeing [153,160–165]; and negatively related with social dominance orientation—i.e., the tendency to accept and even prefer circumstances that sustain social inequalities and hierarchical social structures [166–169]. This would suggest that the

relationship between traits and pro-environmental behaviours would be explained by an increased tendency to experience empathy and concern for the damaging effects of the climate crisis on other humans and species, which could potentially contribute to increase individuals' motivation to reduce their environmental footprint.

On the other hand, other dispositional traits seem to predict differences in individuals' ability to control and regulate their behaviour in front of the environmental crisis. This would support the perspective that cognitive functions underlying self-regulation processes would also contribute to explain why certain individuals are more prone to perform pro-environmental behaviours. For instance, openness (or openness to experience, i.e., the tendency to seek out novelty and variety, and to be imaginative and creative) has been identified as the strongest correlate of pro-environmental engagement among the Big Five [170] and Hexaco [152] traits [151], and as an important predictor of pro-environmental intentions, goals, and behaviours [153,171–177].

Whilst the relationship between openness and pro-environmental behaviour could be explained in terms of an increased tendency to appreciate, and therefore preserve, the beauty of nature [172,174] and in terms of greater environmental knowledge linked to higher-crystallized intelligence [19,178,179], individuals with high openness traits tend to also show increased cognitive flexibility [173,180]. This would suggest that individuals with high openness traits would be more capable to adapt their behavioural strategies to address the challenges posed by the climate crisis. As a matter of fact, cognitive flexibility (i.e., the executive function referring to the ability to shift cognitive sets, perspectives, thoughts, thinking styles, or strategies and to adapt to a constantly changing environment) [181–183] has been found to enable long-term-oriented behaviour [184]—of which environmental conservation behaviours can be considered part [185,186]—and to facilitate disengagement from obsolete and ineffective strategies standing in the way of goal pursuit [187,188]. People high in openness appear, indeed, to be more likely to engage in abstract thinking, a condition which seems necessary to grasp the long-term environmental consequences of one's behaviour. This would be in line with studies suggesting that pro-environmental engagement might be related to the ability to develop a mental theory of others' mental states (i.e., perspective taking) [177,189] and that of mentally simulating possible future states (i.e., prospective thinking) [190,191].

Beyond openness, other dispositional traits seem to be linked to increased individual abilities to plan and enact the implementation of pro-environmental intentions. For instance, pro-environmental behaviour has been repeatedly found to relate with dispositional mindfulness [156,167,192–199]. Whilst most of the studies on the topic explain the correlation between mindfulness and pro-environmental behaviour in terms of a higher tendency of mindful individuals to feel empathy for humans and species affected by the environmental crisis [156,167,197–199], some point out that higher present-moment awareness, entailed in mindfulness traits, would predict a lower inclination to act by default [192,200] and a higher ability to regulate one's behaviour to address pro-environmental goals [197,201]. Parallelly, pro-environmental behaviour has been also linked to conscientiousness—i.e., the tendency to be diligent, organised, and responsible [171,174,175,202] and to the self-control trait—i.e., the disposition to display ability to inhibit undesired behavioural tendencies and refrain from acting on them [146,147,149,150,203–205], implying that performing pro-environmental behaviour would require individuals to refrain from performing potentially unsustainable automatic and/or hedonistic behaviour. This appears in line with neuroscientific studies suggesting that the right dorso-lateral prefrontal cortex (rdlPFC), a brain region supporting inhibitory control—i.e., the executive function underlying the ability to interrupt or inhibit automated or prepotent responses or behaviours [181,206–208], would be activated when individuals perform pro-environmental behaviour [190,209].

In this perspective, cognitive processes underlying individuals' dispositional ability to regulate thoughts, affects, and behaviours in response to situational demands (i.e., self-regulation abilities) [210] would play an important role in determining individual performance of pro-environmental behaviour, besides knowledge of the climate crisis and

willingness to address it. Indeed, self-regulation abilities, beyond determining individuals' likelihood to align actions with intentions [150,206,211–214] seem to also improve the ability to cope with emotionally challenging and stressful events [215,216]. This would mean that higher self-regulation abilities could potentially improve the emotional reactions that individuals experience facing the environmental crisis and contribute to forge more adaptive coping strategies.

This acknowledgement entails important considerations regarding the interventions that have been put in place, to the present day, to increase individual engagement in pro-environmental behaviour. Indeed, if increasing environmental knowledge and persuading individuals of the importance of reducing their environmental footprint, whether through rationalistic or normative arguments, remains important, training individuals' self-regulation abilities appears equally crucial for actual behavioural change to take place. As such, we advocate for more research to be dedicated to investigating the role of self-regulation and underlying executive functions in increasing individual engagement in pro-environmental behaviour. Moreover, considering that self-regulation abilities have shown to be responsive to dedicated interventions and trainings [217–221], testing the effect of techniques and interventions aimed at enhancing such skills in the domain of environmental conservation would also be beneficial to society overall.

6. Conclusions

This paper discusses scientific evidence on the intra-individual factors explaining individual engagement in pro-environmental behaviour, with the aim of increasing our understanding of the reasons underlying the discrepancy between the global increase in environmental concern and the current insufficient behavioural response of individuals to the environmental crisis. After looking at the role of environmental knowledge and of individual motivation to perform pro-environmental behaviour, driven by either utilitaristic or normative influences, we conclude that these factors, whilst necessary, are not sufficient to explain individual engagement in pro-environmental behaviour. In parallel, we observe that cognitive processes underlying individual abilities to regulate one's behaviour may explain why certain individuals appear more prone to engage in pro-environmental behaviour and suggest that self-regulation abilities, supported by executive functions, would play a role in determining pro-environmental engagement, besides knowledge and motivation. Accordingly, we propose that self-regulation abilities would contribute to increase individuals' ability to implement pro-environmental intentions as well as their propensity to embrace more adaptive coping strategies in front of the environmental crisis.

This perspective is not without limitations. First, the evidence supporting the hypothesis of an implication of self-regulation abilities in explaining the discrepancy between knowledge about the climate emergency and actual performance of pro-environmental action is limited. A recent systematic review on the relationship of self-regulation processes and executive functions with pro-environmental behaviour only found 31 articles providing uneven evidence of a positive role of these top-down cognitive processes in explaining pro-environmental behaviour performance [150]. Nevertheless, this limitation might be justified by the fact that this topic has only recently attracted the attention of environmental psychologists and has mostly been overshadowed by the widespread focus on the effects of knowledge and motivation. Further research would be beneficial to consolidate our understanding of the role that top-down cognitive processes might play in enabling/preventing individuals to implement behaviours that are aligned with their perception of the climate change threat. Second, the reported literature on the environmental knowledge-action gap has mostly focused on studies coming from environmental, social, and cognitive psychology. As such, our perspective on the potential determinants of the environmental knowledge-action gap cannot be considered exhaustive as it does not cover factors that are non-psychological, such as contextual (e.g., availability of pro-environmental alternatives) or individual (e.g., economic resources, health) factors which could potentially affect the feasibility of adopting specific behaviours. Further integrating findings coming from differ-

ent domains of research on climate action (e.g., economy, political studies, philosophy, and ergonomics) could provide a more thorough understanding of the intricate mechanisms at the root of pro-environmental action.

We therefore conclude by calling for more research to be dedicated to investigating the potential role of self-regulation in explaining why extra knowledge of the climate change issue has mostly failed to bring about behavioural change, proportionate to the scale and urgency of the global environmental crisis. This would enable us to further clarify whether individual reactions to the climate crisis might be affected, other than by knowledge, motivation, and contextual factors, by cognitive abilities enabling a more adaptive coping strategy to address the issue. More experimental studies on this subject would also enable scientists to collect data on the effects of increased self-regulation skills on individuals' emotional reactions to the climate crisis, and on their tendency to perform behaviours aimed at mitigating it. This knowledge would benefit the design and optimisation of interventions aimed at increasing individual engagement in pro-environmental behaviour. Such interventions could leverage, beyond climate information and persuasion techniques, techniques aimed at enhancing self-regulation (e.g., mindfulness-based interventions, executive functioning training) to increase their effectiveness. Not only do we suggest that more research is specifically dedicated to study the role of self-regulation in explaining the environmental knowledge-action gap, but we also suggest that at least part of this research should aim for a multidisciplinary approach, to provide a more global outlook on this phenomenon.

Author Contributions: Conceptualization, S.L.C., S.G.C., C.L., J.F., L.S. and A.R.; writing—original draft preparation, S.L.C., S.G.C. and L.S.; writing—review and editing, S.L.C., S.G.C., C.L., J.F. and L.S.; supervision, L.S. and A.R. All authors have read and agreed to the published version of the manuscript.

Funding: Antonino Raffone has been supported by a grant from the Sapienza University of Rome on "Mindfulness ecologica e cambiamento comportamentale connesso a clima e a un futuro sostenibile: uno studio esplorativo", RP120172B90D43F3.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. World Meteorological Organisation. *State of the Global Climate 2022*; World Meteorological Association: Geneva, Switzerland, 2022.
2. IPCC. *AR6 Synthesis Report Climate Change 2023*; IPCC: Geneva, Switzerland, 2023.
3. Hertwich, E.G.; Peters, G.P. Carbon Footprint of Nations: A Global, Trade-Linked Analysis. *Environ. Sci. Technol.* **2009**, *43*, 6414–6420. [CrossRef] [PubMed]
4. Ivanova, D.; Stadler, K.; Steen-Olsen, K.; Wood, R.; Vita, G.; Tukker, A.; Hertwich, E.G. Environmental Impact Assessment of Household Consumption. *J. Ind. Ecol.* **2016**, *20*, 526–536. [CrossRef]
5. Ivanova, D.; Vita, G.; Steen-Olsen, K.; Stadler, K.; Melo, P.C.; Wood, R.; Hertwich, E.G. Mapping the Carbon Footprint of EU Regions. *Environ. Res. Lett.* **2017**, *12*, 054013. [CrossRef]
6. Druckman, A.; Jackson, T. Understanding Households as Drivers of Carbon Emissions. In *Taking Stock of Industrial Ecology*; Springer International Publishing: Cham, Switzerland, 2015; pp. 181–203. ISBN 9783319205717.
7. Caeiro, S.; Ramos, T.B.; Huisingh, D. Procedures and Criteria to Develop and Evaluate Household Sustainable Consumption Indicators. *J. Clean. Prod.* **2012**, *27*, 72–91. [CrossRef]
8. Dietz, T.; Gardner, G.T.; Gilligan, J.; Stern, P.C.; Vandenbergh, M.P. Household Actions Can Provide a Behavioral Wedge to Rapidly Reduce US Carbon Emissions. *Proc. Natl. Acad. Sci. USA* **2009**, *106*, 18452–18456. [CrossRef] [PubMed]
9. Ivanova, D.; Barrett, J.; Wiedenhofer, D.; Macura, B.; Callaghan, M.; Creutzig, F. Quantifying the Potential for Climate Change Mitigation of Consumption Options. *Environ. Res. Lett.* **2020**, *15*, 093001. [CrossRef]
10. Jakucionyte-Skodiene, M.; Krikštolaitis, R.; Liobikiene, G. The Contribution of Changes in Climate-Friendly Behaviour, Climate Change Concern and Personal Responsibility to Household Greenhouse Gas Emissions: Heating/Cooling and Transport Activities in the European Union. *Energy* **2022**, *246*, 123387. [CrossRef]

11. Khanna, T.M.; Baiocchi, G.; Callaghan, M.; Creutzig, F.; Guias, H.; Haddaway, N.R.; Hirth, L.; Javaid, A.; Koch, N.; Laukemper, S.; et al. Author Correction: A Multi-Country Meta-Analysis on the Role of Behavioural Change in Reducing Energy Consumption and CO_2 Emissions in Residential Buildings. *Nat. Energy* **2021**, *7*, 117. [CrossRef]
12. Nielsen, K.S.; Clayton, S.; Stern, P.C.; Dietz, T.; Capstick, S.; Whitmarsh, L. How Psychology Can Help Limit Climate Change. *Am. Psychol.* **2021**, *76*, 130–144. [CrossRef]
13. United Nations Development Programme. *People's Climate Vote*; United Nations Development Programme: New York, NY, USA, 2021.
14. Ritchie, H.; Roser, M.; Rosado, P. CO_2 and Greenhouse Gas Emissions. *Our World in Data*, 11 May 2020.
15. 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]
16. Knutti, R. Closing the Knowledge-Action Gap in Climate Change. *One Earth* **2019**, *1*, 21–23. [CrossRef]
17. Frick, J.; Kaiser, F.G.; Wilson, M. Environmental Knowledge and Conservation Behavior: Exploring Prevalence and Structure in a Representative Sample. *Personal. Individ. Differ.* **2004**, *37*, 1597–1613. [CrossRef]
18. Hines, J.M.; Hungerford, H.R.; Tomera, A.N. Analysis and Synthesis of Research on Responsible Environmental Behavior: A Meta-Analysis. *J. Environ. Educ.* **1987**, *18*, 1–8. [CrossRef]
19. Geiger, S.M.; Geiger, M.; Wilhelm, O. Environment-Specific vs. General Knowledge and Their Role in Pro-Environmental Behavior. *Front. Psychol.* **2019**, *10*, 718. [CrossRef] [PubMed]
20. Liobikienė, G.; Poškus, M.S. The Importance of Environmental Knowledge for Private and Public Sphere Pro-Environmental Behavior: Modifying the Value-Belief-Norm Theory. *Sustainability* **2019**, *11*, 3324. [CrossRef]
21. Steg, L.; Perlaviciute, G.; van der Werff, E. Understanding the Human Dimensions of a Sustainable Energy Transition. *Front. Psychol.* **2015**, *6*, 805. [CrossRef] [PubMed]
22. Van der Linden, S. The Social-Psychological Determinants of Climate Change Risk Perceptions: Towards a Comprehensive Model. *J. Environ. Psychol.* **2015**, *41*, 112–124. [CrossRef]
23. Soares, J.; Miguel, I.; Venâncio, C.; Lopes, I.; Oliveira, M. Public Views on Plastic Pollution: Knowledge, Perceived Impacts, and pro-Environmental Behaviours. *J. Hazard. Mater.* **2021**, *412*, 125227. [CrossRef]
24. Sampene, A.K.; Li, C.; Wiredu, J.; Agyeman, F.O.; Brenya, R. Examining the Nexus between Social Cognition, Biospheric Values, Moral Norms, Corporate Environmental Responsibility and pro-Environmental Behaviour. Does Environmental Knowledge Matter? *Curr. Psychol.* **2023**. [CrossRef]
25. Kaiser, F.G.; Fuhrer, U. Ecological Behavior's Dependency on Different Forms of Knowledge. *Appl. Psychol.* **2003**, *52*, 598–613. [CrossRef]
26. Vicente-Molina, M.A.; Fernández-Sáinz, A.; Izagirre-Olaizola, J. Environmental Knowledge and Other Variables Affecting Pro-Environmental Behaviour: Comparison of University Students from Emerging and Advanced Countries. *J. Clean. Prod.* **2013**, *61*, 130–138. [CrossRef]
27. Van Valkengoed, A.M.; Steg, L. Meta-Analyses of Factors Motivating Climate Change Adaptation Behaviour. *Nat. Clim. Chang.* **2019**, *9*, 158–163. [CrossRef]
28. Geiger, S.; Funke, J. The Role of Environmental Knowledge and Attitude: Predictors for Ecological Behavior Across Cultures? Creativity View Project Education for Sustainable Consumption through Mindfulness Training (BiNKA) View Project. *Umweltpsychologie* **2018**, *22*, 69–87.
29. Geiger, S.M.; Otto, S.; Diaz-Marin, J.S. A Diagnostic Environmental Knowledge Scale for Latin America/Escala Diagnóstica de Conocimientos Ambientales Para Latinoamérica. *Psyecology* **2014**, *5*, 1–36. [CrossRef]
30. Shi, J.; Visschers, V.H.M.; Siegrist, M.; Arvai, J. Knowledge as a Driver of Public Perceptions about Climate Change Reassessed. *Nat. Clim. Chang.* **2016**, *6*, 759–762. [CrossRef]
31. Wynes, S.; Zhao, J.; Donner, S.D. How Well Do People Understand the Climate Impact of Individual Actions? *Clim. Chang.* **2020**, *162*, 1521–1534. [CrossRef]
32. Grinstein, A.; Kodra, E.; Chen, S.; Sheldon, S.; Zik, O. Carbon Innumeracy. *PLoS ONE* **2018**, *13*, e0196282. [CrossRef] [PubMed]
33. Whitmarsh, L.; Seyfang, G.; O'Neill, S. Public Engagement with Carbon and Climate Change: To What Extent Is the Public 'Carbon Capable'? *Glob. Environ. Chang.* **2011**, *21*, 56–65. [CrossRef]
34. De Boer, J.; de Witt, A.; Aiking, H. Help the Climate, Change Your Diet: A Cross-Sectional Study on How to Involve Consumers in a Transition to a Low-Carbon Society. *Appetite* **2016**, *98*, 19–27. [CrossRef]
35. Lazzarini, G.A.; Zimmermann, J.; Visschers, V.H.M.; Siegrist, M. Does Environmental Friendliness Equal Healthiness? Swiss Consumers' Perception of Protein Products. *Appetite* **2016**, *105*, 663–673. [CrossRef]
36. Shi, J.; Visschers, V.H.M.; Bumann, N.; Siegrist, M. Consumers' Climate-Impact Estimations of Different Food Products. *J. Clean. Prod.* **2018**, *172*, 1646–1653. [CrossRef]
37. Attari, S.Z.; DeKay, M.L.; Davidson, C.I.; Bruine de Bruin, W. Public Perceptions of Energy Consumption and Savings. *Proc. Natl. Acad. Sci. USA* **2010**, *107*, 16054–16059. [CrossRef] [PubMed]
38. Pickering, G.J.; Schoen, K.; Botta, M.; Fazio, X. Exploration of Youth Knowledge and Perceptions of Individual-Level Climate Mitigation Action. *Environ. Res. Lett.* **2020**, *15*, 104080. [CrossRef]
39. Taube, O.; Ranney, M.A.; Henn, L.; Kaiser, F.G. Increasing People's Acceptance of Anthropogenic Climate Change with Scientific Facts: Is Mechanistic Information More Effective for Environmentalists? *J. Environ. Psychol.* **2021**, *73*, 101549. [CrossRef]
40. Luo, Y.; Zhao, J. Attentional and Perceptual Biases of Climate Change. *Curr. Opin. Behav. Sci.* **2021**, *42*, 22–26. [CrossRef]

41. Brenan, M.; Saad, L. Global Warming Concern Steady Despite Some Partisan Shifts. Gallup 2018. Available online: https://news.gallup.com/poll/231530/global-warming-concern-steady-despite-partisan-shifts.aspx (accessed on 1 July 2023).
42. Böhm, G.; Tanner, C. Environmental Risk Perception. In *Environmental Psychology*; John Wiley & Sons, Ltd.: Chichester, UK, 2018; pp. 13–25.
43. Zaval, L.; Cornwell, J.F.M. Cognitive Biases, Non-Rational Judgments, and Public Perceptions of Climate Change. In *Oxford Research Encyclopedia of Climate Science*; Oxford University Press: Oxford, UK, 2016.
44. Zhao, J.; Luo, Y. A Framework to Address Cognitive Biases of Climate Change. *Neuron* **2021**, *109*, 3548–3551. [CrossRef] [PubMed]
45. Dunlap, R.E.; Van Liere, K.D. The "New Environmental Paradigm. " *J. Environ. Educ.* **1978**, *9*, 10–19. [CrossRef]
46. Whitfield, S.C.; Rosa, E.A.; Dan, A.; Dietz, T. The Future of Nuclear Power: Value Orientations and Risk Perception. *Risk Anal.* **2009**, *29*, 425–437. [CrossRef]
47. Schwartz, S.H. Universals in the Content and Structure of Values: Theoretical Advances and Empirical Tests in 20 Countries. *Adv. Exp. Soc. Psychol.* **1992**, *25*, 1–65.
48. Steg, L. Values, Norms, and Intrinsic Motivation to Act Proenvironmentally. *Annu. Rev. Environ. Resour.* **2016**, *41*, 277–292. [CrossRef]
49. Schultz, P.W.; Gouveia, V.V.; Cameron, L.D.; Tankha, G.; Schmuck, P.; Franěk, M. Values and Their Relationship to Environmental Concern and Conservation Behavior. *J. Cross-Cult. Psychol.* **2005**, *36*, 457–475. [CrossRef]
50. Stern, P.C.; Dietz, T. The Value Basis of Environmental Concern. *J. Soc. Issues* **1994**, *50*, 65–84. [CrossRef]
51. Liu, X.; Mu, R. Public Environmental Concern in China: Determinants and Variations. *Glob. Environ. Chang.* **2016**, *37*, 116–127. [CrossRef]
52. Cruz, S.; Batavia, C.; Arismendi, I.; Spalding, A.; Nelson, M.P. Diversity beyond Demographics: Environmental Worldviews of Forestry and Natural Resource Undergraduate Students. *Ecol. Evol* **2022**, *12*, e9203. [CrossRef]
53. Slimak, M.W.; Dietz, T. Personal Values, Beliefs, and Ecological Risk Perception. *Risk Anal.* **2006**, *26*, 1689–1705. [CrossRef] [PubMed]
54. Macias, T. Environmental Risk Perception among Race and Ethnic Groups in the United States. *Ethnicities* **2016**, *16*, 111–129. [CrossRef]
55. Nagisetty, R.M.; Autenrieth, D.A.; Storey, S.R.; Macgregor, W.B.; Brooks, L.C. Environmental Health Perceptions in a Superfund Community. *J. Environ. Manag.* **2020**, *261*, 110151. [CrossRef] [PubMed]
56. Slovic, P. *The Feeling of Risk*; Routledge: Abingdon, UK, 2013; ISBN 9781136530470.
57. Li, Y.; Johnson, E.J.; Zaval, L. Local Warming: Daily Temperature Change Influences Belief in Global Warming. *Psychol. Sci.* **2011**, *22*, 454–459. [CrossRef]
58. Zaval, L.; Keenan, E.A.; Johnson, E.J.; Weber, E.U. How Warm Days Increase Belief in Global Warming. *Nat. Clim. Chang.* **2014**, *4*, 143–147. [CrossRef]
59. Diggs, D.M. Drought Experience and Perception of Climatic Change among Great Plains Farmers. *Great Plains Res. J. Nat. Soc. Sci.* **1991**, *1*, 114–132.
60. Mase, A.S.; Cho, H.; Prokopy, L.S. Enhancing the Social Amplification of Risk Framework (SARF) by Exploring Trust, the Availability Heuristic, and Agricultural Advisors' Belief in Climate Change. *J. Environ. Psychol.* **2015**, *41*, 166–176. [CrossRef]
61. Sunstein, C.R. The Availability Heuristic, Intuitive Cost-Benefit Analysis, and Climate Change. *Clim. Chang.* **2006**, *77*, 195–210. [CrossRef]
62. Taylor, A.; de Bruin, W.B.; Dessai, S. Climate Change Beliefs and Perceptions of Weather-Related Changes in the United Kingdom. *Risk Anal.* **2014**, *34*, 1995–2004. [CrossRef] [PubMed]
63. Van der Linden, S. On the Relationship between Personal Experience, Affect and Risk Perception: The Case of Climate Change. *Eur. J. Soc. Psychol.* **2014**, *44*, 430–440. [CrossRef] [PubMed]
64. Kahneman, D.; Tversky, A. The Psychology of Preferences. *Sci. Am.* **1982**, *246*, 160–173. [CrossRef]
65. Parrott, W.G. Role of Emotions in Risk Perception. In *Consumer Perception of Product Risks and Benefits*; Springer International Publishing: Cham, Switzerland, 2017; pp. 221–232.
66. Raue, M.; Scholl, S.G. The Use of Heuristics in Decision Making Under Risk and Uncertainty. In *Psychological Perspectives on Risk and Risk Analysis*; Springer International Publishing: Cham, Switzerland, 2018; pp. 153–179.
67. Cologna, V.; Berthold, A.; Siegrist, M. Knowledge, Perceived Potential and Trust as Determinants of Low- and High-Impact pro-Environmental Behaviours. *J. Environ. Psychol.* **2022**, *79*, 101741. [CrossRef]
68. Hungerford, H.R.; Volk, T.L. Changing Learner Behavior Through Environmental Education. *J. Environ. Educ.* **1990**, *21*, 8–21. [CrossRef]
69. Passafaro, P.; Livi, S. Comparing Determinants of Perceived and Actual Recycling Skills: The Role of Motivational, Behavioral and Dispositional Factors. *J. Environ. Educ.* **2017**, *48*, 347–356. [CrossRef]
70. Truelove, H.B.; Parks, C. Perceptions of Behaviors That Cause and Mitigate Global Warming and Intentions to Perform These Behaviors. *J. Environ. Psychol.* **2012**, *32*, 246–259. [CrossRef]
71. Orlove, B.; Shwom, R.; Markowitz, E.; Cheong, S.-M. Climate Decision-Making. *Annu. Rev. Environ. Resour.* **2020**, *45*, 271–303. [CrossRef]
72. Tietenberg, T.H. Economic Instruments for Environmental Regulation. *Oxf. Rev. Econ. Policy* **1990**, *6*, 17–33. [CrossRef]

73. Ajzen, I. The Theory of Planned Behavior. In *Handbook of Theories of Social Psychology: Volume 1*; SAGE Publications Ltd.: London, UK, 2012; pp. 438–459.
74. Ajzen, I. The Theory of Planned Behavior. *Organ. Behav. Hum. Decis. Process.* **1991**, *50*, 179–211. [CrossRef]
75. Bamberg, S.; Schmidt, P. Incentives, Morality, Or Habit? Predicting Students' Car Use for University Routes With the Models of Ajzen, Schwartz, and Triandis. *Environ. Behav.* **2003**, *35*, 264–285. [CrossRef]
76. Kerr, A.; Lennon, A.; Watson, B. The Call of the Road: Factors Predicting Students' Car Travelling Intentions and Behaviour. *Transportation* **2010**, *37*, 1–13. [CrossRef]
77. Havlíčková, D.; Zámečník, P. Considering Habit in Research on Travel Mode Choice: A Literature Review with a Two-Level Methodology. *Trans. Transp. Sci.* **2020**, *11*, 18–32. [CrossRef]
78. Çoker, E.N.; van der Linden, S. Fleshing out the Theory of Planned of Behavior: Meat Consumption as an Environmentally Significant Behavior. *Curr. Psychol.* **2022**, *41*, 681–690. [CrossRef]
79. Harland, P.; Staats, H.; Wilke, H.A.M. Explaining Proenvironmental Intention and Behavior by Personal Norms and the Theory of Planned Behavior. *J. Appl. Soc. Psychol.* **1999**, *29*, 2505–2528. [CrossRef]
80. Arya, B.; Chaturvedi, S. Extending the Theory of Planned Behaviour to Explain Energy Saving Behaviour. *Environ. Clim. Technol.* **2020**, *24*, 516–528. [CrossRef]
81. Canova, L.; Manganelli, A.M. Energy-Saving Behaviours in Workplaces: Application of an Extended Model of the Theory of Planned Behaviour. *Eur. J. Psychol.* **2020**, *16*, 384–400. [CrossRef]
82. Perri, C.; Giglio, C.; Corvello, V. Smart Users for Smart Technologies: Investigating the Intention to Adopt Smart Energy Consumption Behaviors. *Technol. Forecast Soc. Chang.* **2020**, *155*, 119991. [CrossRef]
83. Bamberg, S. Changing Environmentally Harmful Behaviors: A Stage Model of Self-Regulated Behavioral Change. *J. Environ. Psychol.* **2013**, *34*, 151–159. [CrossRef]
84. 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]
85. Armitage, C.J.; Conner, M. Efficacy of the Theory of Planned Behaviour: A Meta-Analytic Review. *Br. J. Soc. Psychol.* **2001**, *40*, 471–499. [CrossRef]
86. Kumar, N.; Mohan, D. Sustainable Apparel Purchase Intention: Collectivist Cultural Orientation and Price Sensitivity in Extended TPB Model. *J. Revenue Pricing Manag.* **2021**, *20*, 149–161. [CrossRef]
87. Shalender, K.; Sharma, N. Using Extended Theory of Planned Behaviour (TPB) to Predict Adoption Intention of Electric Vehicles in India. *Environ. Dev. Sustain.* **2021**, *23*, 665–681. [CrossRef]
88. Wang, X.; Van der Werff, E.; Bouman, T.; Harder, M.K.; Steg, L. I Am vs. We Are: How Biospheric Values and Environmental Identity of Individuals and Groups Can Influence Pro-Environmental Behaviour. *Front. Psychol.* **2021**, *12*, 618956. [CrossRef]
89. Chen, M.F.; Tung, P.J. Developing an Extended Theory of Planned Behavior Model to Predict Consumers' Intention to Visit Green Hotels. *Int. J. Hosp. Manag.* **2014**, *36*, 221–230. [CrossRef]
90. Han, H.; Kim, Y. An Investigation of Green Hotel Customers' Decision Formation: Developing an Extended Model of the Theory of Planned Behavior. *Int. J. Hosp. Manag.* **2010**, *29*, 659–668. [CrossRef]
91. Elahi, E.; Khalid, Z.; Zhang, Z. Understanding Farmers' Intention and Willingness to Install Renewable Energy Technology: A Solution to Reduce the Environmental Emissions of Agriculture. *Appl. Energy* **2022**, *309*, 118459. [CrossRef]
92. Waris, I.; Hameed, I.; Ali, R. Predicting Household Sign up for Solar Energy: An Empirical Study Based on the Extended Theory of Planned Behavior. *Int. J. Energy Sect. Manag.* **2023**, *17*, 455–473. [CrossRef]
93. Pascucci, T.; Cardella, G.M.; Hernàndez-Sànchez, B.; Sànchez-Garcìa, J.C. Environmental Sensitivity to Form a Sustainable Entrepreneurial Intention. *Sustainability* **2022**, *14*, 10398. [CrossRef]
94. French, J.; Gordon, R. *Strategic Social Marketing*; SAGE Publications: Los Angeles, CA, USA, 2015.
95. Gordon, R.; Dibb, S.; Magee, C.; Cooper, P.; Waitt, G. Empirically Testing the Concept of Value-in-Behavior and Its Relevance for Social Marketing. *J. Bus. Res.* **2018**, *82*, 56–67. [CrossRef]
96. Stern, P.C. New Environmental Theories: Toward a Coherent Theory of Environmentally Significant Behavior. *J. Soc. Issues* **2000**, *56*, 407–424. [CrossRef]
97. Schwartz, S.H. Normative Influences on Altruism. *Adv. Exp. Soc. Psychol.* **1977**, *10*, 221–279.
98. Sagiv, L.; Schwartz, S.H. Personal Values Across Cultures. *Annu. Rev. Psychol.* **2022**, *73*, 517–546. [CrossRef] [PubMed]
99. Stern, P.C.; Kalof, L.; Dietz, T.; Guagnano, G.A. Values, Beliefs, and Proenvironmental Action: Attitude Formation Toward Emergent Attitude Objects1. *J. Appl. Soc. Psychol.* **1995**, *25*, 1611–1636. [CrossRef]
100. Bouman, T.; Steg, L. Motivating Society-Wide Pro-Environmental Change. *One Earth* **2019**, *1*, 27–30. [CrossRef]
101. Bouman, T.; Steg, L.; Kiers, H.A.L. Measuring Values in Environmental Research: A Test of an Environmental Portrait Value Questionnaire. *Front. Psychol.* **2018**, *9*, 564. [CrossRef]
102. De Groot, J.I.M.; Steg, L. Mean or Green: Which Values Can Promote Stable pro-Environmental Behavior? *Conserv. Lett.* **2009**, *2*, 61–66. [CrossRef]
103. Tolppanen, S.; Kang, J. The Effect of Values on Carbon Footprint and Attitudes towards Pro-Environmental Behavior. *J. Clean. Prod.* **2021**, *282*, 124524. [CrossRef]

104. Van der Werff, E.; Steg, L.; Keizer, K. The Value of Environmental Self-Identity: The Relationship between Biospheric Values, Environmental Self-Identity and Environmental Preferences, Intentions and Behaviour. *J. Environ. Psychol.* **2013**, *34*, 55–63. [CrossRef]
105. Chen, M.-F. An Examination of the Value-Belief-Norm Theory Model in Predicting pro-Environmental Behaviour in Taiwan. *Asian J. Soc. Psychol.* **2015**, *18*, 145–151. [CrossRef]
106. De Groot, J.I.M.; Steg, L. Value Orientations and Environmental Beliefs in Five Countries. *J. Cross-Cult. Psychol.* **2007**, *38*, 318–332. [CrossRef]
107. Hansla, A.; Gamble, A.; Juliusson, A.; Gärling, T. Psychological Determinants of Attitude towards and Willingness to Pay for Green Electricity. *Energy Policy* **2008**, *36*, 768–774. [CrossRef]
108. Hiratsuka, J.; Perlaviciute, G.; Steg, L. Testing VBN Theory in Japan: Relationships between Values, Beliefs, Norms, and Acceptability and Expected Effects of a Car Pricing Policy. *Transp. Res. Part F Traffic Psychol. Behav.* **2018**, *53*, 74–83. [CrossRef]
109. Simsekoglu, Ö.; Klöckner, C.A. The Role of Psychological and Socio-Demographical Factors for Electric Bike Use in Norway. *Int. J. Sustain. Transp.* **2019**, *13*, 315–323. [CrossRef]
110. Steg, L.; Groot, J. Explaining Prosocial Intentions: Testing Causal Relationships in the Norm Activation Model. *Br. J. Soc. Psychol.* **2010**, *49*, 725–743. [CrossRef] [PubMed]
111. Van der Werff, E.; Steg, L. One Model to Predict Them All: Predicting Energy Behaviours with the Norm Activation Model. *Energy Res. Soc. Sci.* **2015**, *6*, 8–14. [CrossRef]
112. Arya, B.; Kumar, H. Value Behaviour Norm Theory Approach to Predict Private Sphere Pro-Environmental Behaviour among University Students. *Environ. Clim. Technol.* **2023**, *27*, 164–176. [CrossRef]
113. Walton, T.N.; Jones, R.E. An Information-Theoretic Approach to Modeling the Major Drivers of Pro-Environmental Behavior. *Sustainability* **2022**, *14*, 14668. [CrossRef]
114. Abrahamse, W.; Steg, L. How Do Socio-Demographic and Psychological Factors Relate to Households' Direct and Indirect Energy Use and Savings? *J. Econ. Psychol.* **2009**, *30*, 711–720. [CrossRef]
115. Lindenberg, S.; Steg, L. Normative, Gain and Hedonic Goal Frames Guiding Environmental Behavior. *J. Soc. Issues* **2007**, *63*, 117–137. [CrossRef]
116. Klöckner, C.A. A Comprehensive Model of the Psychology of Environmental Behaviour—A Meta-Analysis. *Glob. Environ. Chang.* **2013**, *23*, 1028–1038. [CrossRef]
117. Klöckner, C.A.; Blöbaum, A. A Comprehensive Action Determination Model: Toward a Broader Understanding of Ecological Behaviour Using the Example of Travel Mode Choice. *J. Environ. Psychol.* **2010**, *30*, 574–586. [CrossRef]
118. Klöckner, C.A.; Verplanken, B. Yesterday's Habits Preventing Change for Tomorrow? About the Influence of Automaticity on Environmental Behaviour. In *Environmental Psychology*; John Wiley & Sons, Ltd.: Chichester, UK, 2018; pp. 238–250.
119. Joanes, T.; Gwozdz, W.; Klöckner, C.A. Reducing Personal Clothing Consumption: A Cross-Cultural Validation of the Comprehensive Action Determination Model. *J. Environ. Psychol.* **2020**, *71*, 101396. [CrossRef]
120. Klöckner, C.A.; Friedrichsmeier, T. A Multi-Level Approach to Travel Mode Choice—How Person Characteristics and Situation Specific Aspects Determine Car Use in a Student Sample. *Transp. Res. Part F Traffic Psychol. Behav.* **2011**, *14*, 261–277. [CrossRef]
121. Klöckner, C.A.; Oppedal, I.O. General vs. Domain Specific Recycling Behaviour—Applying a Multilevel Comprehensive Action Determination Model to Recycling in Norwegian Student Homes. *Resour. Conserv. Recycl* **2011**, *55*, 463–471. [CrossRef]
122. Ofstad, S.; Tobolova, M.; Nayum, A.; Klöckner, C. Understanding the Mechanisms behind Changing People's Recycling Behavior at Work by Applying a Comprehensive Action Determination Model. *Sustainability* **2017**, *9*, 204. [CrossRef]
123. Sopha, B.M.; Klöckner, C.A. Psychological Factors in the Diffusion of Sustainable Technology: A Study of Norwegian Households' Adoption of Wood Pellet Heating. *Renew. Sustain. Energy Rev.* **2011**, *15*, 2756–2765. [CrossRef]
124. Al Zaidi, S.M.; Iyanna, S.; Jabeen, F.; Mehmood, K. Understanding Employees' Voluntary pro-Environmental Behavior in Public Organizations—An Integrative Theory Approach. *Soc. Responsib. J.* **2023**. ahead of print. [CrossRef]
125. Bleys, B.; Defloor, B.; Van Ootegem, L.; Verhofstadt, E. The Environmental Impact of Individual Behavior: Self-Assessment Versus the Ecological Footprint. *Environ. Behav.* **2018**, *50*, 187–212. [CrossRef]
126. Klöckner, C.A.; Matthies, E. How Habits Interfere with Norm-Directed Behaviour: A Normative Decision-Making Model for Travel Mode Choice. *J. Environ. Psychol.* **2004**, *24*, 319–327. [CrossRef]
127. Verplanken, B.; Aarts, H.; Knippenberg, A.; Moonen, A. Habit versus Planned Behaviour: A Field Experiment. *Br. J. Soc. Psychol.* **1998**, *37*, 111–128. [CrossRef] [PubMed]
128. Verplanken, B.; Orbell, S. Habit and Behavior Change. In *Social Psychology in Action*; Springer International Publishing: Cham, Switzerland, 2019; pp. 65–78.
129. Aarts, H.; Dijksterhuis, A. Habits as Knowledge Structures: Automaticity in Goal-Directed Behavior. *J. Pers. Soc. Psychol.* **2000**, *78*, 53–63. [CrossRef] [PubMed]
130. Wood, W.; Rünger, D. Psychology of Habit. *Annu. Rev. Psychol.* **2016**, *67*, 289–314. [CrossRef]
131. Aarts, H.; Verplanken, B.; van Knippenberg, A. Habit and Information Use in Travel Mode Choices. *Acta Psychol.* **1997**, *96*, 1–14. [CrossRef]
132. Byerly, H.; Balmford, A.; Ferraro, P.J.; Hammond Wagner, C.; Palchak, E.; Polasky, S.; Ricketts, T.H.; Schwartz, A.J.; Fisher, B. Nudging Pro-Environmental Behavior: Evidence and Opportunities. *Front. Ecol. Environ.* **2018**, *16*, 159–168. [CrossRef]
133. Ölander, F.; Thøgersen, J. Informing Versus Nudging in Environmental Policy. *J. Consum. Policy* **2014**, *37*, 341–356. [CrossRef]

134. Thaler, R.H.; Sunstein, C.R. *Nudge: Improving Decisions about Health, Wealth, and Happiness*; Yale University Press: New Haven, CT, USA, 2008.
135. Mertens, S.; Hahnel, U.J.J.; Brosch, T. This Way, Please: Uncovering the Directional Effects of Attribute Translations on Decision Making. *Judgm. Decis. Mak.* **2020**, *15*, 25–46. [CrossRef]
136. Abrams, D.; Lalot, F.; Hopthrow, T.; Templeton, A.; Steeden, B.; Özkeçeci, H.; Imada, H.; Warbis, S.; Sandiford, D.; Meleady, R.; et al. Cleaning up Our Acts: Psychological Interventions to Reduce Engine Idling and Improve Air Quality. *J. Environ. Psychol.* **2021**, *74*, 101587. [CrossRef]
137. Meleady, R.; Abrams, D.; Van de Vyver, J.; Hopthrow, T.; Mahmood, L.; Player, A.; Lamont, R.; Leite, A.C. Surveillance or Self-Surveillance? Behavioral Cues Can Increase the Rate of Drivers' Pro-Environmental Behavior at a Long Wait Stop. *Environ. Behav.* **2017**, *49*, 1156–1172. [CrossRef] [PubMed]
138. Reser, J.; Bradley, G.; Ellul, M. Coping with Climate Change: Bringing Psychological Adaptation in from the Cold. In *Handbook of the Psychology of Coping: Psychology of Emotions, Motivations and Actions*; Molinelli, V., Grimaldo, V., Eds.; Nova Science Publishers: Hauppauge, NY, USA, 2012; pp. 1–34.
139. Stanley, S.K.; Hogg, T.L.; Leviston, Z.; Walker, I. From Anger to Action: Differential Impacts of Eco-Anxiety, Eco-Depression, and Eco-Anger on Climate Action and Wellbeing. *J. Clim. Chang. Health* **2021**, *1*, 100003. [CrossRef]
140. Clayton, S.; Karazsia, B.T. Development and Validation of a Measure of Climate Change Anxiety. *J. Environ. Psychol.* **2020**, *69*, 101434. [CrossRef]
141. Pihkala, P. Eco-Anxiety and Environmental Education. *Sustainability* **2020**, *12*, 10149. [CrossRef]
142. O'Neill, S.; Nicholson-Cole, S. "Fear Won't Do It. " *Sci. Commun.* **2009**, *30*, 355–379. [CrossRef]
143. Salomon, E.; Preston, J.L.; Tannenbaum, M.B. Climate Change Helplessness and the (de)Moralization of Individual Energy Behavior. *J. Exp. Psychol. Appl.* **2017**, *23*, 15–28. [CrossRef] [PubMed]
144. Wolfe, S.E.; Tubi, A. Terror Management Theory and Mortality Awareness: A Missing Link in Climate Response Studies? *WIREs Clim. Chang.* **2018**, *10*, e566. [CrossRef]
145. Chuang, Y.; Xie, X.; Liu, C. Interdependent Orientations Increase Pro-Environmental Preferences When Facing Self-Interest Conflicts: The Mediating Role of Self-Control. *J. Environ. Psychol.* **2016**, *46*, 96–105. [CrossRef]
146. Gómez-Olmedo, A.M.; Carrero Bosch, I.; Martínez, C.V. Volition to Behave Sustainably: An Examination of the Role of Self-Control. *J. Consum. Behav.* **2021**, *20*, 776–790. [CrossRef]
147. Li, M.; Tan, M.; Wang, S.; Li, J.; Zhang, G.; Zhong, Y. The Effect of Preceding Self-Control on Green Consumption Behavior: The Moderating Role of Moral Elevation. *Psychol. Res. Behav. Manag.* **2021**, *14*, 2169–2180. [CrossRef]
148. Redondo, I.; Puelles, M. The Connection between Environmental Attitude–Behavior Gap and Other Individual Inconsistencies: A Call for Strengthening Self-Control. *Int. Res. Geogr. Environ. Educ.* **2017**, *26*, 107–120. [CrossRef]
149. Wyss, A.M.; Knoch, D.; Berger, S. When and How Pro-Environmental Attitudes Turn into Behavior: The Role of Costs, Benefits, and Self-Control. *J. Environ. Psychol.* **2022**, *79*, 101748. [CrossRef]
150. Colombo, S.L.; Chiarella, S.G.; Lefrançois, C.; Fradin, J.; Simione, L.; Raffone, A. Probing Pro-Environmental Behaviour: A Systematic Review on Executive Functions and Self-Regulation Processes. *J. Environ. Psychol.* **2023**. submitted.
151. Soutter, A.R.B.; Bates, T.C.; Mõttus, R. Big Five and HEXACO Personality Traits, Proenvironmental Attitudes, and Behaviors: A Meta-Analysis. *Perspect. Psychol. Sci.* **2020**, *15*, 913–941. [CrossRef] [PubMed]
152. Ashton, M.C.; Lee, K. HEXACO Personality Inventory-Revised (HEXACO-PI-R). In *Encyclopedia of Personality and Individual Differences*; Springer International Publishing: Cham, Switzerland, 2017; pp. 1–3.
153. Lee, K.; Ashton, M.C.; Choi, J.; Zachariassen, K. Connectedness to Nature and to Humanity: Their Association and Personality Correlates. *Front. Psychol.* **2015**, *6*, 1003. [CrossRef] [PubMed]
154. Barrera-Hernández, L.F.; Sotelo-Castillo, M.A.; Echeverría-Castro, S.B.; Tapia-Fonllem, C.O. Connectedness to Nature: Its Impact on Sustainable Behaviors and Happiness in Children. *Front. Psychol.* **2020**, *11*, 276. [CrossRef] [PubMed]
155. Bruni, C.M.; Winter, P.L.; Schultz, P.W.; Omoto, A.M.; Tabanico, J.J. Getting to Know Nature: Evaluating the Effects of the Get to Know Program on Children's Connectedness with Nature. *Environ. Educ. Res.* **2017**, *23*, 43–62. [CrossRef]
156. Barbaro, N.; Pickett, S.M. Mindfully Green: Examining the Effect of Connectedness to Nature on the Relationship between Mindfulness and Engagement in pro-Environmental Behavior. *Pers. Individ. Dif* **2016**, *93*, 137–142. [CrossRef]
157. Mayer, F.S.; Frantz, C.M. The Connectedness to Nature Scale: A Measure of Individuals' Feeling in Community with Nature. *J. Environ. Psychol.* **2004**, *24*, 503–515. [CrossRef]
158. Nisbet, E.K.; Zelenski, J.M.; Murphy, S.A. The Nature Relatedness Scale. *Environ. Behav.* **2009**, *41*, 715–740. [CrossRef]
159. Otto, S.; Pensini, P. Nature-Based Environmental Education of Children: Environmental Knowledge and Connectedness to Nature, Together, Are Related to Ecological Behaviour. *Glob. Environ. Chang.* **2017**, *47*, 88–94. [CrossRef]
160. Leung, A.K.-Y.; Koh, K.; Tam, K.-P. Being Environmentally Responsible: Cosmopolitan Orientation Predicts pro-Environmental Behaviors. *J. Environ. Psychol.* **2015**, *43*, 79–94. [CrossRef]
161. Loy, L.S.; Reese, G. Hype and Hope? Mind-Body Practice Predicts pro-Environmental Engagement through Global Identity. *J. Environ. Psychol.* **2019**, *66*, 101340. [CrossRef]
162. McFarland, S.; Webb, M.; Brown, D. All Humanity Is My Ingroup: A Measure and Studies of Identification with All Humanity. *J. Pers. Soc. Psychol.* **2012**, *103*, 830–853. [CrossRef] [PubMed]

163. Reese, G. Common Human Identity and the Path to Global Climate Justice. *Clim. Chang.* **2016**, *134*, 521–531. [CrossRef]
164. Reese, G.; Kohlmann, F. Feeling Global, Acting Ethically: Global Identification and Fairtrade Consumption. *J. Soc. Psychol.* **2015**, *155*, 98–106. [CrossRef] [PubMed]
165. Running, K. World Citizenship and Concern for Global Warming: Building the Case for a Strong International Civil Society. *Soc. Forces* **2013**, *92*, 377–399. [CrossRef]
166. Pratto, F.; Sidanius, J.; Stallworth, L.M.; Malle, B.F. Social Dominance Orientation: A Personality Variable Predicting Social and Political Attitudes. *J. Pers. Soc. Psychol.* **1994**, *67*, 741–763. [CrossRef]
167. Panno, A.; Giacomantonio, M.; Carrus, G.; Maricchiolo, F.; Pirchio, S.; Mannetti, L. Mindfulness, Pro-Environmental Behavior, and Belief in Climate Change: The Mediating Role of Social Dominance. *Environ. Behav.* **2018**, *50*, 864–888. [CrossRef]
168. Milfont, T.L.; Sibley, C.G. The Hierarchy Enforcement Hypothesis of Environmental Exploitation: A Social Dominance Perspective. *J. Exp. Soc. Psychol.* **2014**, *55*, 188–193. [CrossRef]
169. Milfont, T.L.; Richter, I.; Sibley, C.G.; Wilson, M.S.; Fischer, R. Environmental Consequences of the Desire to Dominate and Be Superior. *Pers. Soc. Psychol. Bull.* **2013**, *39*, 1127–1138. [CrossRef] [PubMed]
170. John, O.P.; Donahue, E.M.; Kentle, R.L. Big Five Inventory. *J. Personal. Soc. Psychol.* **1991**, *6*, 235–256.
171. Brick, C.; Lewis, G.J. Unearthing the "Green" Personality: Core Traits Predict Environmentally Friendly Behavior. *Environ. Behav.* **2016**, *48*, 635–658. [CrossRef]
172. Hirsh, J.B.; Dolderman, D. Personality Predictors of Consumerism and Environmentalism: A Preliminary Study. *Pers. Individ. Differ.* **2007**, *43*, 1583–1593. [CrossRef]
173. Lange, F.; Dewitte, S. Cognitive Flexibility and Pro-Environmental Behaviour: A Multimethod Approach. *Eur. J. Pers.* **2019**, *33*, 488–505. [CrossRef]
174. Markowitz, E.M.; Goldberg, L.R.; Ashton, M.C.; Lee, K. Profiling the "pro-Environmental Individual": A Personality Perspective. *J. Pers.* **2012**, *80*, 81–111. [CrossRef] [PubMed]
175. Milfont, T.L.; Sibley, C.G. The Big Five Personality Traits and Environmental Engagement: Associations at the Individual and Societal Level. *J. Environ. Psychol.* **2012**, *32*, 187–195. [CrossRef]
176. Panno, A.; De Cristofaro, V.; Oliveti, C.; Carrus, G.; Donati, M.A. Personality and Environmental Outcomes: The Role of Moral Anger in Channeling Climate Change Action and Pro-environmental Behavior. *Anal. Soc. Issues Public Policy* **2021**, *21*, 853–873. [CrossRef]
177. Rothermich, K.; Johnson, E.K.; Griffith, R.M.; Beingolea, M.M. The Influence of Personality Traits on Attitudes towards Climate Change—An Exploratory Study. *Pers. Individ. Differ.* **2021**, *168*, 110304. [CrossRef]
178. Ackerman, P.L.; Heggestad, E.D. Intelligence, Personality, and Interests: Evidence for Overlapping Traits. *Psychol. Bull.* **1997**, *121*, 219–245. [CrossRef]
179. Schretlen, D.J.; van der Hulst, E.-J.; Pearlson, G.D.; Gordon, B. A Neuropsychological Study of Personality: Trait Openness in Relation to Intelligence, Fluency, and Executive Functioning. *J. Clin. Exp. Neuropsychol.* **2010**, *32*, 1068–1073. [CrossRef] [PubMed]
180. DeYoung, C.G. Openness/Intellect: A Dimension of Personality Reflecting Cognitive Exploration. In *APA Handbook of Personality and Social Psychology, Volume 4: Personality Processes and Individual Differences*; American Psychological Association: Washington, DC, USA, 2015; pp. 369–399.
181. Diamond, A. Executive Functions. *Annu. Rev. Psychol.* **2013**, *64*, 135–168. [CrossRef] [PubMed]
182. Ionescu, T. Exploring the Nature of Cognitive Flexibility. *New Ideas Psychol.* **2012**, *30*, 190–200. [CrossRef]
183. Miyake, A.; Friedman, N.P.; Emerson, M.J.; Witzki, A.H.; Howerter, A.; Wager, T.D. The Unity and Diversity of Executive Functions and Their Contributions to Complex "Frontal Lobe" Tasks: A Latent Variable Analysis. *Cogn. Psychol.* **2000**, *41*, 49–100. [CrossRef] [PubMed]
184. Hofmann, W.; Schmeichel, B.J.; Baddeley, A.D. Executive Functions and Self-Regulation. *Trends Cogn. Sci.* **2012**, *16*, 174–180. [CrossRef] [PubMed]
185. De Ridder, D.T.D.; Lensvelt-Mulders, G.; Finkenauer, C.; Stok, F.M.; Baumeister, R.F. Taking Stock of Self-Control. *Personal. Soc. Psychol. Rev.* **2012**, *16*, 76–99. [CrossRef] [PubMed]
186. Hofmann, W.; Friese, M.; Strack, F. Impulse and Self-Control from a Dual-Systems Perspective. *Perspect. Psychol. Sci.* **2009**, *4*, 162–176. [CrossRef] [PubMed]
187. Fishbach, A.; Zhang, Y.; Koo, M. The Dynamics of Self-Regulation. *Eur. Rev. Soc. Psychol.* **2009**, *20*, 315–344. [CrossRef]
188. Marien, H.; Aarts, H.; Custers, R. Being Flexible or Rigid in Goal-Directed Behavior: When Positive Affect Implicitly Motivates the Pursuit of Goals or Means. *J. Exp. Soc. Psychol.* **2012**, *48*, 277–283. [CrossRef]
189. Geiger, N.; Bowman, C.R.; Clouthier, T.L.; Nelson, A.J.; Adams, R.B. Observing Environmental Destruction Stimulates Neural Activation in Networks Associated with Empathic Responses. *Soc. Justice Res.* **2017**, *30*, 300–322. [CrossRef]
190. Brevers, D.; Baeken, C.; Maurage, P.; Sescousse, G.; Vögele, C.; Billieux, J. Brain Mechanisms Underlying Prospective Thinking of Sustainable Behaviours. *Nat. Sustain.* **2021**, *4*, 433–439. [CrossRef]
191. Brosch, T.; Stussi, Y.; Desrichard, O.; Sander, D. Not My Future? Core Values and the Neural Representation of Future Events. *Cogn. Affect. Behav. Neurosci.* **2018**, *18*, 476–484. [CrossRef] [PubMed]

192. Amel, E.L.; Manning, C.M.; Scott, B.A. Mindfulness and Sustainable Behavior: Pondering Attention and Awareness as Means for Increasing Green Behavior. *Ecopsychology* **2009**, *1*, 14–25. [CrossRef]
193. Brown, K.W.; Kasser, T. Are Psychological and Ecological Well-Being Compatible? The Role of Values, Mindfulness, and Lifestyle. *Soc. Indic. Res.* **2005**, *74*, 349–368. [CrossRef]
194. Dhandra, T.K. Achieving Triple Dividend through Mindfulness: More Sustainable Consumption, Less Unsustainable Consumption and More Life Satisfaction. *Ecol. Econ.* **2019**, *161*, 83–90. [CrossRef]
195. Fischer, D.; Stanszus, L.; Geiger, S.; Grossman, P.; Schrader, U. Mindfulness and Sustainable Consumption: A Systematic Literature Review of Research Approaches and Findings. *J. Clean. Prod.* **2017**, *162*, 544–558. [CrossRef]
196. Geiger, S.M.; Grossman, P.; Schrader, U. Mindfulness and Sustainability: Correlation or Causation? *Curr. Opin. Psychol.* **2019**, *28*, 23–27. [CrossRef]
197. Li, Y.; Wei, L.; Zeng, X.; Zhu, J. Mindfulness in Ethical Consumption: The Mediating Roles of Connectedness to Nature and Self-Control. *Int. Mark. Rev.* **2020**, *38*, 756–779. [CrossRef]
198. Ray, T.N.; Franz, S.A.; Jarrett, N.L.; Pickett, S.M. Nature Enhanced Meditation: Effects on Mindfulness, Connectedness to Nature, and Pro-Environmental Behavior. *Environ. Behav.* **2021**, *53*, 864–890. [CrossRef]
199. Richter, N.; Hunecke, M. Mindfulness, Connectedness to Nature, Personal Ecological Norm and pro-Environmental Behavior: A Daily Diary Study. *Curr. Res. Ecol. Soc. Psychol.* **2022**, *3*, 100038. [CrossRef]
200. Bahl, S.; Milne, G.R.; Ross, S.M.; Mick, D.G.; Grier, S.A.; Chugani, S.K.; Chan, S.S.; Gould, S.; Cho, Y.-N.; Dorsey, J.D.; et al. Mindfulness: Its Transformative Potential for Consumer, Societal, and Environmental Well-Being. *J. Public Policy Mark.* **2016**, *35*, 198–210. [CrossRef]
201. Colombo, S.L.; Chiarella, S.G.; Raffone, A.; Simione, L. Understanding the Environmental Attitude-Behaviour Gap: The Moderating Role of Dispositional Mindfulness. *Sustainability* **2023**, *15*, 7285. [CrossRef]
202. Hilbig, B.E.; Zettler, I.; Moshagen, M.; Heydasch, T. Tracing the Path from Personality—Via Cooperativeness—To Conservation. *Eur. J. Pers.* **2013**, *27*, 319–327. [CrossRef]
203. Gillebaart, M.; Kroese, F.M. "Don't Mind If I Do": The Role of Behavioral Resistance in Self-Control's Effects on Behavior. *Front. Psychol.* **2020**, *11*, 396. [CrossRef] [PubMed]
204. Nielsen, K.S.; Hofmann, W. Motivating Sustainability through Morality: A Daily Diary Study on the Link between Moral Self-Control and Clothing Consumption. *J. Environ. Psychol.* **2021**, *73*, 101551. [CrossRef]
205. Wei, X.; Yu, F. Envy and Environmental Decision Making: The Mediating Role of Self-Control. *Int. J. Environ. Res. Public Health* **2022**, *19*, 639. [CrossRef] [PubMed]
206. Roebers, C.M. Executive Function and Metacognition: Towards a Unifying Framework of Cognitive Self-Regulation. *Dev. Rev.* **2017**, *45*, 31–51. [CrossRef]
207. Friese, M.; Gianotti, L.R.R.; Knoch, D. The Association between Implicit Alcohol Attitudes and Drinking Behavior Is Moderated by Baseline Activation in the Lateral Prefrontal Cortex. *Health Psychol.* **2016**, *35*, 837–841. [CrossRef]
208. Gianotti, L.; Figner, B.; Ebstein, R.P.; Knoch, D. Why Some People Discount More than Others: Baseline Activation in the Dorsal PFC Mediates the Link between COMT Genotype and Impatient Choice. *Front. Neurosci.* **2012**, *6*, 54. [CrossRef]
209. Baumgartner, T.; Langenbach, B.P.; Gianotti, L.R.R.; Müri, R.M.; Knoch, D. Frequency of Everyday Pro-Environmental Behaviour Is Explained by Baseline Activation in Lateral Prefrontal Cortex. *Sci. Rep.* **2019**, *9*, 9. [CrossRef]
210. Shen, J.J.; Cheah, C.S.L.; Yu, J. Asian American and European American Emerging Adults' Perceived Parenting Styles and Self-Regulation Ability. *Asian Am. J. Psychol.* **2018**, *9*, 140–148. [CrossRef]
211. Baumeister, R.F.; Heatherton, T.F. Self-Regulation Failure: An Overview. *Psychol. Inq.* **1996**, *7*, 1–15. [CrossRef]
212. Carver, C.S.; Scheier, M.F. A Model of Behavioral Self-Regulation. In *Handbook of Theories of Social Psychology*; SAGE Publications Ltd.: London, UK, 2012; Volume 1, pp. 505–525.
213. Carver, C.S.; Scheier, M.F. Control Theory: A Useful Conceptual Framework for Personality–Social, Clinical, and Health Psychology. *Psychol. Bull.* **1982**, *92*, 111–135. [CrossRef]
214. Jurado, M.B.; Rosselli, M. The Elusive Nature of Executive Functions: A Review of Our Current Understanding. *Neuropsychol. Rev.* **2007**, *17*, 213–233. [CrossRef] [PubMed]
215. Carver, C.S.; Scheier, M.F. Stress, Coping, and Self-Regulatory Processes. In *Handbook of Personality: Theory and Research*; Pervin, L.A., John, O.P., Eds.; Guilford Press: New York, NY, USA, 1999; pp. 553–575.
216. McClelland, M.M.; Ponitz, C.C.; Messersmith, E.E.; Tominey, S. Self-Regulation. In *The Handbook of Life-Span Development*; John Wiley & Sons, Inc.: Hoboken, NJ, USA, 2010.
217. Diamond, A.; Ling, D.S. Review of the Evidence on, and Fundamental Questions About, Efforts to Improve Executive Functions, Including Working Memory. In *Cognitive and Working Memory Training*; Oxford University Press: Oxford, UK, 2019; pp. 143–431.
218. Chiesa, A.; Serretti, A. Mindfulness-Based Stress Reduction for Stress Management in Healthy People: A Review and Meta-Analysis. *J. Altern. Complement. Med.* **2009**, *15*, 593–600. [CrossRef] [PubMed]
219. Guendelman, S.; Medeiros, S.; Rampes, H. Mindfulness and Emotion Regulation: Insights from Neurobiological, Psychological, and Clinical Studies. *Front. Psychol.* **2017**, *8*, 220. [CrossRef] [PubMed]

220. Nyklíček, I.; Kuijpers, K.F. Effects of Mindfulness-Based Stress Reduction Intervention on Psychological Well-Being and Quality of Life: Is Increased Mindfulness Indeed the Mechanism? *Ann. Behav. Med.* **2008**, *35*, 331–340. [CrossRef] [PubMed]
221. Xiu, L.; Wu, J.; Chang, L.; Zhou, R. Working Memory Training Improves Emotion Regulation Ability. *Sci. Rep.* **2018**, *8*, 15012. [CrossRef]