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THREE ESSAYS ON SUSTAINABLE CONSUMER PSYCHOLOGY AND BEHAVIOR

Rahmani Leïla

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FACULTÉ DES HAUTES ÉTUDES COMMERCIALES

DÉPARTEMENT MARKETING

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THÈSE DE DOCTORAT

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pour l'obtention du grade de
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par

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sans se prononcer sur les opinions exprimées dans cette thèse.

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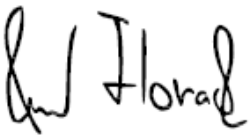
Signature:  Date: 15/12/2023

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Table of Contents

Introduction

We, as humans, bear significant responsibility for climate change (Intergovernmental Panel on Climate Change, 2023). In today's world, it is more critical than ever to mitigate the environmental impact of our individual behaviors. The central theme of this sentence is 'individual behavior,' which is the primary focus of this dissertation. The examination operates at the micro-level of individual behaviors.

Schultz and Kaiser (2012) categorize pro-environmental behaviors into four distinct groups: transportation, choice of residence, consumption, and waste disposal, which can manifest as either obligatory or voluntary acts. Within this framework, “pro-environmental consumption” refers to “behaviors contributing to the sustainability of the natural environment” (Schultz & Kaiser, 2012, p. 557). This involves favoring products or services that impose minimal environmental harm (Harrison et al., 2005). Existing literature suggests that pro-environmental behaviors, especially those of a voluntary nature, can pose considerable challenges, require deliberation, involve cognitive demands, be subject to social influence, and tend to be future-oriented (Trudel, 2019). The literature further underscores the significant role of identity as a motivator for such behaviors, highlighting that these actions are often driven by one's identity (Oyserman, 2009).

Before delving into the concept of identity motivation, we first need to define what constitutes an identity. An identity is described as “any category label to which a consumer self-associates either by choice or endowment” (Reed et al., 2012, p. 312). For instance, consider Caroline, a 30-year-old individual. Her self-concept may encompass various identities, such as a political identity (“I am a moderate Democrat”), a gender identity (“I am a woman”), an ethnic identity (“I am a Hispanic American”), a sport identity (“I am a runner”), and an environmental identity (“I am a part of Nature”). These identities, influenced

by motivations like self-preservation and enhancement, can significantly impact consumer attitudes, intentions, and behaviors across diverse domains (Oyserman, 2009; Reed et al., 2012).

With respect to pro-environmental behavior, consumers often make decisions related to consumption, choice of residence, transportation, and waste disposal (Schultz & Kaiser, 2012). Many of these important decisions can be influenced by motivations tied to their environmental identity, which is defined as the idea that the natural environment is an integral part of how individuals define themselves (Clayton, 2003). This definition emerges as one of the most influential and comprehensive explanations of environmental identity. Individuals with a strong self-connection to nature are more inclined to protect it, forming a key framework for this dissertation.

The concept of environmental identity has garnered sustained research attention in recent years. Scholars have developed valuable instruments for empirically assessing environmental identity (e.g., Brügger et al., 2011; Clayton, 2003; Martin & Czellar, 2016; Mayer & Frantz, 2004; Schultz, 2001). Previous research has consistently demonstrated that environmental identity is correlated with both self-reported pro-environmental actions (e.g., Tam 2013; Kashima et al., 2014) and actual pro-environmental behavior (e.g., Whitmarsh & O'Neill, 2010; Frantz & Mayer, 2014). These relationships have been further substantiated through recent meta-analyses (e.g., Mackay & Schmitt, 2019; Whitburn et al., 2020). The effects may be attributed to identity-based processes, wherein the inclusion of the natural environment in one's self-concept gives rise to self-protective motivations. In essence, as noted by Mayer and Frantz (2004, p. 512), “If people feel connected to nature, they will be less likely to harm it, for harming it would, in essence, be harming their very self.”

While existing research has devoted considerable attention to measuring environmental identity and understanding its impact on behavior, there is still limited knowledge about other

dimensions of environmental identity and their role in driving consumer behaviors. Identity theory (Reed et al., 2012) suggests that three structural characteristics of identity may be in play. In essence, our research aims to answer the following questions: What are the different dimensions of environmental identity, and how do they drive pro-environmental behaviors?

Before delving into the subsequent essays within this dissertation, we begin by illustrating a practical example to ensure a shared understanding. On one hand, consider Caroline—the same individual discussed earlier, now focusing on a specific aspect of her self-concept. She identifies herself as someone who greatly enjoys hiking and exploring unspoiled natural environments. On the other hand, there is Eddy, more of an urban type, who spends limited time outside the city. He is a dedicated pet owner and cherishes taking care of his cat. Consider the current scenario: both Caroline and Eddy are walking down the street on their way to a store to shop for durable and non-durable goods. Along the way, they encounter various World Wide Fund for Nature (WWF) advertisements. Picture them inside the store, selecting items from the shelves. The central question here is: Why would Caroline make more pro-environmental product choices than Eddy?

There are distinct dimensions of environmental identity that may influence behavior. Environmental identity strength refers to the intensity of an individual's psychological connection between the self and the natural environment (Clayton, 2003). The case of environmental identity content pertains to how stimuli aligning with environmental identity receive positive evaluations and incorporate identity-related content without explicit processing (Reed et al., 2012). Finally, environmental identity salience is defined as the extent to which environmental identity occupies one's thoughts across various contexts (Kettle, 2019; Reed et al., 2012).

Returning to the initial question posed by the example—why would Caroline exhibit a higher inclination toward pro-environmental product choices compared to Eddy? Two

plausible explanations arise. Firstly, Caroline's heightened engagement in pro-environmental behavior may be attributed to a stronger development of environmental identity compared to Eddy—this aligns with the environmental identity strength dimension. Secondly, Caroline may have noticed something in a WWF ad that triggered a connection with nature, a realization that did not occur for Eddy. This observation is linked to the environmental identity association and salience dimensions. While there exists substantial research on environmental identity strength, there remains a significant knowledge gap regarding the dimensions of environmental identity salience and association. Further exploration of these dimensions is warranted to comprehensively understand their impact on pro-environmental behaviors.

My dissertation encompasses three distinct essays, each distinct in its thematic focus and research objectives. The first essay, titled “Nature’s Nature: A Content-Based Approach to Environmental Identity Investigating Personal Representations of Nature and Individual Differences,” specifically delves into the content dimension of environmental identity. In my second essay, “And If Nature Was Not Enough? How Self-Nature Connection Boosts Pro-Environmental Behavior through Environmental Identity Salience,” the focus shifts to the salience dimension of environmental identity. This essay introduces a strategy for activating environmental identity and examines its impact on pro-environmental behaviors. Concluding the series, the third essay explores the effects of environmental identity strength and salience on various types of pro-environmental behaviors. Furthermore, we introduce a measurement for environmental identity salience. This essay, titled “How Often Do You Think about Your Relationship with Nature? The Measurement of Environmental Identity Salience and Its Relationship with Pro-environmental Behaviors,” has already been published in Frontiers in Psychology. I would like to thank my coauthors Simona Haasova, Valentina Clergue,

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References

Brügger, A., Kaiser, F. G., & Roczen, N. (2011). One for all? Connectedness to nature, inclusion of nature, environmental identity, and implicit association with nature. *European Psychologist*, 16, 324–333.

Clayton, S. (2003). Environmental identity: A conceptual and operational definition. In S. Clayton & S. Opotow (Eds.), *Identity and the natural environment* (pp. 45–65). Cambridge, MA: MIT Press.

Harrison, R., Newholm, T., & Shaw, D. (2005). *The ethical consumer*. London: Sage Publications.

Intergovernmental Panel on Climate Change. (2023). Climate Change 2023: Synthesis Report. A Report of the Intergovernmental Panel on Climate Change. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC, Geneva, Switzerland, (in press).

Kashima, Y., Paladino, A., Margetts, E.A. (2014). Environmentalist identity and environmental striving. *Journal of Environmental Psychology*, 38, 64–75.

Kettle, K. L. (2019). Identity salience: Understanding when identity affects consumption. In A. Reed & M. R., Forehand (Eds.). *Handbook of research on identity theory in marketing* (pp. 30–43). Edward Elgar.

Mackay, C.M., & Schmitt, M.T. (2019). Do people who feel connected to nature do more to protect it? A meta-analysis. *Journal of Environmental Psychology*, 65, 101323.

Martin, C., & Czellar, S. (2016). The extended Inclusion of Nature in Self scale. *Journal of Environmental Psychology, 47,* 181–194.

Mayer, F.S., & Frantz, C.M. (2004). The connectedness to nature scale: A measure of individuals' feeling in community with nature. *Journal of Environmental Psychology*, 24, 503–515.

Oyserman, D. (2009). Identity-based motivation: Implications for action-readiness, procedural-readiness, and consumer behavior. *Journal of Consumer Psychology,* 19, 250–260.

Reed II, A., Forehand, M.R., Puntoni, S., & Warlop, L. (2012). Identity-based consumer behavior. *International Journal of Research in Marketing,* 29, 310–321.

Schultz, P. W. (2001). The structure of environmental concern: Concern for self, other people, and the biosphere. *Journal of Environmental Psychology*, 21, 327–339.

Schultz, P. W., & Kaiser, F. G. (2012). Promoting proenvironmental behavior. In S. Clayton (Ed.), *Handbook of environmental and conservation psychology* (pp. 556–580). Oxford University Press.

Tam, K.-P. (2013a). Concepts and measures related to connection to nature: Similarities and differences. *Journal of Environmental Psychology*, 34, 64–78.

Trudel, R. (2019). Sustainable consumer behavior. *Consumer Psychology Review*, 2(1), 85–96.

Whitburn, J., Linklater, W., & Abrahamse, W. (2020). Meta-analysis of human connection to nature and proenvironmental behavior. *Conservation Biology,* 34, 180-193.

Whitmarsh, L., & O'Neill, S. (2010). Green identity, green living? The role of pro-environmental self-identity in determining consistency across diverse pro-environmental behaviours. *Journal of Environmental Psychology*, 30(3), 305–314.

Essay 1

Nature's Nature: A Content-Based Approach to Environmental Identity Investigating Personal Representations of Nature and Individual Differences

Leïla Rahmani

Abstract

In the past twenty years, environmental identity (i.e., personal sense of connection to nature) has become a key concept in environmental psychology. Extant research has proposed and validated valuable instruments to quantify environmental identity. Using these measures, researchers have been investing considerable effort into the assessment of the antecedents and consequences of environmental identity. Despite these efforts, there are still existing gaps around the concept of environmental identity that need to be systematically investigated. Many of the extant measures predominantly rely on generic terms such as “nature,” “natural world,” or “natural environment” without clearly defining them or assessing what individuals may associate with these terms. People can have a different representation of nature, which can be linked to the specificities of their individual environmental identity. In this research, we implemented a content approach to environmental identity to better understand the underpinning meaning of nature. An individual’s environmental identity goes beyond the well-established strength dimension and needs to include identity content as well. In a series of studies, we devised a comprehensive measure of environmental identity content, encompassing eleven nature-related associations that depict individuals' representations of nature, as well as the valence (positivity vs. negativity) and frequency of these associations. Additionally, individual differences were assessed, leading to the formulation of research propositions and questions for systematic future inquiry.

Keywords: meaning of nature, self-nature connection, environmental identity content, nature associations, nature, natural environment

1. Introduction

A poet once said, “That’s why on a warm day/ I feel sad because I enjoy it so much,/ And stretching out on the grass,/ And closing my hot eyes,/ I feel my whole body lying stretched out on reality,/ I know the truth and I am happy” (Pessoa, 2020). This poet, Alberto Caeiro, wrote this along with twenty-two other poems that are part of his most famous oeuvre, “The Keeper of Sheep.” There, he identified himself as an “interpreter of nature” (poem 31, pp. 101-102 Pessoa, 2020) and, just as in the above verses, he established a clear link between the meaning of life and nature, but also how to live according to nature itself.

He was not the only poet to do it. Better-known poets such as Emily Dickinson, Elizabeth Bishop, Sylvia Plath, and Mary Oliver also use nature as a “metaphor in relation to the self” (Yaros, n.d.). Yet, the reason Caeiro is singled out in this introduction is that he never existed. He was one of the heteronyms, i.e., an imaginary character created by Fernando Pessoa. All of Pessoa’s heteronyms had different personalities and took on their perception of nature. Like these heteronyms, people can have other takes on nature and its meaning to them. In turn, these diverse meanings can be correlated with the specificities of their self-concept and, consequently, their individual environmental identity. But what is the meaning of nature? Has it remained constant over time? Furthermore, do individuals harbor unique associations with nature, and how do these connections relate to individual differences and the strength of environmental identity.

This paper will focus on this last part as we believe that by gaining greater insights into environmental identity content, policymakers and marketers can develop customized approaches via education and communication to strengthen and activate environmental identity in their target populations.

2. Theoretical Background

2.1 The Meaning of Nature

The definition of nature, as provided by the Oxford Learner's Dictionaries (n.d.), encompasses the entirety of non-human-made elements: "all the plants, animals and things that exist in the universe that are not made by people." According to the Cambridge Dictionary (n.d.), nature encompasses "all the animals, plants, rocks, and other elements in the world, and all the features, forces, and processes that happen or exist independently of people, such as the weather, the sea, mountains, the production of young animals or plants, and growth." Another definition, also highlighted in the Dictionary (n.d.), refers to nature as "the material world, especially as surrounding humankind and existing independently of human activities." All these definitions underscore the non-human elements as the essence of nature. Therefore, it encompasses everything that exists and operates autonomously, free from any direct human intervention.

The ancient Egyptian civilization attributed immense significance to the natural world (Evans, 2020). The concept of "nature" was intricately intertwined with their religious and spiritual beliefs (Morenz, 1973). The ancient Egyptians viewed nature as a representation of divine forces and powers that exerted control over the functioning of the world (Tobin, 1988). They embraced the belief in resurrection after death as an integral aspect of their religious worldview, emphasizing the cyclical nature of death and rebirth (Meskell, 2001). Furthermore, they acknowledged the harmonious and balanced interconnectedness between human existence and the surrounding natural environment, reflecting a profound awareness of their interdependence (Germond, 2001; Hornung, 1967; te Velde, 1980).

The ancient Greeks held a nuanced and multifaceted understanding of nature. They regarded nature as a strong and formidable force, often characterized by its unpredictability and untamed essence (Wiman, 1990). Consequently, nature possessed the ability to both

nurture and inflict destruction, demonstrating a dualistic power to sustain and devastate, commonly referred to as the "law of nature" (Horsley, 1978). Some historians attribute the origin of this concept to Greek philosophy (Koester, 1968). Moreover, the Greeks thought that nature was ruled by many gods and goddesses, and each of them had their distinct abilities (Kennedy, 2016). The ancient Greeks perceived their position within the natural world as an integral part of a vast interconnected network, and they held the belief that by embracing nature and acknowledging its immense power, humans could attain a state of equilibrium (Barnett, 2007). Furthermore, the ancient Greeks regarded nature as "the unity and harmony of the cosmos" (Glacken, 1967). In contrast to the assertions of classical Greek humanists, including Aristotle and Plato, as well as the early Stoics, who contended that the resources of nature were exclusively intended for the benefit of humankind (Egri, 1997; Hughes, 1975; Wall, 1994).

Monotheistic religions approach the concept of "nature" as profoundly intertwined with theological and ethical perspectives (Nasr, 1996). While there may be variations in the perception of nature among these religions, common themes emerge (Gottlieb, 1996). Nature is often regarded as a reflection of the divine, encompassing the created world, which includes the physical universe, living beings, and natural phenomena (Ducarme & Couvet, 2020; Rockefeller, 1992). Consequently, nature is seen as a manifestation of God's power, serving as a medium to establish a connection with the divine and reflecting divine intention and purpose (Armstrong, 1993). The interpretation of religious texts by believers often leads to the belief that human beings are superior to the rest of the natural world because they have been chosen by God (Egri, 1997; Poorthuis, 2022). Monotheistic religions often perceive human beings as superior and dominant over nature, granting them a sense of entitlement or dominion over the natural world (Hand & Van Liere, 1984). Furthermore, religious writings

reject the theory of evolution (Darwin, 1861) which strongly reinforces the connection between the natural world and human beings (Haught, 2008).

Nowadays, there remains a divergence in perspectives on nature between the Occidental and Oriental viewpoints (even if views of nature can vary among individuals within those societies) (McNeill, 2003). From a Western perspective, the concept of "nature" refers to the independent physical world and its phenomena, separate from human influence. In that sense, it is perceived as being distinct from human civilization and the constructed environment (Coates, 1998; Latour, 2011). Authors like Descartes (1664), Darwin (1861), and Kant (1786) have engaged in discussions regarding the connection between humans and nature, exploring ideas such as the duality of subject and object and the intrinsic worth of the natural world. From this perspective, nature is perceived as an independent entity separate from human society (Merchant, 1980). From an Eastern perspective, the concept of "nature" is deeply ingrained in various philosophical and cultural traditions such as Taoism, Hinduism, Buddhism, and Shinto. In these traditions and cultures, nature is revered as a source of wisdom and inspiration, with a focus on aligning oneself with the natural flow of life (Bloom, 1972; Chappel, 2000; Rots, 2017). It is viewed as a manifestation of the divine, symbolizing the unity and interconnectedness of all existence (Butcher, 2013). The cyclic patterns observed in nature reflect the eternal rhythm of life (Berthrong, 2003; Kassiola, 2010). Eastern perspectives emphasize a holistic and interconnected view of nature, emphasizing harmony, balance, and the interdependence of all living beings and the environment (Coward, 2003; Johnson, 2006). In these viewpoints, humans are considered an integral part of the natural world rather than separate entities (Sponsel & Natadecha-Sponsel, 2003).

2.2 Human-Nature Connection and Interaction

Humans are inherently interconnected with the natural environment, forming an integral part of our planet's intricate web of life (Kahn, 1997; Kellert, 1996). The Biophilia hypothesis, proposed by Wilson (1984), suggests that throughout human evolution, our existence has been intertwined with natural environments, and we have relied on nature for sustenance and various needs. This prolonged interaction has instilled a profound appreciation for nature within our genetic code (Kahn, 1997). Some scholars refer to this phenomenon as a "biophilic instinct" or an "innate love of nature" (Saad, 2013, p. 63). The theory of Biophilia further posits that humans possess an inherent and instinctive affinity for the natural world and living organisms. This intrinsic connection with nature, rooted in our evolutionary heritage, is believed to influence our well-being, cognitive abilities, and emotional state (Wilson, 1984, 1993). Humans are thought to possess an innate inclination to seek out and establish connections with nature, which can have positive effects on our physical and mental health (Ulrich, 1993). The consistent finding that individuals enjoy enhanced well-being when residing in proximity to nature (Barragan-Jason et al., 2023; White et al., 2013) or when they have exposure to natural environments (White et al., 2017) has been linked to this inherent affinity for nature known as the biophilic instinct. Additionally, the prevalence of nature-related behaviors exhibited has also been associated with this inherent affinity for nature (Saad, 2013). Moreover, Kaplan and Kaplan (1989, 1995) demonstrated that the natural environment has the power to act as a restorative setting for individuals. Furthermore, recent studies grounded in the Biophilia Hypothesis underscore the significance of integrating nature into our constructed environments and nurturing a harmonious relationship between humans and the natural world (Browing et al., 2014; Gillis & Gatersleben, 2015).

A relevant area of study related to the Biophilia hypothesis can be found in Kellert's extensive research on people's values and attitudes toward the natural world. For two decades,

Kellert (1996a) has constructed a classification system consisting of nine values. These values represent various functions of the innate biophilic inclination to connect with nature. They encompass a broad spectrum of physical, emotional, and intellectual functions that serve as indicators of people's affinity for and relationship with the natural environment.

Throughout history, humans have often acted as masters of nature, exploiting it at their discretion (Egri, 1997). In the late 19th and early 20th centuries, conservation and environment protection movements emerged as a response to the rapid industrialization and exploitation of natural resources (Frisken, 1971), with influential figures like John Muir and Theodore Roosevelt playing pivotal roles (Fox, 1985; Izatt, 2004). Later, Rachel Carson raised early alarms about the real dangers of pesticides on the environment and warned about the lack of regulation in their use (Carson, 1962). These movements led to the implementation of environmental laws and the establishment of regulatory bodies (Fiksel et al., 2009). All these ongoing efforts to raise awareness of climate change as a global issue have resulted in international agreements such as the Paris Agreement in 2016 (Bohre, 2016), as well as the establishment of the United Nations Sustainable Development Goals, which urge all nations to foster economic growth while addressing social and environmental concerns (United Nations, 2020). Throughout the years, there has been a notable shift toward prioritizing environmental protection, with increased public awareness and efforts to address climate change, biodiversity loss, and sustainable development (Calculli et al., 2021; Santos & Bakhshoodeh, 2021). Today, there is a growing recognition of the urgent need to protect and restore the natural environment to achieve a more sustainable world (Starik & Kanashiro, 2013; Wang and Udall, 2023; Williams et al., 2017). In Gunter Pauli's words (2010, p. 201): "Nature should never be forced to produce like a factory. Factories should produce like nature."

2.3 Nature in Environmental Psychology

Environmental identity has become a key concept in environmental psychology in the past twenty years. In general, identities (e.g., political identity, gender identity, ethnic identity, sport identity) may exert an impact on consumer attitudes, intentions, and behaviors, through identity motivations such as self-preservation and enhancement, in a variety of domains (Oyserman, 2009; Reed et al., 2012). Concerning pro-environmental behavior, consumers make decisions in domains such as daily consumption, transportation, and waste disposal choices (Schultz & Kaiser, 2012). Many of these important decisions are influenced by motivations related to their environmental identity (Schultz, 2002). The most comprehensive definition of environmental identity has been conceptualized by Susan Clayton as "a sense of connection to some part of the non-human environment, based on history, emotional attachment, and/or similarity, that affects the way we perceive and act toward the world; the belief that the environment is important to us and an important part of who we are" (Clayton, 2003, p. 45-46). A dominant approach to environmental identity is the self-nature connection paradigm (Tam, 2013). Self-nature connection is defined as "the extent to which an individual includes nature within his/her cognitive representation of self" (Schultz, 2002, p. 67). A general finding in the literature is that exposure to, and direct experiences with, nature are conducive to the development of an individual environmental identity (Brügger et al., 2011). This effect has been found in correlational (e.g., Cheng & Monroe, 2012; Collado et al., 2015) as well as experimental studies (e.g., Mayer, et al., 2009; Nisbet & Zelenski, 2011). Notably, individuals who report a stronger (weaker) environmental identity are more (less) likely to identify themselves as environmentalists (Nisbet et al., 2009). The environmental identity concept has gained momentum in research in part because of its relation to self-reported pro-environmental actions (e.g., Tam, 2013; Kashima et al., 2014) and actual pro-environmental behavior (e.g., Whitmarsh & O'Neill, 2010; Frantz & Mayer, 2014). Such a relationship was

also confirmed in recent meta-analyses (Mackay & Schmitt, 2019; Whitburn et al., 2020). The relationship may occur through identity-based processes, whereby the inclusion of the natural environment in the self may give rise to self-protective motivations that go beyond the actual self and spill over to the natural environment, in a sense that “if people feel connected to nature, then they will be less likely to harm it, for harming it would in essence be harming their very self.” (Mayer & Frantz, 2004, p. 512).

The concept of environmental identity has been the topic of sustained research attention in recent years. Scholars have developed valuable instruments for the empirical assessment of environmental identity, such as ronmental Identity (Clayton, 2003), Connectedness to Nature (Mayer & Frantz, 2004), Nature Relatedness (Nisbet et al., 2009), Connectivity with Nature (Dutcher et al., 2007), and variants of the Inclusion of Nature in Self (Martin & Czellar, 2016; Schultz, 2001) scales. Some of these measures consist of verbal multi-item scales, while others, such as the Inclusion of Nature in Self (INS), the Extended Inclusion of Nature in Self (EINS), the Self-Nature IAT, and the connectivity with nature scale, take different forms. The Connectivity with Nature scale incorporates verbal items along with the INS. The INS and EINS are graphical assessments that capture the individual's connection to nature (Schultz et al., 2004). Using these measures, researchers have been devoting significant efforts to evaluating the factors that contribute to and the outcomes resulting from environmental identity (Bruni et al., 2017; Clayton, 2012; Martin & Czellar, 2016, 2017; Tam, 2013). Many of the extant measures predominantly rely on generic terms such as “nature,” “natural world” or “natural environment” without clearly defining them or assessing what individuals may associate with these terms.

As stated by Kate Soper (1995), the meaning of nature is full of symbolism and encompasses complexity and contradiction; it is the subject of widely divergent ideologies and has been represented in a highly varied manner. In environmental psychology, "nature" is

commonly defined by researchers as the non-human environment (Simmons, 1993), untouched by human influence and free from artificial elements (Clayton, 2003; Schultz, 2002) with a recognized dichotomy between what is influenced by human activity and what remains in its natural state (Clayton & Opotow, 2003). While acknowledging that humans are part of nature themselves, this definition specifically refers to the non-human aspects of the environment (Myers, 2012). The Self-Nature IAT provides a tangible demonstration of this dichotomy division, evaluating individual environmental identity through response latency tasks that measure the speed of reactions to different combinations of "me" and "not me" categories with the "nature" and "built" categories (Schultz et al., 2004). The authors also emphasized some specific representations of nature using terms such as animals, plants, whales, and trees. Other IATs utilized alternative depictions of nature, incorporating terms such as germ, maggot, insect, fungus, rock, nectar, animal, and glacier to evaluate the concept of nature (Bruni et al., 2011). The scale developed by Clayton (2003) for evaluating environmental identity offers a broader perspective of nature. This scale encompasses not only broad terms like “nature” and “natural world” but also includes more specific elements that symbolize nature, such as woods, mountains, deserts, lakes, oceans, earth, trees, storms, sunset, and mountains.

More generally, representations of nature can be diverse and varied (Myers & Russell, 2003). Some individuals perceive it as a spiritual aspect involving a connection with “Mother Earth” or a sense of unity with Gaia (Clayton, 2003), which is an anthropomorphic representation of nature (Liu et al., 2019). Anthropomorphic interpretation means that individuals attribute human characteristics to their description of nature (Gebhard et al., 2003; Searles, 1960). According to Myers (1998), a dominant representation of nature, as per child development research, relates to animals, including wild animals, and Gebhard et al. (2003) showed that anthropomorphic reasoning is often used by individuals with animals but also

surprisingly with trees. Furthermore, as explained by Kahn (2003), isomorphic and transmorphic reasoning can also be used to describe natural entities.

In his book, Noel Castree (2014b) explored the concept of nature from different angles, employing four distinct categories to define "what is nature" (external, universal, intrinsic, super-ordinate), delving into the spatial dimension of "where is nature" (localization), and discussing the temporal aspect of "when is nature" as it relates to temporality.

Yet, as stated by Roszak (1993), the recognition of the intertwined relationship between humans and the natural world might be so apparent that many individuals tend to overlook this unique bond, potentially missing the opportunity to effectively leverage it to achieve our shared sustainability goals (Starik & Kanshiro, 2013).

3. Research Gap

As mentioned earlier, humans are inherently interconnected with the natural environment (Wilson, 1984), yet there is an increasing tendency for individuals to become disconnected from nature, perceiving it as a separate realm that should be kept at a distance (Schultz, 2002). Zoos can serve as a means to reestablish a connection with the natural world through emotional engagement, personal experiences, and educational initiatives (Clayton et al., 2009). However, it is interesting to note that zoos also symbolize our separation from nature, as they physically distance animals from human beings and present a version of nature that aligns with human preferences (Bruni et al., 2008). While zoos allow people to observe and learn about various species, they simultaneously highlight the separation between humans and the natural environment. This disconnection is particularly pronounced among younger generations, who have significantly reduced direct exposure to the natural environment (Louv, 2008). The evolution of Disney movies over the past 70 years provides further evidence of the growing distance between nature and human beings (Prévot-Julliard et al., 2014). The

potential decline in the connection between individuals and nature (Barrable & Booth, 2022) is a critical concern as it directly impacts our environmental awareness and willingness to preserve the natural environment (Schultz et al., 2004). In other words, the disconnect between humans and the natural world could potentially play a role in the deterioration of our planet (Howard, 1997; Schultz et al., 2004). How individuals perceive and interact with nature can offer valuable insights into their environmental behavior (Nisbet et al., 2009).

So, by gaining a deeper understanding of nature's personal significance and meaning, we can take more effective action to address the (dis)connection and thereby restore and strengthen this crucial bond between the natural environment and humans. Furthermore, acquiring a comprehensive understanding of nature's personal meaning will enable us to develop adapted educational programs and communication messages. According to Moser (2010), the efficacy of a communication message is based on four principles: “internal consistency, alignment with the audience's mental model, capturing and maintaining the audience's attention, and incorporating an emotional element” (Gifford & Sussman, 2012, p. 71). A recent study by Koivisto and Grassini (2022) demonstrated that mental imagery of nature positively influences psychological states. As stated by Kosslyn et al. (2001, p. 635), mental imagery is akin to “seeing with the mind's eye” or “hearing with the mind's ear,” which can be a powerful tool for enhancing environmental behaviors. Therefore, acquiring a deeper understanding of personal representations of nature is crucial.

When it comes to educational programs, previous research has demonstrated that the effectiveness of teaching programs incorporating environmental education components can vary and may not always lead to effectiveness (Eagles & Demare, 1999); and, in some cases, even lead to contrary effects (Bull, 1993). To ensure the success of environmental education programs, researchers have put forward multiple suggestions (Boerschig & de Young, 1993; Gifford & Sussman, 2012; Newhouse, 1990; Pooley & O’Connor, 2000). Among these,

integrating emotional and personal elements into the program stands out as a key recommendation. This can be achieved by delving deeper into individuals' personal perceptions of nature.

This research implemented a content approach to environmental identity to better understand the underpinning meaning of nature and individual connection to nature. An individual's environmental identity goes beyond the well-established strength dimension (Barragan-Jason et al., 2021) and should also include identity content. Individuals can have different nature-related associations, which can be linked to the specificities of their individual environmental identity (Schultz, 2002). As explained previously, extant research has focused heavily on the conceptualization and measurement of the strength of environmental identity. It has, however, devoted less attention to the content dimensions of this identity. For example, not considering the variability in the personal meaning of "nature" seems common practice in the scales presented in a previous section. Most extant measures use relatively generic/abstract terms such as "nature" and "natural environment" without considering variance in individual meanings related to these concepts. We need to know more about how people define these terms and what concepts come to mind when they reflect on them (Beery & Wolf-Watz, 2014). As these authors point out, some researchers also tend to oppose natural environments to human intervention, resulting in a relatively radical contrast between man-built environments and unspoiled, pristine nature. The present research views "nature" as an idiosyncratic concept with considerable individual variations that does not need to be an antonym of "urban" or "human-built" environments. Individuals may not only exhibit variation in the strength of their connection to nature, as demonstrated in previous research, but they may also differ in the images and experiences they associate with nature, the positive or negative character of these associations, and the number of associations they have with nature.

While substantial research has been dedicated to measuring environmental identity, in other words to the measure of the strength dimension and comprehending its influence on behavior, there remains a dearth of knowledge concerning other dimensions of environmental identity and their pivotal role in shaping consumer behaviors. Drawing from identity theory (Reed et al., 2012), it is proposed that identity associations play a crucial role in this dynamic. Specifically, within the realm of environmental identity association, the focus lies in understanding how stimuli aligned with environmental identity not only garner positive evaluations but also seamlessly incorporate identity-related content without necessitating explicit processing (Reed et al., 2012). This paper strategically delves into the association dimension of environmental identity by meticulously examining the content inherent to this specific identity.

Through four studies, we assessed the associations individuals have with nature across various categories we developed, representing the primary associations people form with nature. The valence of these associations, encompassing both positivity and negativity, was then examined alongside the number of associations individuals maintain with nature. This initial exploration constitutes the content of environmental identity. Consequently, individuals may differ not only in the strength of their connection to nature (strength of environmental identity) but also in the types of images and experiences associated with nature (type of nature associations), the degree of negativity or positivity in these associations (valence of associations), and whether they have numerous or limited nature associations (frequencies of associations). Furthermore, individual differences, classified into seven groups, were assessed: Personality Traits and Cultural Background, Values, Demographics and Cultural Background, Perceptions of Power, Perceptions of Time, Concerns and Attitudes, and Behavioral Tendencies. Through the examination of these individual differences, this research aims to offer a holistic view of the multifaceted factors that contribute to and shape the

content of environmental identity. This approach provides a more comprehensive understanding of the intricate interplay between individual characteristics and nature-related associations.

In conducting our exploratory research, we deliberately refrained from formally crafting hypotheses, aiming instead to generate research propositions organically based on the outcomes of our studies. Bamberg and Möser (2007) highlighted that researchers investigating the influence of personal factors often rely on rational choice models, such as the theory of planned behavior (Ajzen, 1991). Inspired by well-established models in the behavioral change literature, notably the Theory of Planned Behavior (Ajzen, 1991) and The Theory of Reasoned Action by Fishbein and Ajzen (1975), in conjunction with insights from environmental identity theory (Clayton, 2003; Reed et al., 2012), we acknowledge that specific individual differences can have an impact on the content of environmental identity. Our assessment encompassed a diverse range of individual differences, including personality, cultural background, concerns, and personal values domains. Taking an even more exploratory approach, we also incorporated the often-overlooked dimensions of perception of power and time into our analysis. This comprehensive exploration is aimed at unraveling the nuanced interplay between these multifaceted factors and their potential impact on environmental identity, contributing valuable insights to the ongoing discourse in environmental psychology and behavior.

The initial set of factors shaping environmental identity content encompasses individual differences related to personality and cultural background. Research indicates that individuals with pro-environmental inclinations often exhibit higher levels of pro-social attitudes and lower social dominance orientation, aligning with a tendency toward lower system justification (Markowitz et al., 2012). Examining the Big Five personality factors, studies have shown that Agreeableness and Openness to Experience are positively correlated with

measures indicative of environmental identity strength (Zhang et al., 2014; Markowitz et al., 2012). Regarding self-control and self-monitoring, the concept of internal locus of control has demonstrated significant associations with environmentally conscious behaviors. Studies have revealed that individuals with an internal locus of control exhibit a heightened willingness to buy pro-environmental products (Schwepker & Cornwell, 1991). Furthermore, this internal locus of control has been linked to more robust pro-environmental intentions and behaviors, as highlighted in studies by Ando et al. (2010) and Fielding and Head (2012). This suggests that individuals who perceive a greater degree of control over their actions and outcomes are not only more inclined toward eco-friendly product choices but also show a stronger commitment to pro-environmental initiatives. Consequently, individuals possessing these specific personality traits and cultural orientations may wield a considerable influence on the content and strength of their environmental identity.

The second group of factors centers around values, often instilled through familial education during childhood. Cheng and Monroe's (2012) research highlights that family values concerning nature stand out as robust correlates of children's environmental identity. Examining religiosity, high religious beliefs have been associated with lower scores on the revised New Environmental Paradigm (NEP) (Schultz et al., 2000), establishing a negative link between religious beliefs and environmental concern (Eckberg & Blocker, 1996; Guth et al., 1995). Furthermore, individuals embracing self-transcendence (Schwartz, 1992) tend to exhibit heightened environmental concern and engage in more pro-environmental behaviors (Karp, 1996; Thogersen & Olander, 2002). Finally, the role of moral foundations in shaping individual behavior has been shown in past studies, which highlight the crucial influence of personal norms, characterized by feelings of moral obligations, on both intentions for pro-social behavior and subsequent actual behaviors (Biel & Thøgersen, 2007; Thøgersen, 2006). According to Schwartz (1977), personal norms are self-expectations regarding specific actions

in particular situations, and they manifest as a deep-seated sense of moral obligation. Consequently, individuals adhere to personal norms driven by internal motivations aligned with their values and ethical principles (Thøgersen, 2006; Jansson & Dorrepaal, 2015). Additionally, research indicates that individuals characterized as more people-oriented and less authoritarian tend to exhibit higher levels of moral development (Schultz & Stone, 1994; Swearingen, 1990).

The demographic dimension constitutes the third group of factors for understanding environmental identity content. A review by Markowitz et al. (2012) shows that individuals who report pro-environmental behaviors often align with the demographic characteristics of being female and younger. Past research demonstrates that younger individuals exhibit a higher level of environmental concern compared to their older counterparts, particularly regarding general environmental issues (Klineberg et al.,1998; Zhang, 1993). While existing research sheds light on the relationship between demographics and pro-environmental behaviors, the impact of these demographic factors on environmental identity content remains a relatively unexplored territory. At this stage, we pose an open empirical question, inviting further exploration into whether gender and age are associated with variations in environmental identity content, including types of associations, valence of associations, and frequency of associations.

The fourth set of factors revolves around attitudes and concerns. Extant research indicates that biospheric values can foster pro-environmental behaviors (Steg & de Groot, 2012). Martin and Czellar (2017) develop and test a framework explaining how nurturing an environmental identity can help individuals form biospheric values which in turn may lead to pro-environmental behaviors. According to Steg and de Groot (2012), biospheric values reflect environmental care. Individuals embracing biospheric values tend to exhibit heightened environmental concern and engage in more pro-environmental behaviors (Schultz

& Zelezny, 1999; Stern, 2000). Conversely, materialism has been found to exert a detrimental impact on environmental beliefs and pro-environmental behaviors (Kilbourne & Pickett, 2008). On the other hand, post-materialistic attitudes have demonstrated a positive association with environmental concern and pro-environmental behaviors (Oreg & Katz-Gerro, 2006). Regarding Green Consumption and the New Ecological Paradigm (NEP), extant research shows that consumers who report stronger environmental identity are more likely to identify themselves as environmentalists, exhibit higher pro-environmental behavioral intentions, and tend to engage more in actual sustainable behaviors (e.g., Frantz & Mayer, 2014; Martin & Czellar, 2016; Mayer & Frantz, 2004; Tam, 2013). Concerning status consumption, Griskevicius et al. (2010) demonstrated that considerations of social status impact the intention to purchase green products. This implies that the desire for social status can notably shape consumer choices in favor of pro-environmental behaviors. In a similar vein, Brick and Lai (2018) provided further support for this notion by finding that individuals who highly value social status are more inclined to actively engage in pro-environmental behaviors. Regarding environmental identity and social desirability, Uren et al. (2021) highlighted the impact of environmental identity, encompassing both self and public identity, on perceptions of social status. This suggests that individuals' self-perception and their desire for how others view them play a crucial role in shaping their perceptions of social status. Finally, past research (Binder & Blankenberg, 2017; Schmitt et al., 2018) has demonstrated a positive association between pro-environmental and pro-social engagement and life satisfaction, suggesting a reciprocal cause-and-effect relationship.

The fifth set of factors pertains to time orientations. Within the context of environmental identity and pro-environmental behaviors, the temporal disconnection between future consequences and present actions significantly influences consumer preferences and choices. Research suggests that individuals generally possess an awareness of the consequences of

their actions on the environment (Trudel, 2019). However, these consequences often exhibit a future orientation, while the associated behaviors and benefits manifest in the present moment (Gifford & Sussman, 2012; Malkoc & Zauberman, 2019). Future orientation consistently emerges as a significant and positive predictor of pro-environmental behaviors (Corral-Verdugo & Pinheiro, 2006; Joireman et al., 2004; Urien & Kilbourne, 2011). Milfont and Gouveia (2006) discovered that environmental attitudes are not solely associated with future orientation. Past-positive and present fatalistic orientations were found to have a negative relationship with environmental preservation, whereas a positive association was observed between present-hedonistic orientation and environmental utilization. Thus, there is an intriguing aspect in delving into the relationship between alternative time orientations and the content of environmental identity.

The sixth set of factors was related to the perceptions of power. We know from past research that individuals with lower social dominance orientation will tend to view humans and other species as equal (rather than unequal) partners in power relations (Markowitz et al., 2012). Previous research indicates that liberal religious denominations place less emphasis on dominion over nature, and within these denominations, there is a positive association between church attendance and environmental concern (Hand & Van Liere, 1984). Furthermore, Dong et al. (2020) demonstrated that individuals with pro-environmental dispositions exhibited a greater likelihood of engaging in environmentally friendly behaviors when prompted to experience a heightened sense of power, as opposed to a low one. Regarding the measure of Divine Nature, monotheistic religions approach the concept of "nature" as profoundly intertwined with theological and ethical perspectives (Nasr, 1996). Nature is often regarded as a reflection of the divine, encompassing the created world, which includes the physical universe, living beings, and natural phenomena (Ducarme & Couvet, 2020; Rockefeller, 1992). As such, the Divine Nature measure was self-constructed to assess individuals'

perception of a higher force in nature, akin to the concept of God in religious literature. Finally, when delving into environmental identity as conceptualized by Clayton (2003), it becomes crucial to explore the nuanced relationship between two distinct entities within this construct—the self and nature. Recognizing that environmental identity involves the intertwining of these elements, understanding the power dynamics at play between the self and the natural environment emerges as a key focal point. Past research has demonstrated that humans often perceive themselves as dominant over nature (Curran, 1999; Johns et al., 2022) and that nature can be exploited for human benefits (Egri, 1997).

The final set of factors included environmental identity strength, pro-environmental behaviors, and pro-social behaviors. Extant research shows that consumers who report stronger environmental identity are more likely to identify themselves as environmentalists, exhibit higher pro-environmental behavioral intentions, and tend to engage more in actual sustainable behaviors (e.g., Frantz & Mayer, 2014; Martin & Czellar, 2016; Mayer & Frantz, 2004; Tam, 2013). Such relationship effects have also been evidenced in recent meta-analyses (e.g., Mackay & Schmitt, 2019; Whitburn et al., 2020; Vesely et al., 2021). Building on an existing classification (Kaiser and Byrka, 2011; Kadic-Maglajlic et al., 2019), a distinction can be made between two forms of engagement in sustainable consumption: pro-environmental and pro-social engagement.

At a broader level, acquiring a more comprehensive and personalized understanding of the content of individuals' environmental identity empowers policymakers and marketers to craft communicational and educational efforts more effectively. This customization seeks to strengthen environmental identity or activate it within their target populations.

4. Materials and Methods

This exploratory research investigates the diversity of nature-related associations and their connections with individual differences, including environmental identity strength and other factors. Our goal is to gain a deeper understanding of how individuals perceive nature and how the content of their environmental identity relates to values, personality traits, cultural background, concerns, power perception, time orientation, and engagement in relevant behaviors. To ensure the robustness and consistency of our findings, we administered four distinct surveys with varying sample characteristics. These surveys included multiple measures related to self-nature representations and environmental identity, as well as attitudinal, perceptual, and behavioral measures linked to pro-environmentalism, personality traits, and individual differences in time orientation. It is important to note that the studies included additional measures not discussed in this paper. A comprehensive list of measures, their sources, specific items, response formats, scale reliability statistics, and descriptive statistics, can be found in the Appendix.

In terms of methodology, we aimed to address a potential source of common method variance, specifically the common scale format (Podsakoff et al., 2003). To mitigate this issue and avoid potential inflation of relationships among the variables, we employed diverse scale formats in our measurements, following the procedural remedies suggested by Podsakoff et al. (2003). Furthermore, we implemented randomization of measure and item order whenever feasible to minimize order effects. These steps were taken to ensure the validity and reliability of our results, given the correlational and proximal nature of the measurements.

4.1 Participants

We conducted two laboratory studies; for Study 1 (Study 2), a total of 221 (207) students participated in exchange for a standard payment. Next, two online studies were conducted on

M-Turk with 410 participants for Study 3 and 437 participants for Study 4 in exchange for a standard payment. Through all our surveys, we followed the same criteria of exclusion, which involved removing participants who did not fully complete the questionnaire (Study 1 = 7; Study 2 = 0; Study 3 =7, Study 4 = 9) and then those who did not pass the attention check Study 1 = 4; Study 2 = 1; Study 3 = 42; Study 4 = 22).

The final samples of the studies included 210 participants, from which 55.2% were women with a mean age of 21.32 years (*SD* = 3.11) in Study 1, 206 participants from which 46.6% were women with a mean age of 20.35 years (*SD* = 2.73) in Study 2, 361 participants from which 55.9% were women with a mean age of 38.34 years (*SD* = 13.07) in Study 3, and 406 participants from which 56.0% were women with a mean age of 39.96 years (*SD* = 13.19) in Study 4.

4.2 Design and Procedure

The design and procedure of the studies were consistent across the four surveys conducted for data collection. Following informed consent, the data was gathered in separate measurement blocks, with the order of these blocks counterbalanced among participants.

Through all four studies, we initiated by requesting participants to engage in a free word association task (adapted from Lorenzoni et al., 2006) to assess the various contents, thoughts, and feelings associated with nature. They were asked to provide ten words that spontaneously came to mind when thinking about nature. Furthermore, participants evaluated the valence of these words and self-categorized them into eleven constructed nature-related associations. Detailed information regarding the construction of these types of nature-related associations can be found in Section 5.1, “Environmental Identity Content”.

Regarding Study 1, in addition to the first part included in all studies, we measured participants’ green consumption values with a scale developed by Haws et al. (2014) that

evaluates how much consumers value the environment when making consumption decisions. Participants also answered some questions about the frequency of self-reported ecological behaviors (Tam, 2013) to assess their pro-environmental behaviors. Another measure was related to pro-social behaviors (Nickell, 1998) that aim to measure individuals' attitudes toward providing assistance or support to others. In addition, we assessed participants' list of values (LOV) based on the work from Homer & Kahle (1988). Moreover, we measured the participants' personal sense of power (Dubois et al., 2015) to assess individuals' subjective perceptions and experiences of power. We also evaluated their tendencies for status consumption (Eastman et al., 1999), which gauges individuals' inclination to engage in consumption behaviors aimed at demonstrating their social status. This measure evaluates how individuals assign importance to material acquisitions and use them to signify their social standing. Consecutively, we gathered data on participants' material values (Richins, 2004), aiming to assess individuals' orientations and attitudes toward material possessions and their significance in their daily lives. Then we assessed their environmental identity with the Extended Inclusion of Nature in Self scale (Martin & Czellar, 2016). The New Ecological Paradigm (Dunlap et al., 2000) evaluated which measures individuals' beliefs and attitudes regarding the environment. The Self-Monitoring Scale developed by Lennox and Wolfe (1984) was employed to gauge an individual's inclination to adapt their behavior in response to social signals and varying circumstances. To gauge participants' life satisfaction, we included an evaluation of their subjective perception of life quality and overall well-being (Diener et al., 1985). Moreover, the study also evaluated three specific categories of values - egoistic, altruistic, and biospheric - that individuals might possess concerning the environment (de Groot & Steg, 2007a). The scale evaluates how much individuals prioritize personal benefits, the welfare of others and society, and the conservation of the larger ecosystem and natural world.

Regarding Study 2, we included additional measures, including Bakan's (1966) concept of agency and communion. Agentic traits encompass elements related to achieving goals and performing tasks effectively, and communal traits pertain to aspects associated with fostering relationships and functioning within social contexts (Abele & Wojciszke, 2014). We also assessed participants' commitment to religious aspects developed by Worthington et al. (2012), which aims to measure various dimensions related to religious beliefs, practices, and experiences. Then, we measured the moral foundations using a scale developed by Graham et al. (2011) which is divided into five subscales (Harm/Care, Fairness/Reciprocity, Ingroup/Loyalty, Authority/Respect, and Purity/Sanctity). Furthermore, we included a scale assessing the transcendental time perspective (Zimbardo & Boyd, 2008). This scale examines individuals' thoughts and beliefs concerning the period beyond their death and their perspectives on life after death. To evaluate participants' personality traits, we encompassed the short version of the big five personality trait measure (Gosling et al., 2003). The Big Five is well-established, consisting of five major dimensions that capture various personality traits. These dimensions, namely openness to experience, conscientiousness, extraversion, agreeableness, and emotional stability, provide a comprehensive framework for understanding and describing different personality traits. Then we assessed their environmental identity with the Extended Inclusion of Nature in Self scale (Martin & Czellar, 2016). Finally, a self-control measure was included (Tangney et al., 2004) to examine individuals' level of self-discipline and their aptitude to uphold self-control across various aspects of their lives.

Study 3 also encompassed additional measures such as the Zimbardo Time Perspectives Inventory (ZTPI; Zimbardo & Boyd 1999), which assesses variations in time orientation by gauging individuals' inclination to prioritize various aspects of the past, present, and future. Two self-constructed scales were included in this study. The first scale, "Divine Nature," was developed based on the divine attributes constructed by Flint and Rea (2009) to assess

individuals' perception of a higher force in nature, similar to the concept of God in religious literature. The second scale was developed to evaluate the power relationship between nature and humans across three levels: nature having power over humans, humans having power over nature, and nature and humans perceived as having equal levels of power. Additionally, we evaluated participants' environmental identity, similar to previous studies (Martin & Czellar, 2016). Furthermore, we also included a gauge of social desirability, employing a scale adapted from Hart et al. (2015).

Finally, Study 4 included measures of personal cultural orientations (Sharma, 2010). This measure redefines Hofstede's five cultural dimensions (1980, 2001) into twelve individual cultural orientations, offering a more comprehensive understanding of these individual differences. It assesses various sub-scales that capture different aspects of cultural orientations such as independence – IND (which assesses the degree to which individuals value personal independence, self-sufficiency, and individual accomplishments); interdependence – INT (which examines individuals' propensity for connection, collaboration, and harmonious interactions within their cultural community); power – POW (which investigates how individuals perceive power dynamics within their culture, including their embrace or refusal of hierarchical authority); social inequality – IEQ (which explores individuals' recognition and understanding of social inequalities prevalent in their cultural context); risk aversion – RSK (which evaluates how individuals within their cultural community either tend to avoid or accept uncertainty and risk); ambiguity intolerance – AMB (which gauges individuals' ease with ambiguity and their inclination for clear and straightforward situations rather than uncertain or unclear ones); masculinity – MAS (which measures individuals' conformity to conventional gender roles and the societal norms linked with masculinity); gender equality – GEQ (which evaluates individuals' views and opinions regarding gender equality and equitable treatment for both genders within their cultural context); tradition – TRD (which

explores how individuals accept, follow and preserve cultural traditions, beliefs, and practices, indicating their inclination to respect and embrace their cultural heritage); prudence – PRU (which assesses individuals' preferences toward careful conduct, long-term planning, and aversion to risk in both their decision-making and daily activities); consumer ethnocentrism – CET (which reflects individuals' favoring of goods produced domestically or locally and their readiness to endorse products from their own culture rather than from other cultures), and consumer innovativeness – CIN (which evaluates individuals' openness to novel concepts, products, and experiences, showcasing their readiness to embrace and experiment with innovations). Jointly, these sub-scales comprehensively evaluate individuals' unique cultural orientations. In addition, we assessed participants' environmental identity as previously (Martin & Czellar, 2016).

For more details about the items of the scales, the descriptive statistics of these variables, and the scales' Cronbach α values, see Tables A1 to A5 in the Appendix. In all of the studies, we gathered demographic information, included an attention check, and concluded the surveys with data inclusion questions.

In the upcoming sections, we will present descriptive statistics on a set of variables categorized across the four studies under our three main themes: (1) *environmental identity content*, which encompasses types of nature-related associations, the frequency of associations and the valence of associations; (2) *environmental identity strength*, studying the link between environmental identity content (types of nature-related associations, the frequency of associations and the valence of associations) and environmental identity strength; (3) *individual differences*, including measures of values (LOV, biospheric values, religious values), personality traits and cultural background (big five, self-control, self-monitoring, cultural background, agency/communion traits), demographics (age and gender), concerns and attitudes (new ecological paradigm, moral foundations, status consumption,

satisfaction with life, green consumption values, materialism values, social desirability), power perception (sense of power, power and nature, divine nature), time perspective (Zimbardo time orientation, transcendental time perspective) and behavioral tendencies (pro-environmental behaviors, pro-social behaviors). In our analysis, we assess the strength of associations (e.g., correlation coefficients) between these variables. Specifically, we focus on the types of nature-related associations, the frequency of associations with nature, and the valence of these associations. Refer to Table 1 for an overview of this research. Additionally, we provide a thorough discussion of the findings and propose testable propositions and directions for future research on the relationship between environmental identity content and various individual characteristics. These propositions are highlighted in italics within the Discussion sections.

Table 1. Research Overview

ENVIRONMENTAL IDENTITY CONTENT (PART 1)	
Types of nature-related associations	My perceptions and feelings, my activities, sky, earth, animals, humans, water, trees and plants, well-being, spiritual aspects, high power
Valence of associations	Positivity vs. negativity in these associations
Frequency of associations	Numerous vs. limited nature associations
ENVIRONMENTAL IDENTITY STRENGTH (PART 2)	
Environmental identity strength	• Extended Inclusion of Nature in Self Scale (EINS; Martin & Czellar, 2016)
INDIVIDUAL DIFFERENCES (PART 3)	
Personality traits & Cultural background	• Big five personality traits (Gosling et al.,2003) • Self-control measure (Tangney et al., 2004) • The Self-Monitoring Scale (Lennox and Wolfe, 1984) • Personal cultural orientations (Sharma, 2010) • Agency/Communion traits (Bakan, 1966)

Values	• List of values (LOV) (Homer & Kahle, 1988) • Moral foundations (Graham et al., 2011) • Religious commitment (Worthington et al., 2012)
Demographics	• Age • Gender
Perceptions of time	• Transcendental time perspective (Zimbardo & Boyd, 2008) • Zimbardo Time Perspectives Inventory (ZTPI; Zimbardo and Boyd 1999)
Concerns and attitudes	• New Ecological Paradigm (Dunlap et al., 2000) • Green consumption values scale (Haws et al., 2014) • Status consumption (Eastman et al., 1999) • Material values (Richins, 2004) • Egoistic, altruistic, and biospheric values (De Groot & Steg, 2007a) • Satisfaction with life (Diener et al., 1985) • Social desirability (Hart et al., 2015)
Perceptions of power	• Power nature scale (self-constructed) • Divine nature scale (self-constructed based on Flint & Rea, 2009) • Personal sense of power (Dubois et al., 2015)
Behavioral tendencies	• Engagement in pro-environmental behaviors (Tam, 2013) • Pro-social behaviors (Nickell, 1998)

5. Results and Discussion

5.1 Environmental Identity Content

Results

The initial categorization of various types of associations was informed by insights derived from a preliminary study, which was included in a master's academic thesis. Using these insights, we constructed a total of ten nature-related associations, which were tested through several exploratory studies. In total, we conducted ten exploratory studies to identify the most representative nature-related associations of individuals. After each study, we implemented necessary changes to the associations, such as adjusting those with limited variance or insufficient frequency. Moreover, in the first five studies, we incorporated a category labeled “other,” allowing participants to define relevant terms with their own associations. We actively encouraged participants to propose additional association types for

consideration in future studies. Through this iterative development process, certain association types were retained in their initial form, while others underwent significant redevelopment or were altogether discarded. This iterative refinement continued until our data indicated that all associations could be considered stable indicators of individuals' nature associations. The last three studies demonstrated consistent nature-related associations, resulting in a final set of eleven types that portray individuals' associations with nature. These association types, along with examples of their corresponding word, are presented in Table 2 below.

Table 2. Nature-related associations and examples of words

Nature-related associations	Examples of words used by participants
My perceptions and feelings	Peace, green, respect, beautiful, balance, eternal, harmony, freedom, wild, calm, peaceful, energy, home, connection, tranquility, happiness
My activities	Hiking, walking, mountains, camping, gardening, running
Sky	Fresh air, clouds, blue, stars, sun, moon, birds, free, rain, snow
Earth	Vast, mountains, environment, climate change, pollution, home, planet, traveling, landscape, dust, soil
Animals	Wildlife, birds, dogs, bears, untouched, cows, cats, horses, friends
Humans	Dogs, oxygen, camping, humans, healthy, destruction, climate change, energy
Water	River, lake, water, life, rain, sea, pure, waterfall, pollution, beach, summer
Trees and plants	Trees, green, forest, colorful, woods, grass, jungle, flowers, leaves, branches, roots
Well-being	Freshness, peaceful, everywhere, meditation, well-being, health, mental health, relaxing
Spiritual aspects	Connection, wildlife, rain, God, smell, home, serenity, calmness, love
High power	Death, peaceful, rain, God, waterfall, storm, mother nature, strong, control, lack of control

A word cloud was also created using a cloud generator with all the words cited by participants across our four studies, with the most prominent words indicating the most frequently used ones.

Figure 1. Cloud of words throughout all studies

Regarding the valence of associations, individuals seem to hold a predominantly positive image of nature, with a mean score of 6.08 out of 7 in terms of valence. Additionally, on average, individuals exhibit a richness of thoughts about nature, associating approximately seven words with it. See Table 3 for more details.

Table 3. Frequency and valence of associations

	Study 1	**Study 2**	**Study 3**	**Study 4**
Frequency of associations	8.6 (1.79)	7.73 (2.10)	7.40 (2.81)	7.63 (2.74)
Valence of associations	5.99 (.88)	5.93 (0.88)	6.04 (1.06)	6.08 (1.02)

Note. The frequency of associations can range from 0 to 10 words, and the valence of associations was assessed using a seven-point Likert scale. Numbers in parentheses represent the standard deviations.

We then classified the various nature-related associations. We performed pairwise chi-square tests to compare the frequencies of each type of association. The paired-wise comparison did not reveal any significant differences in terms of their relative importance. Consequently, we chose to classify them by their ranking order, offering a more informative perspective. We decided to arrange them in ascending order solely for indicative purposes, without making any extrapolations regarding their importance relative to each other. This ascending order suggests that individuals across different locations and sample sizes commonly associate nature with three main types: "My perceptions and feelings," "Trees," and "Earth." To understand the underlying pattern, we decided to perform a factor analysis to

distinguish between the different types of associations and construct a comprehensive framework for environmental identity content.

Table 4. The rate of use of nature-related associations by participants throughout all studies

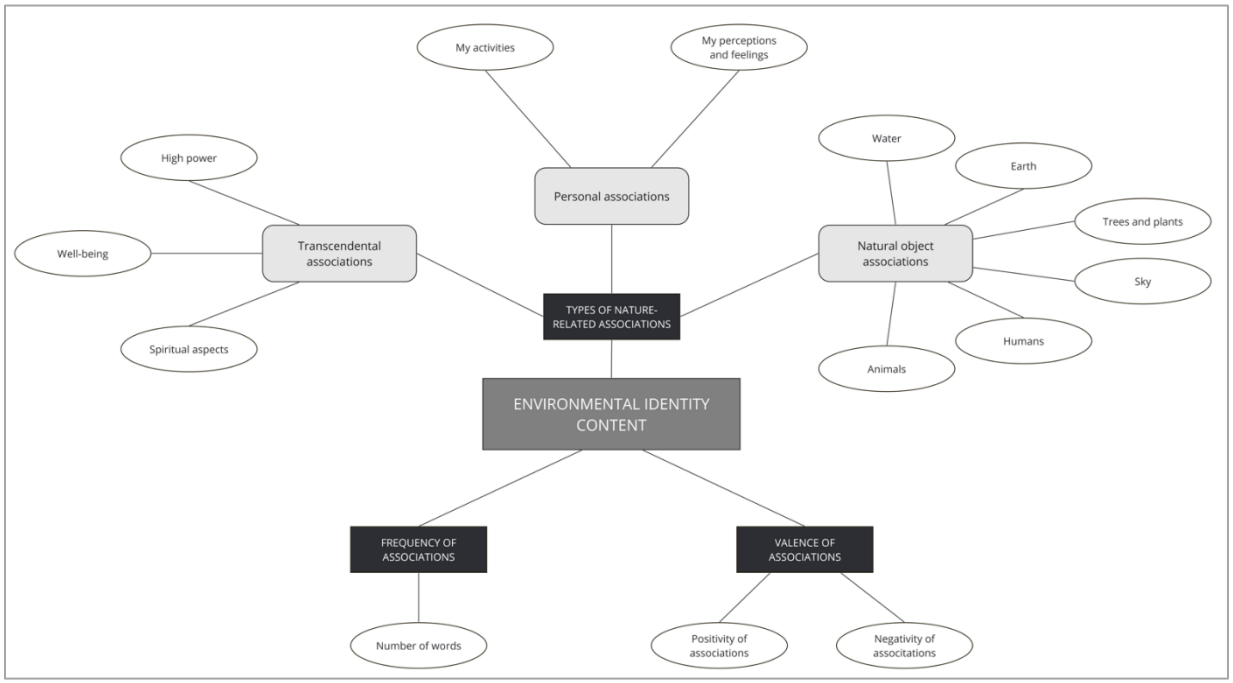
	Study 1	**Study 2**	**Study 3**	**Study 4**
My perceptions and feelings	35.34% (22.98)	44.75% (25.01)	46.2% (32.22)	40.17% (30.47)
Earth	39.46% (24.33)	44.34% (25.65)	41.51% (29.16)	40.92% (29.47)
Trees and plants	38.74% (21.06)	43.1% (23.28)	40.65% (22.05)	41.08% (25.19)
Well-being	33.08% (22.93)	38.17% (22.36)	35.51% (25.93)	37.68% (26.75)
Spiritual aspects	29.8% (19.49)	33.51% (19.44)	34.14% (23.27)	35.96% (25.91)
Humans	27.34% (20.71)	35.42% (21.64)	37.13% (34.34)	33.07% (31.07)
Animals	25.96% (18.33)	34.13% (21.53)	33.28% (32.94)	31.72% (31.46)
Water	27.04% (17.72)	33.26% (20.41)	29.15% (19.95)	31.05% (30.83)
High power	27.16% (19.66)	27.38% (14.29)	30.33% (21.31)	31.34% (24.79)
My activities	25.18% (16.15)	28.09% (14.9)	28.98% (20.04)	30.81% (22.67)
Sky	22.18% (15.62)	28.43% (18.56)	28.42% (20.49)	28.48% (22.51)

Note. The rate of use of nature-related associations is indicated in percentages. Numbers in parentheses represent the standard deviations. Ranked in ascending order.

The correlations between the measures of the eleven nature-related associations were positive (see Tables A7 – A10 in the Appendix for more details). We used exploratory factor analysis (EFA) for the set of eleven items composing the type of associations of environmental identity content. The Kaiser–Meyer–Olkin values ranged between .69 and .77, which are above the recommended threshold of .6 (Kaiser, 1974), and Bartlett's Test of Sphericity achieved statistical significance across the four studies ($p < .001$), indicating that the correlations were large enough for EFA. Across three studies (Study 2, Study 3, Study 4), three factors explaining between 62.07% to 76.52% of the variance in the data were extracted. We decided on the number of factors from the eigenvalues, cumulative variance, and inspection of the scree plot. The three factors explained a cumulative variance of 62.07%,

76.52%, and 65.29% across Study 2, Study 3, and Study 4, respectively. We rotated the factors obliquely using Promax rotation (correlated data). Based on these results, we can conceptualize the types of nature-related associations into three main factors, namely natural object associations (Sky, Earth, Humans, Animals, Water, Trees & Plants), personal associations (My perceptions and feelings, My activities), and transcendental associations (Well-being, Spiritual aspects, High power). For details, see Table A6 in the Appendix.

Figure 2. Environmental identity content: Types of nature-related associations, frequency of associations, valence of associations



Discussion

By constructing the framework of environmental identity content, these findings contribute to a deeper understanding of how people conceptualize and relate to nature. This knowledge can be valuable for designing interventions, campaigns, or educational programs that aim to enhance environmental awareness, promote sustainable behaviors, and foster a stronger sense of connection and responsibility toward the natural environment. It also

underscores the potential significance of focusing on individual experiences and emotional connections aiming at encouraging pro-environmental attitudes and actions.

Based on the results, we observe that “Trees and plants” emerge as one of the commonly employed nature-related associations, highlighting their importance within environmental identity content. In general, trees are frequently perceived as emblematic of nature, symbolizing its beauty, vitality, and significance in ecosystems (Sommer, 2003). People may recognize and value the presence of trees in their perception of the natural environment (Austin & Kaplan, 2003). Exploring the profound connection between humans and trees, Robert Sommer (2003) noted that people share a strong identification with trees, a bond sometimes even reflected in myths and beliefs of human origin from trees (Quantz, 1897). Behavioral researchers have extensively examined the restorative power of trees across various environmental settings, both for adults and children (Kaplan & Kaplan, 1989; Kuo et al., 1998; Ulrich et al., 1991). Referring to trees as "walking trees," some narratives even associate trees with humans, as pointed out by Altman (1993). Gebhard et al. (2003) showed that children frequently attribute human-like traits to trees, including cognitive abilities and emotions. This phenomenon, known as anthropomorphism, underlines the tendency to confer human attributes upon non-human entities. Previous studies have shown that the expression "Mother Nature" contributes to an increased sense of connection with nature and promotes pro-environmental behavior.

Proposition #1. *Future research should investigate whether priming individuals with anthropomorphic images of trees (compared to nonanthropomorphic images of trees) could positively impact pro-environmental behaviors and environmental identity strength. Moreover, researchers should explore which specific human attributes could yield the most favorable impact.*

Prior studies have provided some evidence of a positive effect from emotions (such as smiling versus sad images of trees) in the context of sudden disaster advertising (Chang et al., 2022).

5.2 Environmental Identity Strength and Environmental Identity Content

Introduction

In the upcoming sections, we will establish connections between environmental identity content, encompassing types of nature-related associations, the valence of associations, and the frequency of associations, and both EID strength and individual differences. To offer a comprehensive perspective, we developed a nomological network that includes all constructs and propositions generated from the upcoming results (refer to Figure 3 for details).

Results

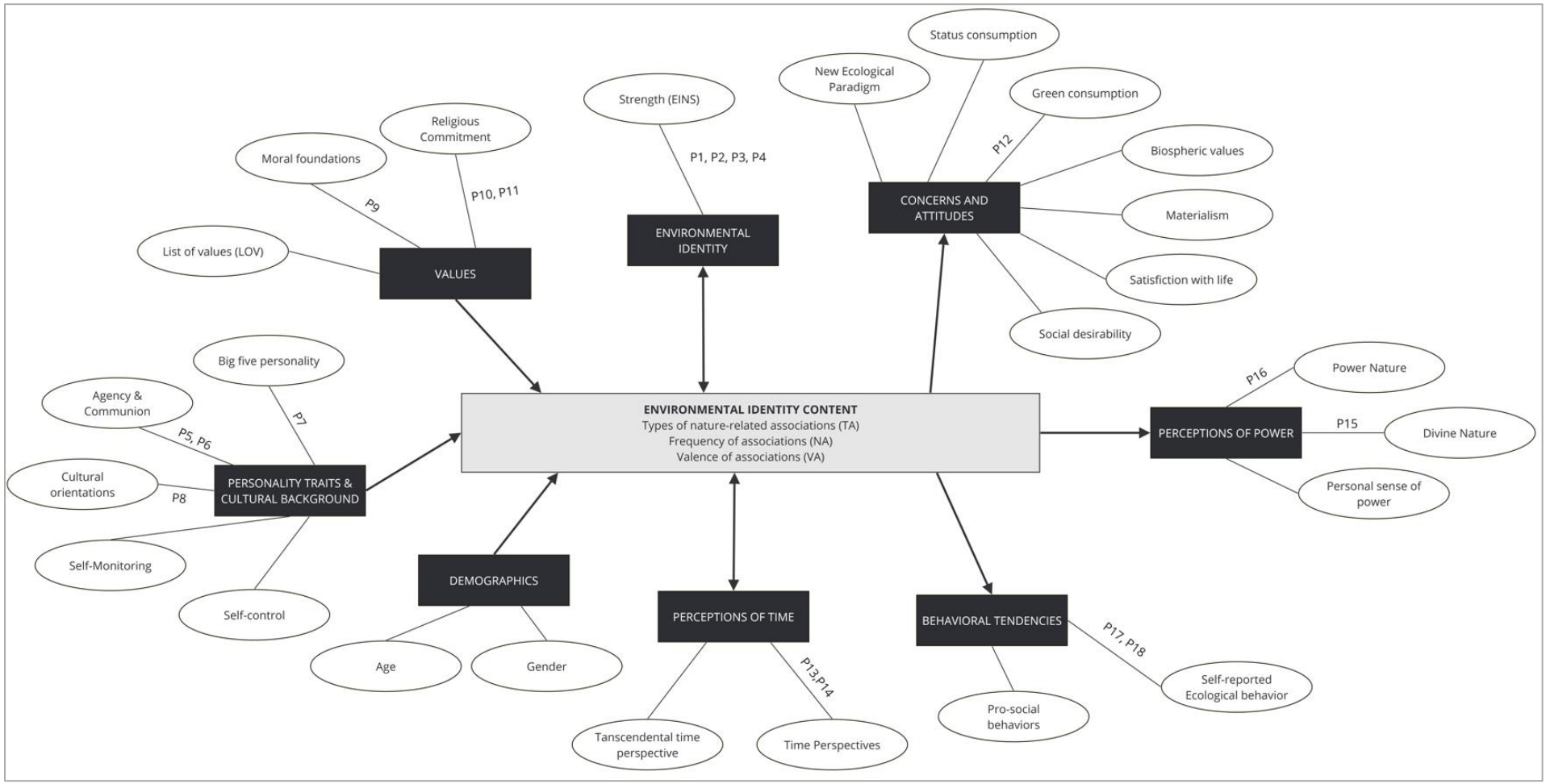
Table 5. Environmental identity strength and environmental identity content (frequency of associations, valence of associations, and types of nature-related associations): Correlations

		Environmental identity Strength			
		Study 1	*Study 2*	*Study 3*	*Study 4*
Environmental identity Content	Frequency of associations			.110* (.036)	.128* (.010)
	Valence of associations	.188** (.006)	.192** (.006)	.390** (<.001)	.450** (<.001)
	My perceptions and feelings	.159* (.045)	.197** (.002)		.163* (.021)
	My activities			.202* (.016)	
	Sky	.180* (.044)			.148* (.017)
	Earth				
	Animals				
	Humans				
	Water			.130* (.042)	
	Trees and plants				
	Well-being		.131* (.045)	.213** (.004)	.310** (<.001)

	Spiritual aspects	.200* (.021)			.221** (.007)
	High power	.352** (<.001)	.220** (.010)	.197* (.044)	.212* (.021)

*Note. *p < 0.05 (2-tailed); **p < 0.01 (2-tailed). The correlations highlighted in grey in the table were used to generate propositions.*

Figure 3. Nomological network of environmental identity content



Regarding the valence of associations, our analysis revealed a moderate to high correlation between environmental identity strength and participants' positive perceptions of nature. This trend remained consistent across all four studies, indicating that individuals with a stronger environmental identity tended to perceive nature in a more positive light or the reverse. Conversely, there is also a possible inverse relationship, indicating that individuals who tend to perceive nature positively are more likely to have a stronger environmental identity.

While looking at the role of the number of thoughts, our data provided interesting insights suggesting its potential influence on environmental identity. Two of the four studies demonstrated a positive correlation between environmental identity strength and the frequency of associations individuals had in their minds when thinking about nature. This suggests that a greater number of thoughts related to nature may contribute to developing or strengthening environmental identity.

Another notable discovery relates to the nature-related association types utilized by participants. The data revealed that individuals with a stronger environmental identity tended to link nature with personal associations rather than factual ones. Nature-related associations such as "perceptions & feelings," encompassing emotional experiences related to nature, “well-being," and "spiritual aspects" were more commonly associated with a strong environmental identity. Furthermore, in all four studies, the association consistently linked with a strong environmental identity was “High power,” indicating a perception of nature as a force of considerable significance and authority.

These findings shed light on the intricate relationship between environmental identity strength and content. They underscore the significance of positive valence, a higher frequency of associations, and the presence of personal and transcendent associations in fostering a strong environmental identity. Understanding these dynamics contributes to our

comprehension of the factors influencing pro-environmental behaviors and the potential for fostering a deeper connection between individuals and the natural world.

It is interesting to note that while “Trees and plants” emerges as the most commonly used nature-related association among participants in general (see Table 4), this association does not necessarily hold the same prominence when it comes to discussions about environmental identity. This indicates that while trees are a frequent and noticeable element in people's thoughts about nature, they might not play a central role in shaping their sense of connection with the natural environment.

Discussion

Across our four waves of data collection, we observed a positive association between environmental identity and individuals' tendency to associate nature with a transcendental aspect linked to a vision of nature as a higher entity (see Table 5).

Potential research endeavors could build upon recent findings highlighting the significant influence of religious beliefs on pro-environmental attitudes and behaviors (Eom & Tian Ng, 2023; Iqbal & Khan, 2020; Orellano et al., 2020). These lines of research explore the notion that humans are responsible for nurturing and protecting the world, considering it as a divine creation (God’s creation) entrusted to their care. A similar approach could be taken to environmental identity and examine the role of viewing nature as a higher entity having a greater power than us in forming environmental identity.

Proposition #2. *In that regard, it would be fundamental to investigate whether communication messages or educational programs that present nature as a higher force could enhance the salience or strength of environmental identity.*

Furthermore, the results indicated a correlation (see Table 5) between the strength of environmental identity and the positivity of associations with nature.

Proposition #3. *Subsequent research could investigate whether the valence of associations (positive vs. negative) might serve as a moderator in the relationship between environmental identity strength and the nature-related association of "Higher force".*

Indeed, theological literature also explores the parallel between the punishing or redeeming God and the influence of these associations on religiosity (Exline et al., 2014; Sharp et al., 2019).

As stated, our analysis of the valence of associations with nature demonstrated a consistent trend across all four studies, revealing a moderate to high correlation between environmental identity strength and participants' positive perceptions of nature (see Table 5). This finding suggests that individuals with a stronger environmental identity generally hold more positive views of nature. Alternatively, individuals who exhibit a positive perception of nature are more prone to having a stronger environmental identity, illustrating an inverse relationship. In previous research, scholars found that affect and emotions play a crucial role in shaping perceptions and actions related to climate change (Lange & Dewitte, 2020; Schneider et al., 2021). Effective communication of both positive and negative emotions can encourage the adoption of sustainable behaviors (Brosch, 2021). Jacobs and McConnell (2022) conducted a study exploring the impact of two distinct categories of positive emotions (self-transcendent vs. self-interested emotions) on pro-environmental behaviors. As mentioned earlier, previous research (Mackay & Schmitt, 2019; Whitburn et al., 2020) showed that pro-environmental attitudes and behavior are strongly predicted by one's connection with nature.

Proposition #4. *An important avenue for future research is to explore how positive (vs. negative) portrayals of nature can influence environmental identity strength and pro-environmental behaviors.*

Numerous communication campaigns, such as WWF's message (“Exploiting the ecosystem also threatens human lives. For a living planet: wwf.org”), often emphasize the adverse impact of human activities on nature, potentially eliciting negative emotions and contributing to a negative perception of nature. Therefore, it could be valuable to shift focus toward highlighting individuals' positive associations with nature, offering a potential avenue to encourage behavior change and strengthen their connection with the natural world. According to Moser (2010), while invoking strong images can enhance pro-environmental behavior (Hine & Gifford, 1991), it is essential to note that negative emotions like worry or fear should only be elicited when a solution to mitigate those emotions is provided.

5.3 Environmental Identity Content and Individual Differences

5.3.1 Personality traits and cultural background

Results

Table 6. Personality traits and environmental identity content (frequency of associations, valence of associations, and types of nature-related associations): Correlations

		Personality traits						
		Big Five: Extraversion	Big Five: Agreeableness	Big Five: Conscientiousness	Big Five: Emotional Stability	Big Five: Openness	Self-Control	Communion
Environmental identity content	Frequency of associations							
	Valence of associations		.158* (.024)			.193** (.005)		.214** (.002)
	My Perceptions and feelings					.165* (.029)		
	My activities							
	Sky							.225** (.008)
	Earth	-.146* (.048)		.211** (.004)				.220** (.003)
	Animals			.157* (.038)				.263** (<.001)
	Humans	-.171* (.037)						
	Water	-.174* (.029)						.176* (.027)
	Trees and plants	-.183* (.011)						.168* (.020)
	Well-being							
	Spiritual aspects				.185* (.046)		.206* (.026)	
	High power							

*Note. *p < 0.05 (2-tailed); **p < 0.01 (2-tailed). Self-monitoring was not statistically significant as well as Agentic traits. The correlations highlighted in grey in the table were used to generate propositions.*

Noteworthy are the positive correlations found between the measure of communion and the valence of associations, as well as with most natural object associations with nature, encompassing “Sky,” “Earth,” “Animals,” “Water,” and “Trees and plants.” (see Table 6). The only natural object association that did not demonstrate a correlation was “Humans.”

Concerning the five traits that characterize human personality, a positive correlation was found between conscientiousness and the nature-related associations “Earth” and “Animals.” Additionally, the nature-related association “Spiritual aspects” showed a positive correlation with emotional stability, suggesting that individuals who are more emotionally stable and resilient are more likely to associate nature with spiritual dimensions. Furthermore,

individuals who identified themselves as more open to experience exhibited a positive correlation with the nature-related association “My perceptions and feelings” as well as the valence of associations. Agreeableness as a personality trait was also positively linked with the valence of associations. Surprisingly, extraversion negatively correlated with natural object associations such as “Earth,” “Humans,” “Water,” and “Trees and plants,” a pattern that may be explained by their tendency to seek social interaction and stimulation.

Furthermore, the data revealed a positive correlation between the measure of self-control and the nature-related association of “Spiritual aspects.” This suggests that individuals with high self-control may perceive themselves as having less influence over nature, thus developing a tendency to associate nature with more spiritual dimensions as a means of restoring agency to the natural environment.

Table 7. Cultural background and environmental identity content (frequency of associations, valence of associations, and types of nature-related associations): Correlations

		Cultural background							
		IND	INT	POW	IEQ	GEQ	TRD	PRU	CIN
Environmental identity content	Frequency of associations	.122* (.013)	.123* (.013)	-.124* (.013)	-.180** (<.001)				
	Valence of associations	.384** (<.001)	.305** (<.001)			.234** (<.001)	.288* (<.001)	.309** (<.001)	
	My perceptions and feelings						.172* (.015)		
	My activities						.203* (.013)		
	Sky			.125* (.044)	.159* (.010)	-.124* (.045)			.156* (.012)
	Earth								
	Animals					-.179** (.001)			
	Humans				.215* (.013)	-.187* (.031)			.180* (.038)
	Water				.135* (.013)	-.161** (.006)			
	Trees and plants			.119* (.023)					
	Well-being	.154* (.033)						.189** (.009)	
	Spiritual aspects						.242** (.003)		
	High power								

*Note. *p < 0.05 (2-tailed); **p < 0.01 (2-tailed). Only the dimensions that exhibit a correlation with our variables of interest (Frequency of associations, Valence of associations, and Types of nature-related associations) were included. IND = Independence, INT = Interdependence, POW = Power, IEQ = Social Inequality, GEQ = Gender Equality, TRD = Tradition, PRU = Prudence, CIN = Consumer Innovativeness. The correlations highlighted in grey in the table were used to generate propositions.*

Regarding the valence of associations, a positive correlation was found with various cultural background variables, including independence, interdependence, gender equality, tradition, and prudence.

Regarding the frequency of associations, a positive link was discovered with independence and interdependence, but a negative correlation was observed with power and social inequality. This finding suggests that individuals who place a strong emphasis on societal and gender equality tend to have a greater number of associations with the natural environment.

Furthermore, an interesting finding emerged regarding the nature-related associations used by individuals and gender inequality. Our results indicate a tendency to link nature with more factual associations, including “Sky,” “Animals,” “Humans,” and “Water”.

Discussion

Our findings support the inclusion of communal and agentic traits in environmental research and suggest that traits such as communion may be effective in promoting pro-environmental behavioral intentions. However, there is mixed evidence regarding individuals who exhibit communal and agentic traits in the literature. Some research suggests that agentic traits are stronger predictors of pro-environmental behaviors when they signal status to others (Griskevicius et al, 2010; Naderi & Strutton, 2015). Conversely, other studies indicate that narcissists generally display less inclination to engage in such behaviors (Naderi, 2018; Naderi & Strutton, 2014). For instance, Kesenheimer and Greitemeyer (2021) found that narcissistic traits can contribute to increased pro-environmental behavior in daily life, primarily driven by egoistic motivations. However, agentic narcissism diminishes the extent of altruistic pro-environmental behavior in everyday life. Therefore, further research is warranted to investigate the relationship between communal traits and pro-environmental behaviors.

Proposition #5. *We propose that environmental identity content, specifically natural object associations such as sky, trees, water, earth, and animals, can serve as a mediating factor between communal traits and pro-environmental behaviors.*

Related research might also explore the connections between environmental identity content, the valence of associations, and pro-environmental behaviors.

Proposition #6. *We propose that environmental identity content, specifically the valence of associations (positive vs. negative), can serve as a moderating factor between communal traits and pro-environmental behaviors.*

Individuals who self-identified as more open to experience demonstrated a significant positive correlation between their openness and the valence of associations (see Table 6). Furthermore, agreeableness as a personality trait was also linked with positive associations (see Table 6). These findings suggest that individuals with a greater inclination for openness and agreeableness tend to form more favorable connections with the natural environment. Regarding the Big Five personality factors, past research has shown that Agreeableness and Openness to Experience positively correlate with measures related to sustainable behaviors (Markowitz et al., 2012; Zhang et al., 2014).

Proposition #7. *The strength of the relationship between Openness to Experience and sustainable behaviors may be influenced by the valence of associations with nature, differentiating between positive and negative perceptions of nature.*

Understanding the relationship between openness to experience and positive nature associations provides valuable insights into the psychological factors influencing individuals' attitudes and behaviors toward nature.

Cultural influences are crucial in explaining consumer behavior, particularly in understanding green product purchasing patterns (Sreen et al., 2018). Prior research underscores that a society's higher power distance is linked to suboptimal environmental performance (Park et al., 2007) and a nation's institutional capacity for environmental sustainability (Husted, 2005). Notably, individuals adhering to high power distance cultural values tend to perceive inequality as fundamentally positive (Caputo et al., 2019). An

empirical investigation conducted in Hungary showed that power distance holds a significant negative influence on pro-environmental behavior (Nagy & Molnárné, 2018). Our data revealed a negative correlation between the frequency of associations with nature and participants' acceptance of hierarchical authority and social inequalities prevalent in their cultural context (see Table 7).

Proposition #8. *Individuals who possess a higher (lower) acceptance of social inequalities and hierarchical authority tend to engage in fewer (more) pro-environmental behaviors due to their weaker (stronger) nature-related associations. Therefore, a potential intervention could involve enhancing their connections with the natural environment by enriching the depth of their associations with nature.*

5.3.2 Demographics

Results and discussion

Regarding demographics, we incorporated measures of age and gender, albeit not being the primary focus of our research. Upon analyzing the data, intriguing patterns emerged. Firstly, a positive correlation surfaced between the valence of associations and age, indicating that as individuals age, their associations with nature tend to become more positive (see Tables A14 and A16 in the Appendix). Furthermore, a gender-based analysis conducted through an ANOVA revealed differences in the valence of associations between men and women, but this was observed only in the online samples (studies 3 and 4) and not in the lab (studies 1 and 2). In this context, women exhibited more positive associations with nature compared to their male counterparts It is important to note that the age analysis was confined to data from studies 3 and 4, as studies 1 and 2 were conducted in a lab setting, eliminating variance in age (see Tables A11, A12, A13, A15 in the Appendix more details).

5.3.3 Values

Results

Table 8. Values and environmental identity content (frequency of associations, valence of associations, and types of nature-related associations): Correlations

		Values								
		LOV – external /inter-personal value	LOV – Internal - apersonal value	LOV – Internal-personal value	Religious Values	MF - Care	MF - Fairness	MF - Ingroup	MF - Authority	MF - Purity
Environmental identity content	Frequency of associations				-.216** (.002)					
	Valence of associations	.167* (.015)	.302** (<.001)	.250** (<.001)		.208** (.003)	.179* (.010)			
	My perceptions and feelings								-.197** (.009)	
	My activities			.300** (<.001)			.259** (.005)		-.182* (.050)	-.190* (.040)
	Sky									
	Earth									
	Animals	-.162* (.030)							-.158* (.037)	
	Humans						.202* (.014)			
	Water									
	Trees and plants									
	Well-being		.154* (.045)	.174* (.024)						
	Spiritual aspects									
	High power								.226* (.030)	

*Note. *p < 0.05 (2-tailed); **p < 0.01 (2-tailed). MF = Moral Foundation and LOV = List of Values. The correlations highlighted in grey in the table were used to generate propositions.*

Regarding the general values of individuals, they were classified into three sub-scales (LOV_ external/interpersonal, LOV_internal/apersonal, and LOV_internal/personal) as suggested by Homer & Kahle (1988). Firstly, all three subscales were positively linked with valence of associations, indicating that these three types of values are linked to a positive perception of the natural environment. However, a negative correlation was found between the external/interpersonal value and the nature-related association "Animals". As for the internal/apersonal value, a marginally significant correlation was observed with the nature-

related association “Well-being,” which aligns with the definition of this value. Lastly, a strong and positive correlation was identified between internal/personal value and the nature-related association “My activities,” indicating that individuals with a greater emphasis on self-related values tend to envision nature in terms of their own experiences and actions.

Regarding the moral values held by individuals, a positive correlation was discovered between the valence of associations and individuals' values regarding compassion, care, and the protection of others. This finding suggests that individuals who are more sensitive to the suffering of others and exhibit a deep sense of care also tend to have a more positive perception of nature. For values related to fairness, a positive association was found between the valence of associations with nature, which is consistent with our previous finding, as well as positive links with nature-related associations such as “My activities” and “Humans.” A negative association was observed between the value of authority and three nature-related associations (“My activities,” “My perceptions and feelings,” “Animals”). Regarding the value of purity, there was also a negative link with “Animals” as well as “Humans”. No relation was found with the value related to loyalty (MF – Ingroup). For the detailed correlations, see Table 8.

When it comes to religious values, individuals who identify themselves as more religious tend to have fewer associations with nature (see Table 8). This suggests that religion may negatively influence the diversity of people's imagery of the natural world.

Discussion

Regarding the moral values held by individuals, the data of our study revealed a positive correlation between the valence of associations and individuals' concerns regarding compassion, care, and the protection of others (see Table 8). Past research showed that moral foundations such as care and fairness play an essential role in shaping personal norms

concerning climate change (Dawson & Tyson, 2012; Jansson & Dorrepaal, 2015). Similarly, studies by Better et al. (2023) discovered a negative correlation between the belief that food waste is morally unacceptable and individuals' self-reported food waste. In other words, individuals who adhere to the care/harm foundation are more likely to view food waste as morally reprehensible when an intervention underscores its potential harm. Additionally, Dickinson et al. (2016) demonstrated, based on a US survey, that compassion and fairness strongly and positively predict the readiness to take action against climate change. Another line of research has underscored the significance of empathy in influencing human-environment interactions (Brown et al., 2019). As early as 2013, Kim-Pong Tam emphasized the need for further exploration into empathy from a personality standpoint, particularly regarding empathy toward non-human entities. Notably, Davidson and Kecinski (2021) have highlighted that this specific research domain remains insufficiently represented in environmental psychology literature. They stressed that empathy is often omitted from empirical studies despite its potential explanatory value.

Proposition #9. *We propose that environmental identity content, specifically the valence of associations (positive vs. negative), can serve as a moderating factor between moral foundation "Care" and pro-environmental behaviors.*

When it comes to religious values, individuals who identify themselves as more religious tend to have fewer associations with nature, suggesting that religion may negatively influence the diversity of people's imagery of the natural world (see Table 8). In previous research, it was demonstrated that religiosity functions as a moderator concerning pro-environmental behaviors (Bhuian & Sharma, 2017). Orellano et al. (2020) showed that religion influences sustainable consumption indirectly through its influence on attitudes, self-efficacy, social norms, and identity. Examining religiosity, high religious beliefs have been associated with

lower scores on the revised New Environmental Paradigm (NEP) (Schultz et al., 2000), establishing a negative link between religious beliefs and environmental concern (Eckberg & Blocker, 1996; Guth, Green, Kellstedt, & Smidt, 1995).

Proposition #10. *We suggest researching interventions aimed at enhancing the strength of environmental identity among religious individuals by increasing the number of nature-related associations. By emphasizing the interconnectedness between religious beliefs and the natural world, such interventions have the potential to foster a stronger sense of environmental identity among religious individuals. This, in turn, may lead to an increase in pro-environmental behaviors.*

Our findings from the environmental identity strength and environmental identity content section indicated a potential positive association between environmental identity and the frequency of associations (see Table 5). Additionally, we observed a positive correlation between the frequency of associations and pro-environmental behaviors (see Table 8).

Proposition #11. *We propose that future research should explore the potential moderating role of religiosity in the relationship between the frequency of associations with nature, environmental identity strength, and pro-environmental behaviors. We propose that the effect of the frequency of associations on environmental identity strength and pro-environmental behaviors is weakened among individuals with higher levels of religiosity, compared to those with lower levels of religiosity.*

In previous studies, Neaman et al. (2021) found that individuals identifying as Catholic scored notably lower on the connectedness to nature scale than those not religious. Similarly, Vess et al. (2011) revealed that religious fundamentalism was linked to decreased feelings of connectedness to nature, particularly when confronted with thoughts about mortality. Schultz

et al. (2000) also indicated that those who held more literal interpretations of the Bible had lower scores on the NEP (New Ecological Paradigm; Dunlap et al., 2000).

5.3.4 Concerns and attitudes

Results

Table 9. Concerns and environmental identity content (frequency of associations, valence of associations, and types of nature-related associations): Correlations

		Concerns and attitudes				
		Green Consumption	New Ecological Paradigm	Social Desirability	Materialism	Biospheric Values
Environmental identity content	Frequency of associations					
	Valence of associations			.250** (<.001)	-.151* (.029)	.208** (.002)
	My perceptions and feelings					.180* (.023)
	My activities			.300** (<.001)		
	Sky					
	Earth					
	Animals	0.204** (.006)	.153* (.039)	-.128* (.028)		.218** (.003)
	Humans			-.253** (.004)		
	Water					
	Trees and plants					
	Well-being			.174* (.024)		
	Spiritual aspects					.183* (.035)
	High power					.226* (.030)

*Note. *p < 0.05 (2-tailed); **p < 0.01 (2-tailed). Status Consumption and Satisfaction with Life were not statistically significant. The correlations highlighted in grey in the table were used to generate propositions.*

Concerning green consumption concerns (Haws et al., 2014), our findings revealed a positive correlation between these values and the nature-related association "Animals." This finding suggests that individuals who prioritize green consumption express a solid commitment to preserving the animal realm or representing nature through the animal realm. It may indicate that these individuals are particularly eager to support environmental

sustainability efforts that are focused on the welfare and conservation of animals, considering that animals are their primary nature-related association.

Concerning the New Ecological Paradigm (NEP), a positive correlation was identified solely with the nature-related association “Animals.”

Furthermore, a negative association was observed between social desirability, reflecting concern for other people's opinions and the nature-related associations “Animals” and “Humans.”

A negative correlation was found between the valence of associations with nature and materialism concerns. In other words, this could imply that individuals who perceive nature in a more positive manner tend to prioritize possession and acquisition less.

Furthermore, the data provided valuable insights into the link between biospheric values and participants' thoughts regarding nature. A positive correlation was observed between these variables, indicating that individuals who perceive nature more positively tend to hold strong values related to environmental protection. Additionally, in terms of the nature-related associations analyzed, a positive link was found with "Animals," "My perceptions and feelings”, "Spiritual Aspects," and "High power" associations.

Discussion

Regarding Green Consumption, our findings demonstrated a positive link between these values and the nature-related association "Animals" (see Table 9). Past research has shown that consumers who exhibit stronger green consumption concerns, commonly known as "green" consumers, typically prioritize the preservation of resources at both the environmental and personal levels (Haws et al., 2014). Previous research has also demonstrated a positive influence of green consumption concerns on intentions to engage in pro-environmental consumption (Wang et al., 2020).

Proposition #12. *We propose that an important and promising area for future investigation would involve conducting empirical studies to examine the direct activation of Green Consumption concerns through the nature-related association "Animals." By manipulating individuals' associations with animals in relation to their green consumption concerns, we can gain a deeper understanding of how such activations impact pro-environmental behaviors.*

This line of inquiry can provide valuable insights into the effectiveness of using animals' associations to promote environmentally friendly consumption and inform the development of targeted interventions to foster sustainable behaviors.

5.3.5 Perceptions of Time

Results

Table 10. Perceptions of time and environmental identity content (frequency of associations, valence of associations, and types of nature-related associations): Correlations

		Time orientations				
		Past Positive	Past Negative	Present Hedonistic	Present Fatalistic	Future
Environmental identity content	Frequency of associations	.178** (<.001)			-.098* (.050)	.210** (<.001)
	Valence of associations	.286** (<.001)	.114* (.022)	.208** (<.001)		.355** (<.001)
	My perceptions and feelings		.168* (.025)			
	My activities		.184* (.022)	.350** (<.001)	.254** (<.001)	
	Sky			.191** (.003)	.183** (.005)	
	Earth					
	Animals	-.160** (.003)				-.253** (<.001)
	Humans	-.163* (.036)				-.269** (<.001)
	Water				.139* (.021)	
	Trees and plants					
	Well-being					

	Spiritual aspects				.308** (<.001)	
	High power				.289** (.002)	

*Note. *p < 0.05 (2-tailed); **p < 0.01 (2-tailed). The transcendental time perspective was not statistically significant. The correlations highlighted in grey in the table were used to generate propositions.*

While examining the valence of associations with nature, a strong correlation was observed between individuals' inclination to focus on the positive aspects of their past. These findings suggest that individuals who have a positive attitude toward their past and enjoy nostalgic reminiscing tend to perceive nature more positively. Similarly, individuals with a future-oriented perspective, characterized by a focus on long-term thinking and consideration of the consequences of actions, also demonstrated a more positive view of nature. These results highlight the influence of individual differences in time orientation on the perception of nature.

Notably, regarding the present hedonistic orientation, an interesting finding emerged about the valence of associations. The present hedonistic perspective, which prioritizes immediate pleasure and gratification over long-term goals, displayed a significant positive association with the positive valence of participants' associations. This finding may seem counterintuitive when considering nature protection, as the emphasis on immediate pleasure can potentially detract from the long-term benefits of environmental conservation.

Discussion

Our findings revealed a positive correlation between the future time perspective, the valence of associations, and the frequency of associations that people hold with nature (see Table 10). Past research highlights that individuals possess awareness regarding the consequences of climate change, pollution, over-consumption, and other unsustainable behaviors (Trudel, 2019). However, these outcomes are predominantly future-oriented, while the associated behaviors and benefits are realized in the present (Gifford & Sussman, 2012;

Malkoc & Zauberman, 2019). This disconnection between future consequences and present actions significantly influences consumer preferences and choices.

Proposition #13. *To shift consumers' time orientation toward a more future-focused perspective, one potential intervention might involve activating individuals' future orientation by considering the frequency of nature associations they hold (e.g., high (vs. low) number of nature associations) in order to increase pro-environmental behaviors. Alternatively, manipulating individuals' future orientation could be achieved by focusing on the positivity (vs. negativity) of nature associations, potentially leading to increased engagement in pro-environmental behaviors.*

Regarding people that tend to be focused on the present in a fatalistic way, our data revealed a positive link between present fatalistic orientation and the nature-related associations of “High power” and “Spiritual aspects.” This time perspective relates to the external locus of control and the feeling that one’s actions are outside one’s control. Extant studies have demonstrated that pro-environmental attitudes and behaviors are negatively related to perceptions of external locus of control, i.e., perceptions that individual actions will not influence personal life outcomes (Geller, 1995; Hines et al., 1987). When protecting the environment seems unattainable, striving for this goal may seem burdensome and pointless (Milfont & Gouveia, 2006). For this reason, people with a more (vs. less) pronounced present-fatalistic orientation will be less motivated to make an effort to act in a pro-environmental manner. Therefore, future research holds the potential to explore strategies that can alter individuals' perception of nature as a dominant force, thereby empowering individuals with a present-fatalistic orientation.

Proposition #14. *Future research could examine the manipulation of the perception of power attributed to nature. By employing interventions that highlight the human ability to influence and shape the natural world, researchers could seek to restore a sense of control and agency among individuals who perceive nature as an overwhelming force.*

Such interventions may involve educational programs, immersive experiences, or persuasive messaging that emphasizes human capacity for environmental responsibility. By shifting the power dynamic and empowering individuals to perceive themselves as active agents in environmental conservation, it is possible to foster a greater sense of responsibility and engagement with pro-environmental behaviors. Further exploration and experimentation in this area could yield valuable insights for developing effective interventions and initiatives aimed at promoting sustainable attitudes and behaviors in present-fatalistic individuals.

5.3.6 Perceptions of Power

Results

Table 11. Perceptions of power and environmental identity content (frequency of associations, valence of associations, and types of nature-related associations): Correlations

		Perceptions of power				
		Sense of power	Power People	Power Nature	Power Same	Divine Nature
Environmental identity content	Frequency of associations			.142** (.007)	.133* (.011)	
	Valence of associations			.254** (<.001)		.370** (<.001)
	My perceptions and feelings					.240** (.002)
	My activities	.233* (.018)				
	Sky					.139* (.043)
	Earth					
	Animals			-.132* (.023)	.139* (.016)	
	Humans					
	Water					
	Trees and plants					.127* (.021)
	Well-being	.163* (.035)				.218** (.003)
	Spiritual aspects					.319** (<.001)
	High power	.242* (.019)				.251** (.010)

*Note. *p < 0.05 (2-tailed); **p < 0.01 (2-tailed). The correlations highlighted in grey in the table were used to generate propositions.*

Concerning the association of nature with a divine dimension, a strong and positive correlation was observed with nature-related associations "My perceptions and feelings," "Well-being," "Spiritual aspects," and "Higher power," as well as the valence of associations. This finding could suggest that individuals who experience positive feelings, well-being, spirituality, and a belief in a higher power when engaging with nature tend to perceive nature as having a divine dimension.

A notable finding regarding the perception of power dynamics between humans and nature emerged as a positive correlation was discovered between the perception of nature as having power over humans and both the frequency and valence of associations.

Discussion

As mentioned earlier, we observed a positive correlation among nature-related associations, the valence of associations, and the measure of Divine Nature (see Table 12). We know from past research that environmental identity strength is correlated with self-reported pro-environmental behaviors (e.g., Tam, 2013) and actual conservational behavior (e.g., Frantz & Mayer, 2014; Martin & Czellar, 2016).

Proposition #15. *Related research could investigate whether perceiving nature as possessing divine attributes individuals can mediate the relationship between environmental identity strength and pro-environmental behaviors.*

As mentioned in the results section, an interesting finding emerged concerning the perception of power dynamics between humans and nature, revealing a positive correlation between perceiving nature as having power over humans and the frequency and valence of associations (see Table 11).

Proposition #16. *Future research could directly manipulate the perception of power by comparing the effects of images depicting nature as having power over humans (vs. images depicting humans having power over nature) and examining their effects on environmental identity and pro-environmental behavior.*

This approach can provide valuable insights into the role of power dynamics in shaping individuals' relationships with nature and their subsequent engagement in pro-environmental actions. Similar research has been conducted in the area of religion (Eom et al., 2021;

Karvinen & Carr, 2014). Another approach to influencing the perception of nature's power could involve utilizing the technique of Nature-self size manipulation, as employed by McConnel and Jacobs (2020) in their paper. The experimental design could directly manipulate the size of nature and the self-using circles, comparing scenarios where the self is much larger than nature to scenarios where nature is much larger than the self. This manipulation can provide insights into how variations in perceived size can influence individuals' perceptions of power and their subsequent behaviors toward nature.

5.3.7 Behavioral tendencies

Results

Table 12. Behavioral tendencies and environmental identity content (frequency of associations): Correlations

		Behavioral tendencies	
		Pro-environmental Behaviors	Pro-social Behaviors
Environmental identity content	Frequency of associations	.193** (.005)	.163* (.018)

*Note. *p < 0.05 (2-tailed); **p < 0.01 (2-tailed). The only significant variable of environmental identity content in this analysis was the "Frequency of associations." The correlations highlighted in grey in the table were used to generate propositions.*

Concerning pro-environmental behaviors, a significant link was found between the frequency of associations with nature and their engagement in pro-environmental behaviors. The results demonstrated a significant association, indicating that individuals with more elaborate thoughts tend to engage in pro-environmental actions. Additionally, our analysis unveiled a positive correlation between the frequency of associations with nature and their pro-social behaviors. This intriguing finding suggests that individuals who vividly imagine nature tend to exhibit a greater inclination toward protecting the environment and displaying

care toward others. It implies that a deeper engagement with nature through rich imagery fosters an enhanced sense of responsibility and empathy, prompting individuals to take proactive measures in conserving the environment and exhibiting compassionate behavior toward fellow human beings.

Discussion

Our results revealed a significant correlation between the frequency of associations with nature that individuals possess and their involvement in pro-environmental behaviors.

Proposition #17. *Relatedly, future research could investigate whether increasing the number of associations with nature positively impacts pro-environmental behaviors.*

To investigate this, an experimental design could be implemented wherein participants are exposed to a video that directly manipulates the number of nature images presented, comparing a high number of images to a low number. By subsequently observing the participants' actual pro-environmental behavior, such as their choices, actions, or intentions, researchers can assess the direct impact of increased associations with nature. This approach has the potential to uncover whether higher exposure to natural imagery can lead to a positive change in individuals' pro-environmental behaviors, providing valuable guidance for developing interventions and strategies to promote environmental consciousness and sustainable practices.

Proposition #18. *Another promising area of research could focus on investigating the role of the frequency of associations with nature as a potential mediator in the relationship between environmental identity strength and pro-environmental behaviors.*

Understanding how the frequency or intensity of thoughts about nature might influence individuals' pro-environmental actions could provide valuable insights into the underlying

mechanisms at play. Previous research has already established a direct association between environmental identity and the inclination to engage in pro-environmental behaviors (Mackay & Schmitt, 2019; Whitburn et al., 2020). However, exploring the mediating effect of nature-related thoughts on this relationship could enhance our understanding of the cognitive processes and psychological factors that drive individuals' environmentally conscious actions. By delving deeper into this aspect, we can better understand the interplay between environmental identity, cognitive factors, and pro-environmental behaviors.

6. Conclusion

Global warming poses a significant worldwide challenge for humanity (Intergovernmental Panel on Climate Change, 2023). Human activities have played a substantial role in climate change, emphasizing the need for concerted efforts to mitigate the environmental impacts of individual behaviors (Trudel, 2019). An essential component of this effort is understanding our relationship with the natural environment. Environmental identity refers to the sense of connection to the natural world. It is conceptualized as a dynamic interaction between individuals and their environment, shaping how humans perceive and interact with their surroundings (Clayton, 2003). Prior research has primarily concentrated on conceptualizing and measuring the strength of environmental identity. Nevertheless, delving further into individuals' perceptions of nature is essential, as it plays a pivotal role in influencing their behaviors. How individuals perceive and interact with nature offers invaluable insights into their environmental attitudes and behaviors (Nisbet et al., 2009). Our exploratory studies offer fresh insights into these domains by categorizing individuals' mental associations with nature, assessing their valence, and the depth of these connections. Humanity is intrinsically intertwined with nature, underscoring the importance of understanding our connection with the natural world for its conservation and protection (Kellert, 1996; Roszak, 1993; Wilson,

1984). In this context, our current research contributes significantly by conducting a series of exploratory studies that delve into the nuanced meanings individuals attribute to nature.

Our findings are characterized by their exploratory nature, and it is important to acknowledge this predominant aspect. An exploratory methodology was selected because it could lay the groundwork for future investigations and hypothesis development (Sarantakos, 2013; Stebbins, 2001). A quantitative approach was favored, given the availability of established measures for most of the investigated constructs (Creswell, 2009). The interpretations stemming from our exploratory data are a way of shedding light on novel aspects of research, given our statistical analyses' orientation, they are not a way of validating hypotheses or propositions. In that sense, this paper initiates preliminary insights and formulates propositions worthy of systematic exploration in subsequent hypothesis-testing research.

Furthermore, it is important to highlight that the outcomes and discussions put forth in this research heavily draw upon correlational evidence characterized by small to moderate effect sizes. Hence, maintaining an understanding that the interpretation of these findings should remain grounded within specific theoretical frameworks is crucial. Finally, causal inferences necessitate testing in subsequent research endeavors.

Despite the acknowledged limitations, our exploratory investigation primarily focused on deepening comprehension regarding individuals' perceptions of nature, delving into their cognitive representations and their link to personal differences. Understanding these dynamics contributes to our comprehension of the factors influencing pro-environmental behaviors and the potential for fostering a deeper connection between individuals and the natural world. The principal aim of this paper was to extend insights into environmental identity. We are confident that by gaining a more nuanced and individualized grasp of environmental identity, policymakers, and marketers could tailor educational and communication strategies,

enhancing environmental identity and unveiling innovative pathways to stimulate such identity within their target populations.

References

Abele, A., & Wojciszke, B. (2014). Communal and agentic content in social cognition: A dual perspective model. *Advances in experimental social psychology*, 50, 195–255.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179–211

Altman, N. (1993). *Sacred trees.* San Francisco: Sierra Club Books.

Ando, K., Ohnuma, S., Blöbaum, A., Matthies, E., & Sugiura, J. (2010). Determinants of individual and collective proenvironmental behaviors: Comparing Germany and Japan. *Journal of Environmental Information Science*, 38, 21–32.

Armstrong, K. (1993). *A history of God: The 4,000-year quest of Judaism, Christianity and Islam*. New York: Ballantine.

Austin, M.E., & Kaplan, R. (2003). Identity, involvement, and expertise in the inner city: some benefits of tree-planting projects. (pp. 205–225). In: Clayton, S., Opotow, S. (Eds.), *Identity and the Natural Environment: The Psychological Significance of Nature.* The MIT Press, Cambridge, MA, USA.

Bamberg, S., & Möser, G. (2007). Twenty years after Hines, Hungerford, and Tomera: A new meta-analysis of psycho-social determinants of pro-environmental behaviour. *Journal of Environmental Psychology*, 27(1), 14–25.

Barnett, R. (2007). Sacred Groves: Sacrifice and the Order of Nature in Ancient Greek Landscapes. *Landscape Journal*, 26(2), 252−269.

Barrable, A., & Booth, D. (2022). Disconnected: what can we learn from individuals with very low nature connection? *International Journal of Environmental Research and Public Health*, 19 (13), 8021.

Barragan-Jason, G., Loreau, M., de Mazancourt, C., Singer, M.C., & Parmesan, C. (2023). Psychological and physical connections with nature improve both human well-being

and nature conservation: a systematic review of meta-analyses. *Biological Conservation*, 277.

Barragan-Jason, G., de Mazancourt, C., Parmesan, C., Singer, M. C., & Loreau, M. (2021). Human–nature connectedness as a pathway to sustainability: A global meta-analysis. *Conservation Letters*, 15.

Beery, T. H., & Wolf-Watz, D. (2014). Nature to place: Rethinking the environmental connectedness perspective. *Journal of Environmental Psychology*, 40, 198–205.

Berthrong, J., 2003. Confucian views of nature. In: Selin, H. (Ed.), *Nature Across Cultures: Views of Nature and the Environment in Non-Western Cultures*. Kluwer Academic Publishers, London, pp. 373–392.

Bhore, S.J. (2016). Paris agreement on climate change: A booster to enable sustainable global development and beyond. *International Journal of Environmental Research And Public Health*, 13, 1134.

Bhuian, S., & Sharma, K. (2017). Predicting consumer pro-environmental behavioral intention: The moderating role of religiosity. *Review of International Business and Strategy*, 27(3), 352–368.

Biel, A., Thøgersen, J., 2007. Activation of social norms in social dilemmas: a review of the evidence and reflections on the implications for environmental behavior. *Journal of Economic Psychology,* 28 (1), 93–112.

Binder, M., Blankenberg, A.-K. (2017). Green lifestyles and subjective well-being: More about self-image than actual behavior? *Journal of Economic Behavior & Organization*, 137, 304–323.

Bloom, A. (1972). Buddhism, Nature and the Environment. *The Eastern Buddhist*, 5(1), 115–129.

Boerschig, S., & de Young, R. (1993). Evaluation of selected recycling curricula: Educating the green citizen. *Journal of Environmental Education*, 24, 17–22.

Bretter, C., Unsworth, K.L., Kaptan, G., & Russell, S.V. (2023). It is just wrong: moral foundations and food waste. *Journal of Environmental Psychology*, 88, 102021.

Brosch, T. (2021). Affect and emotions as drivers of climate change perception and action: A review. *Current Opinion in Behavioral Sciences*, 45, 15–21.

Brown, K., Adger, W.N., Devine-Wright, P., Anderies, J.M., Barr, S., Bousquet, F., Butler, C., Evans, L., Marshall, N., & Quinn, T. (2019). Empathy, place and identity interactions for sustainability. *Global Environmental Change*, Part A, 56, 11–17.

Browning, W., Ryan, C., & Clancy, J. (2014). *14 Patterns of Biophilic Design: Improving Health & Well-Being in the Built Environment.* Terrapin Bright Green, LLC., New York.

Brügger, A., Kaiser, F. G., & Roczen, N. (2011). One for all? Connectedness to nature, inclusion of nature, environmental identity, and implicit association with nature. *European Psychologist*, 16, 324–333.

Bruni, C. M., Chance, R. C., Schultz, W. P., & Nolan, J. M. (2012). Natural connections: bees sting and snakes bite, but they are still nature. *Environment and Behavior,* 44, 197–215.

Bruni, C. M., Fraser, J., & Schultz, P. W. (2008). The Value of Zoo Experiences for Connecting People with Nature. *Visitor Studies,* 11(2), 139–150.

Bruni, C. M., Winter, P. L., Schultz, P. W., Omoto, A. M., & Tabanico, J. J. (2017). Getting to know nature: evaluating the effects of the Get to Know Program on children's connectedness with nature. *Environmental Education Research*, 23, 43–62.

Brick C., Lai C. K. (2018). Explicit (but not implicit) environmentalist identity predicts pro-environmental behavior and policy preferences. *Journal of Environmental Psychology*, 58, 8-17.

Bull, J. N. (1993). The effect of participation in an environmental action program on empowerment, interest and problem-solving skills of inner-city students. *Dissertation Abstracts International*, 53(10-B), 5481.

Butcher A. (2013). Keeping the faith: divine protection and flood prevention in modern Buddhist Ladakh. *Worldviews: Global Religions, Culture, and Ecology*, 17(2), 103–14.

Calculli, C., D'Uggento, A.M., Labarile, A., & Ribecco, N. (2021). Evaluating people's awareness about climate changes and environmental issues: a case study. *Journal of Cleaner Production*, 324, 129244.

Cambrigde Dictionary. (n.d.). Nature. In *dictionary.cambridge.com dictionary.* Retrieved June 21, 2023, from https://dictionary.cambridge.org/dictionary/english/nature

Caputo, A., Ayoko, O. B., Amoo, N., & Menke, C. (2019). The relationship between cultural values, cultural intelligence and negotiation styles. *Journal of Business Research*, 99, 23–36.

Carson, R. (1962). Silent Spring. New York: Fawcett Crest Books.

Castree, N. (2014b). Making Sense of Nature. Routledge, London/New York.

Chang, C. T., Lee, H. C., & Lee, Y. K. (2022). Are consumers moved by a crying tree or a smiling Forest: Effects of anthropomorphic valence and cause acuteness in green advertising. *Journal of Advertising Research*, 62(4), 367–384.

Chapple C.K., & Tucker M.E., (2000). *Hinduism and Ecology: The Intersection of Earth, Sky, and Water*. Cambridge, MA: Center Study World Religion.

Cheng, J. C. H., & Monroe, M. C. (2012). Connection to nature: Children's affective attitude toward nature. *Environment and Behavior*, *44*, 31–49.

Clayton, S. (2003). Environmental identity: A conceptual and operational definition. In S. Clayton & S. Opotow (Eds.), *Identity and the natural environment* (pp. 45–65). Cambridge, MA: MIT Press.

Clayton, S. (2012). Environment and identity. In S. Clayton (Ed.), *Handbook of environmental and conservation psychology* (pp. 164-180). New York, NY: Oxford University Press.

Clayton, S., Fraser, J., & Saunders, C. (2009). Zoo Experiences: Conservation, Connections, and Concern for Animals. *Zoo Biology*, 28(5), 377–97.

Collado, S., Corraliza, J. A., Staats, H., & Ruiz, M. (2015). Effect of frequency and mode of contact with nature on children's self-reported ecological behaviors. *Journal of Environmental Psychology*, *41*, 65–73.

Coates, P. (1998). *Nature. Western Attitude Since Ancient Times*. Oxford: Polity Press.

Corral-Verdugo, V., & Pinheiro, J. Q. (2006). Sustainability, future orientation and water conservation. *Revue Européenne de Psychologie Appliquée/European Review of Applied Psychology*, 56, 191–198.

Coward, H. (2003). Hindu views of nature and the environment. *In Nature across cultures: Views of nature and the environment in non-western cultures*, Edited by: Selin, H. 411–420. Dordrecht, NL: Springer.

Creswell, J. (2009). *Research Design, Qualitative, Quantitative and Mixed Methods*, 3rd Edn, Thousand Oaks: Sage.

Curran, G. (1999). Murray Bookchin and the domination of nature. *Critical Review of International Social and Political Philosophy*, 2, 59–94.

Davidson, D. J., & Kecinski, M. (2021). Emotional pathways to climate change responses. *Wiley Interdisciplinary Reviews: Climate Change*, 13(2), e751.

Darwin C. (1861). On the origin of species. John Murray, London.

Dawson S.L., & Tyson G. (2012). Will morality or political ideology determine attitudes to climate change? *Australian Community Psychologist*, 24, 8–25.

Descartes R (1664) Le Monde, ou Traité de la lumière. Paris : Théodore Girard.

De Groot, J. I., & Steg, L. (2007a). Value orientations and environmental beliefs in five countries validity of an instrument to measure egoistic, altruistic and biospheric value orientations. *Journal of Cross-Cultural Psychology*, 38(3), 318–332.

Dickinson, J.L., McLeod, P., Bloomfield, R., & Allred, S. (2016). Which moral foundations predict willingness to make lifestyle changes to avert climate change in the USA? *PLoS One*, 11(10), e0163852.

Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment*, 49(1), 71–75.

Dictionary. (n.d.). Nature. In *dictionary.com dictionary.* Retrieved June 21, 2023, from https://www.dictionary.com/browse/nature

Dong M., Palomo-Vélez G., Wu S. (2021). Reducing the gap between pro-environmental disposition and behavior: The role of feeling power. *Journal of Applied Social Psychology*, 51, 262–272.

Dubois, D., Rucker, D.D., & Galinsky, A.D. (2015). Social class, power, and selfishness: When and why upper and lower class individuals behave unethically. *Journal of Personality and Social Psychology*, 108(3), 436–449.

Ducarme, F., & Couvet, D. (2020). What does ‘nature’ mean? *Palgrave Communications*, 6(1), 14.

Dunlap, R. E., van Liere, K. D., Mertig, A. G., & Jones, R. E. (2000). Measuring endorsement of the new ecological paradigm: a revised NEP scale. *Journal of Social Issues*, 56, 425–442.

Dutcher, D.D., Finley, J.C., Luloff, A.E., & Johnson, J.B. (2007). Connectivity with nature as a measure of environmental values. *Environment and Behavior*, 39, 474–493.

Eagles, P. F., & Demare, R. (1999). Factors influencing children's environmental attitudes. *Journal of Environmental Education*, 30, 33–37.

Eastman, J. K., Goldsmith, R. E., & Flynn, L. R. (1999). Status consumption in consumer behavior: Scale development and validation. *Journal of Marketing,* 7(3), 41–52.

Egri, C. (1997). Spiritual connections with the natural environment. *Organization & Environment*, 10, 407–431.

Eckberg, D.L., & Blocker, T.J. (1996). Christianity, environ-mentalism, and the theoretical problem of fundamentalism. *Journal for the Scientific Study of Religion*, 35, 343–355.

Eom, K., & Ng, S.T. (2023). The potential of religion for promoting sustainability: The role of stewardship. *Topics in Cognitive Science*, 15(3) 480–499.

Eom, K., Saad, C. S., & Kim, H. S. (2021). Religiosity Moderates the Link Between Environmental Beliefs and Pro-Environmental Support: The Role of Belief in a Controlling God. *Personality and Social Psychology Bulletin*, 47(6), 891–905.

Evans, L. (2020). *Ancient Egyptian Response to the Natural World. Profane Landscapes, Sacred Spaces*. United Kingdom: Equinox eBooks Publishing.

Exline, J.J, Grubbs, J.B., & Homolka, S.J. (2015). Seeing God as Cruel or Distant: Links with Divine Struggles Involving Anger, Doubt, and Fear of God's Disapproval. *The International Journal for the Psychology of Religion*, 25(1), 29–41.

Fielding, K. S., & Head, B. W. (2012). Determinants of young Australians' environmental actions: The role of responsibility attributions, locus of control, knowledge and attitudes. *Environmental Education Research*, 18, 171–186.

Fiksel, J., Graedel, T., Hecht, A.D., Rejeski, D., Sayler, G.S., Senge, P.M., Swackhamer, D. L., & Theis, T.L. (2009). Epa at 40: bringing environmental protection into the 21st century. *Environmental Science & Technology*, 43 (23), 8716–8720.

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention and behavior: An introduction to theory and research*. Addison-Wesle.

Fox, S. (1985). The American conservation movement: John Muir and his legacy. Madison: University of Wisconsin Press.

Frantz, C. M., & Mayer, F. S. (2014). The importance of connection to nature in assessing environmental education programs. *Studies in Education Evaluation*, *41*, 85–89.

Frisken, W.R. (1971). Extended industrial revolution and climate change. *AGU*, 1971, 52(7), 500–508.

Gebhard, U., Nevers, P., & Billmann-Mahecha, E. (2003). "Moralizing trees: anthropomorphism and identity in children's relationships to nature," in *Identity and the Natural Environment: The Psychological Significance of Nature*, eds S. Clayton and S. Opotow (Cambridge: MIT Press), 91–112.

Geller, E.S. (1995). Actively caring for the environment: an integration of behaviourism and humanism. *Environment and Behavior*, 27, 184–195.

Germond, P. (2001). *Das Tier im alten Ägypten*. Hirmer.

Glacken, C. (1967). *Traces on the Rhodian Shore: Nature and Culture in Western Thought from Ancient Times to the End of the Eighteenth century.* Berkeley: University of California Press.

Gifford, R., & Sussman, R. (2012). Environmental attitudes, in *The Oxford Handbook of Environmental and Conservation Psychology*, ed S. Clayton (New York, NY: Oxford University Press), 65–80.

Gillis, K., & Gatersleben, B. (2015). A review of psychological literature on the health and wellbeing benefits of biophilic design. *Buildings*, 5, 948–963.

Gosling, S.D., Rentfrow, P.J., & Swann, W.B., Jr. (2003). A very brief measure of the Big Five personality domains. *Journal of Research in Personality*, 37, 504–528.

Gottlieb, R.S. (1996). *This Sacred Earth: Religion, Nature, Environment*. New York: Routledge.

Graham, J., Haidt, J., Koleva, S., Motyl, M., Iyer, R., Wojcik, S. P., & Ditto, P. H. (2013). Moral Foundations Theory: The pragmatic validity of moral pluralism. *Advances in Experimental Social Psychology*, 47, 55–130.

Griskevicius, V., Tybur, J. M., & Van den Bergh, B. (2010). Going green to be seen: status, reputation, and conspicuous conservation. *Journal of personality and social psychology*, 98, 392–404.

Guth, J. L., Green, J. C., Kellstedt, L., & Smidt, C. (1995). Faith and the environment: Religious beliefs and attitudes on environmental policy. *American Journal of Political Science*, 39, 64–382.

Hand, C.M., & Van Liere, K.D. (1984). Religion, mastery over nature, and environmental concern. *Social Forces*, 63, 555–570.

Haught J. F. (2000). *God after Darwin: A theology of evolution*. Westview Press, Boulder.

Haws, K.L., Winterich, K.P., & Naylor, R.W. (2014). Seeing the world through GREEN-tinted glasses: green consumption values and responses to environmentally friendly products. *Journal of Consumer Psychology*, 24 (3), 336–354.

Helmut K. (1968). NOMOS PHYSEOS: The Concept of Natural Law in Greek Thought, in *Religions in Antiquity*. Ed. Jacob Neusner; Leiden: Brill.

Hine, D.W., & Gifford, R. (1991). Fear appeals, individual differences, and environmental concern. *Journal of Environmental Education*, 23, 36–41

Hines, J.M., Hungerford, H.R., & Tomera, A.N. (1987). Analysis and Synthesis of Research on Responsible Environmental Behavior: A Meta-Analysis. *Journal of Environmental Education*, 18, 1–8.

Hofstede, G. (1980). *Culture's consequences: International differences in work-related values*. Beverly Hills: Sage.

Hofstede, G. (2001). *Culture's consequences: Comparing values, behaviors, institutions, and organizations across nations*. Thousand Oaks: Sage.

Homer, P.M., & Kahle, L.R. (1988). A structural equation test of the value-attitude-behavior hierarchy. *Journal of Personality and Social Psychology*, 50, 438–646.

Hornung, E. (1967). Neue Materialien zur ägyptischen Chronologie. *Zeitschrift Der Deutschen Morgenländischen Gesellschaft*, 117(1), 11–16.

Horsley, R.A. (1978). The law of nature in philo and cicero. *Harvard Theological Review*, 71(1–2), 35–59.

Howard, G.S. (1997). *Ecological psychology: Creating a more earth-friendly human nature. Notre Dame*, IN: University of Notre Dame Press

Hughes, J.D. (1975). *Ecology in ancient civilizations*. Albuquerque: University of Mexico Press.

Husted, B.W. (2005). Culture and ecology: A cross-national study of the determinants of environmental sustainability. *MIR: Management International Review*, 45(3), 349–371.

Iqbal, S., & Khan, M.I. (2020). Spirituality as a predictor of psychological well-being: An explanatory mechanism of religiosity and sustainable consumption. *Religions*, 11(12), 634.

Izatt, H.J. (2004). The Precedent of a President: Theodore Roosevelt and Environmental Conservation. *Sigma: Journal of Political and International Studies*, 22(6).

Jacobs, T. P., & McConnell, A. R. (2022). Self-transcendent emotion dispositions: greater connections with nature and more sustainable behavior. *Journal of Environmental Psychology*, 81, 101797.

Jansson, J., & Dorrepaal, E. (2015). Personal norms for dealing with climate change: results from a survey using moral foundations theory. *Sustainable Development*, 23, 381–395.

Johns, D., Crist, E., Sahgal, B. (2022). Ending the domination of nature. *Biological Conservation* 272, 109599.

Johnston, L. (2006). The "nature" of Buddhism: A survey of relevant literature and themes. *Worldviews: Global Religions, Environment and Culture,* 10(1), 69–99.

Joireman, J. A., Van Lange, P. A. M., & Van Vugt, M. (2004). Who cares about the environmental impact of cars? *Environment and Behavior*, 36, 187–206.

Kadic-Maglajlic, S., Arslanagic-Kalajdzic, M., Micevski, M., Dlacic, J., & Zabkar. V. (2019). Being Engaged is a Good Thing: Understanding Sustainable Consumption Behavior among Young Adults. *Journal of Business Research,* 104, 644–654.

Kahn, P.H. (1997). Developmental Psychology and the Biophilia Hypothesis: Children's Affiliation with Nature. *Developmental Review*, 17(1), 1–61.

Kahn, J., Peter, H. (2003). The development of environmental moral identity. In S. Clayton, & S. Opotow (Eds.), *Identity and the natural environment* (pp. 113-134). Cambridge, MA: MIT Press.

Kaiser, F. G., & Byrka, K. (2011). Environmentalism as a trait: Gauging people's prosocial personality in terms of environmental engagement. *International Journal of Psychology*, 46, 71–79.

Kant, E. (1786). *Premiers principes métaphysiques de la science de la nature*, trad . J. Gibelin. Paris: Vrin, 1982.

Kaplan, R., & Kaplan, S. (1989). *The experience of nature.* New York: Cambridge University Press.

Kaplan, S. (1995). The restorative benefits of nature: Toward an integrative framework. *Journal of Environmental Psychology*, 15, 169–182.

Karvinen K.H., & Carr L.J. (2014). Does the perception that God controls health outcomes matter for health behaviors? *Journal of Health Psychology*, 19(4), 521–530.

Karp, D.G. (1996). Values and their effect on pro-environmental behavior. *Environment and Behavior*, 28, 111–133.

Kashima, Y., Paladino, A., Margetts, E.A. (2014). Environmentalist identity and environmental striving. *Journal of Environmental Psychology*, 38, 64–75.

Kassiola, J.J. (2010). *Confucianizing modernity and modernizing confucianism: environmentalism and the need for a confucian positive argument for social change.* China's Environmental Crisis: Springer.

Kellert, S.R. (1996a). *The value of life.* Washington, D.C.: Island Press.

Kellert, S.R. (1996b). Unpublished letter to the editor of New Scientist.

Kennedy, R.F. (2016). Air, Waters, Metals, Earth: People and Environment in Archaic and Classical Greek Thought. *In The Routledge Handbook of Identity and the Environment in the Classical and Medieval Worlds*, ed. Kennedy, Rebecca Futo and Jones-Lewis, Molly, 9–28. London: Routledge.

Kesenheimer, J.S., & Greitemeyer, T. (2021). Greenwash yourself: the relationship between communal and agentic narcissism and pro-environmental behavior. *Journal of Environmental Psychology*, 75, 101621.

Kilbourne, W., & Pickett, G. (2008). How materialism affects environmental beliefs, concern, and environmentally responsible behavior. *Journal of Business Research*, 61(9), 885–893.

Klineberg, S. L., McKeever, M., & Rothenbach, B. (1998). Demographic predictors of environmental concern: It does make a difference how it's measured. *Social Science Quarterly*, 79, 734–753.

Koivisto, M., & Grassini, S. (2022). Affective responses to urban but not to natural scenes depend on inter-individual differences in childhood nature exposure. *Journal of Environmental Psychology*, 82, 10184.

Kosslyn, S.M., Behrmann, M., & Jeannerod, M. (1995). The cognitive neuroscience of mental imagery. *Neuropsychologia*, 33(11), 1335–1344.

Kuo, F.E., Bacaicoa, M., & Sullivan, W.C. (1998). Transforming inner-city landscapes. *Environment and Behavior*, 30, 28–59.

Latour, B. (2011). Politics of nature: East and West perspectives. *Ethics & Global Politics*, 4(1), 71-80.

Lange F., & Dewitte S. (2020). Positive affect and pro-environmental behavior: a preregistered. *Journal of Economic Psychology*, 80, 102291.

Lennox, R., & Wolfe, R. (1984). Revision of the self-monitoring scale. *Journal of Personality and Social Psychology*, 46(6), 1349–1364.

Liu, T., Geng, L., Ye, L., & Zhou, K. (2019). "Mother nature" enhances connectedness to nature and pro-environmental behavior. *Journal of Environmental Psychology*, 61, 37–45.

Lorenzoni, I., Leiserowitz, A., Doria, De Franca, Poortinga, M., & Pidgeon, N.F., W. (2006). Cross-National Comparisons of Image Associations with "Global Warming" and "Climate Change" among Laypeople in the United States of America and Great Britain. *Journal of Risk Research*, 9, 265–281.

Louv R. (2008). National Conference on Outdoor Leadership. *Journal of the Wilderness Education Association*, 20(1), 4-6.

Mackay, C.M., & Schmitt, M.T. (2019). Do people who feel connected to nature do more to protect it? A meta-analysis. *Journal of Environmental Psychology*, 65, 101323.

Malkoc, S., & Zauberman, G. (2019). Psychological analysis of consumer decisions from an intertemporal choice perspective. *Consumer Psychology Review*, 2(1), 97–113.

Martin, C., & Czellar, S. (2016). The extended Inclusion of Nature in Self scale. *Journal of Environmental Psychology, 47*, 181–194.

Martin, C., Czellar, S., 2017. Where do biospheric values come from? A connectedness to nature perspective. *Journal of Environmental Psychology*, 52, 56–68.

Markowitz, E. M., Goldberg, L. R., Ashton, M. C., & Lee, K. (2012). Profiling the "pro-environmental individual": A personality perspective. *Journal of Personality*, 80, 81–111.

Mayer, F.S., & Frantz, C.M. (2004). The connectedness to nature scale: A measure of individuals' feeling in community with nature. *Journal of Environmental Psychology, 24*, 503–515.

Mayer, F.S., Frantz, C.M., Bruehlman-Senecal, E., & Dolliver, K. (2009). Why is nature beneficial?: The role of connectedness to nature. *Environment and Behavior*, 41(5), 607–643.

McConnell, A.R., & Jacobs, T.P. (2020). Self-nature representations: On the unique consequences of nature-self size on pro-environmental action. *Journal of Environmental Psychology*, 71, 10147.

McNeill, J.R. (2003). Observations on the Nature and Culture of Environmental History. *History and Theory,* 42, 5–43.

Merchant C. (1980). *The death of nature: women, ecology, and the scientific revolution.* New York: Harper & Collins.

Meskell, L. (2001). The Egyptian ways of death, in Chesson, M.S. (ed.) *Social memory, identity and death: anthropological perspectives on mortuary rituals* (pp. 27–40). Arlington (VA): American Anthropological Association.

Milfont, T.L., & Gouveia, V.V. (2006). Time perspective and values: An exploratory study of their relations to environmental attitudes. *Journal of Environmental Psychology*, 26, 72–82.

Myers, G. (1998). *Children and animals: Social development and our connections to other species*. Boulder, Col: Westview Press.

Myers, G., & Russell, A. (2003). Human identity in relation to wild black bears: A natural-social ecology of subjective creatures. Identity and the natural environment, 67–90.

Myers, O. E. (2012). Children and nature. In S. D. Clayton (Ed.), *The Oxford handbook of environmental and conservation psychology* (pp. 113–126). Oxford University Press.

Morenz, S. (1973). *Egyptian Religion.* Ithaca : Cornell University Press (first published in German in 1960).

Moser, S.C. (2010). Communicating climate change: history, challenges, process and future directions. *WIREs Clim Change,* 1, 31–53.

Naderi, I., & Strutton, D. (2014). Can normal narcissism be managed to promote green product Purchases? Investigating a counterintuitive proposition. *Journal of Applied Social Psychology*, 44 (5), 375-391.

Naderi, I. (2018). I'm nice, therefore I go green: An investigation of pro-environmentalism in communal narcissists. *Journal of Environmental Psychology*, 59, 54–64.

Nagy, S., & Molnárné, C.K. (2018). The Effects of Hofstede's Cultural Dimensions on Pro-Environmental Behaviour: How Culture Influences Environmentally Conscious Behaviour. *Theory Methodology Practice*, 1, 27–36.

Nations, U. Home—United Nations Sustainable Development. Available online: https://www.un.org/sustainabledevelopment/ (accessed on 19 July 2022).

Nasr, S.H. (1996). *Religion and the Order of Nature.* Oxford: Oxford University Press.

Neaman, A., Diaz-Siefer, P., Burnham, E., Castro, M., Zabel, S., Dovletyarova, E.A., Navarro-Villarroel, C., & Otto, S. (2021). Catholic religious identity, prosocial and pro-environmental behaviors, and connectedness to nature. *Chile*, 30, 44–50.

Newhouse, N. (1990). Implications of attitude and behavior research for environmental conservation. *Journal of Environmental Education*, 22, 26–32.

Nickell, G. (1998). The Helping Attitudes Scale. *Paper presented at 106th Annual Convention of the American Psychological Association at San Francisco,* August.

Nisbet, E. K., Zelenski, J. M., & Murphy, S. A. (2009). The nature relatedness scale: Linking individuals' connection with nature to environmental concern and behavior. *Environment and Behavior, 41,* 715–740.

Nisbet, E.K., Zelenski, J.M., & Murphy, S.A. (2011). Happiness is in our nature: exploring nature-relatedness as a contributor to subjective well-being. *Journal of Happiness Studies*, 12, 303–322.

Orellano, A., Valor, C., & Chuvieco, E. (2020). The influence of religion on sustainable consumption: A systematic review and future research agenda. *Sustainability (switzerland)*, 12(19), 1–21.

Oreg, S., & Katz-Gerro, T. (2006). Predicting proenvironmental behavior cross-nationally. *Environment and Behavior*, 38, 462–483.

Oxford Learner's Dictionaries. (n.d.). Nature. In *oxfordlearnersdictionaries.com dictionary.* Retrieved June 21, 2023, from https://www.oxfordlearnersdictionaries.com/definition/english/nature

Oyserman, D. (2009). Identity-based motivation: Implications for action-readiness, procedural-readiness, and consumer behavior. *Journal of Consumer Psychology, 19*, 250–260.

Park, H., Russell, C., & Lee, J. (2007). National culture and environmental sustainability: a cross-national analysis. *Journal of Economics and Finance*, 31, 104–121.

Pauli, G.A. (2010). *The blue economy: 10 years, 100 innovations, 100 million jobs*. Taos: NM, Paradigm Publications.

Pessoa, F., 2020. The Complete Works of Alberto Caeiro: Bilingual Edition. First ed. New York: New Directions.

Podsakoff, P.M., MacKenzie, S.B., Lee, J.Y., & Podsakoff, N.P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88 (5), 87.

Pooley, J. A., & O'Connor, M. (2000). Environmental education and attitudes: Emotions and beliefs are what is needed. *Environment and Behavior*, 32, 711–723.

Poorthuis, M. (2022). Abrahamic religions and the environment: Intimate strangers? In L. Hufnagel (Ed.), *Sustainability, ecology, and religions of the world*. Rijeka: IntechOpen.

Prévot-Julliard, A.-C., Julliard, R., & Clayton, S. (2014). Historical evidence for nature disconnection in a 70-year time series of Disney animated films. *Public Understanding of Science*, 10, 1–9.

Quantz, J.O. (1897). Dendro-psychoses. *American Journal of Psychology*, 9, 449–506.

Reed II, A., Forehand, M.R., Puntoni, S., & Warlop, L. (2012). Identity-based consumer behavior. *International Journal of Research in Marketing, 29*, 310–321.

Richins, M.L. (2004). The material values scale: Measurement properties and development of a short form. *Journal of Consumer Research,* 31(1), 209–19.

Rockefeller, S.C. (1992). Faith and community in an ecological age. In S. C. Rockefeller & J. C. Elder (Eds.), *Spirit and nature: Why the environment is a religious issue* (pp. 139–172). Boston: Beacon.

Rots, A.P., (2017). *Shinto, Nature and Ideology in Contemporary Japan: Making Sacred Forests.* Bloomsbury Publishing, London.

Roszak, T. (1993). *The voice of the earth: An exploration of ecopsychology*. New York: Touchstone.

Saad, G. (2013). Evolutionary Consumption. *Journal of Consumer Psychology*, 23(3), 351–371.

Santos, R.M., Bakhshoodeh, R. (2021). Climate change/global warming/climate emergency versus general climate research: comparative bibliometric trends of publications. *Helyion*, 7(11).

Sarantakos, S. (2013). *Social Research*. 4th Edn, Basingstoke: Palgrave Macmillan.

Searles, H.F. (1960). *The nonhuman environment in normal development and schizophrenia*. New York: International Universities Press.

Schmitt, M., Aknin, L., Axsen, J., & Shwom, R. (2018). Unpacking the relationships between pro-environmental behavior, life satisfaction, and perceived ecological threat. *Ecological Economics*, 143, 130–140.

Schneider, C. R., Zaval, L., & Markowitz, E. M. (2021). Positive emotions and climate change. *Current Opinion in Behavioral Sciences*, 42, 114–120.

Schultz, P. W., & Stone, W. F. (1994). Authoritarianism and attitudes toward the environment. *Environment and Behavior*, 26, 25–37.

Schultz, P. W., Zelezny, L. C., & Dalrymple, N. J. (2000). A multinational perspective on the relation between Judeo–Christian religious beliefs and attitudes of environmental concern. *Environment and Behavior*, 32, 576–591.

Schultz, P. W. (2001). The structure of environmental concern: Concern for self, other people, and the biosphere. *Journal of Environmental Psychology, 21*, 327–339.

Schultz, P. W. (2002). Inclusion with nature: The psychology of human-nature relations. In P. Schmuck & P. W. Schultz (Eds.), *Psychology of sustainable development* (pp. 61-78). Kluwer Academic Publishers.

Schultz, P.W., Shriver, C., Tabanico, J.J., Khazian, A.M. (2004). Implicit connections with nature. *Journal of Environmental Psychology*, 24 (1), 31-42.

Schultz, P. W., & Kaiser, F. G. (2012). Promoting proenvironmental behavior. In S. Clayton (Ed.), *Handbook of environmental and conservation psychology* (pp. 556–580). Oxford University Press.

Schwartz, S. H. (1977). Normative influences on altruism. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 10, pp. 221–279). New York, NY: Academic.

Schwartz, S. H. (1992). Universals in the content and structures of values: Theoretical advances and empirical tests in 20 countries. In M. Zanna (Ed.*), Advances in experimental psychology (*Vol. 25, pp. 1–65). Orlando, FL: Academic Press.

Sreen, N., Purbey, S., & Sadarangani, P. (2018). Impact of culture, behavior and gender on green purchase intention. *Journal of Retailing and Consumer Services*, 41, 177–189.

Schwepker, C. H., & Cornwell, T. B. (1991). An examination of ecologically concerned consumers and their intention to purchase ecologically packaged products. *Journal of Public Policy and Marketing*, 10(2), 77–101.

Sharma, P. (2010). Measuring personal cultural orientations: scale development and validation. *Journal of the Academy of Marketing Science*, 38 (6), 787–806.

Sharp, C. A., Davis, E. B., George, K., Cuthbert, A. D., Zahl, B. P., Davis, D. E., Hook, J. N., & Aten, J. D. (2019). Measures of God representations: Theoretical framework and critical review. *Psychology of Religion and Spirituality*, 13(3), 340–357.

Simmons, I. G. (1993). *Interpreting nature: Cultural constructions of the environment*. New York: Routledge.

Sommer, R. (2003). Trees and human identity. In S. Clayton & S. Opotow (Eds.), I*dentity and the natural environment: The psychological significance of nature* (pp. 179-204). Cambridge, MA: MIT Press.

Soper, K. (1995). *What is nature?* Oxford, UK: Blackwell.

Sponsel L.E., Natadecha-Sponsel P. (2003). Buddhist views of nature and the environment Selin H. (Ed.), *Nature Across Cutures: Views of Nature and the Environment in Non-Western Cultures* (pp. 351-371), London: Kluwer Academic Publishers.

Starik, M., & Kanashiro, P. (2013). Toward a theory of sustainability management: uncovering and integrating the nearly obvious. *Organization and Environment*, 26(1), 7-30.

Stebbins, R.A. (2001). *Exploratory Research in the Social Sciences*. London: Sage.

Steg, L., & De Groot, J. (2012). Environmental values. In S. Clayton (Ed.), *The Oxford handbook of environmental and conservation psychology* (pp. 81–92). Oxford: Oxford University Press.

Stern, P. C. (2000).Toward a coherent theory of environmentally significant behavior. *Journal of Social Issues*, 56, 407–424.

Swearingen, T. C. (1990). Moral development and environmental ethics. *Dissertation Abstracts International*, 50(12-B, Part 1), 5905.

Tam, K.-P. (2013a). Concepts and measures related to connection to nature: Similarities and differences. *Journal of Environmental Psychology, 34*, 64–78.

Tam, K.-P. (2013b). Dispositional empathy with nature. *Journal of Environmental Psychology*, 35, 92-104.

Tangney, J.P., Baumeister, R.F., & Boone, A.L. (2004). High self-control predicts good adjustment, less pathology, better grades, and interpersonal success. *Journal of Personality*, 72, 271–322.

Tobin, V.A. (1988). Mytho-Theology in Ancient Egypt. *Journal of the American Research Center in Egypt*, 25, 169–183.

Thøgersen, J., 2006. Norms for Environmentally Responsible Behaviour: An extended taxonomy. *Journal of Environmental Psychology,* 26 (4), 247–261.

Thøgersen, J., & O¨ lander, F. (2002). Human values and the emergence of a sustainable consumption pattern: A panel study. *Journal of Economic Psychology*, 23, 605–630.

Trudel, R. (2019). Sustainable consumer behavior. *Consumer Psychology Review*, 2(1), 85–96.

Ulrich, R.S., Simons, R.F., Losito, B.D., Fiorito, E., Miles, M.A., & Zelson, M.E. (1991). Stress recovery during exposure to natural and urban environments. *Journal of Environmental Psychology*, 11, 201–230.

Ulrich, R.S. (1993). Biophilia, biophobia, and natural landscapes', in S.R. Kellert and E.O. Wilson (eds.), *The Biophilia Hypothesis* (pp. 73–137). Washington DC: Island Press.

Uren, H. V., Roberts, L. D., Dzidic, P. L., & Leviston, Z. (2021). High-Status Pro-Environmental Behaviors: Costly, Effortful, and Visible. Environment and Behavior, 53(5), 455-484.

Urien, B., & Kilbourne, W. (2011). Generativity and selfenhancement values in eco-friendly behavioral intentions and environmentally responsible consumption behavior. *Psychology and Marketing*, 28, 69–90.

Velde, H. te. (1980). A Few Remarks upon the Religious Significance of Animals in Ancient Egypt. *Numen*, 27(1), 76–82.

Vess, M., Arndt, J., and Cox, C. R. (2012). Faith and nature: the effect of death-relevant cognitions on the relationship Between religious fundamentalism and connectedness to nature. *Social Psychological and Personality Science*, 3, 333–340.

Wall, D. (1994). *Green history: A reader in environmental literature, philosophy and politics.* New York: Routledge.

Wang, B., & Udall, A.M. (2003). Sustainable Consumer Behaviors: The Effects of Identity, Environment Value and Marketing Promotion. *Sustainability*, 15, 1129.

Wang, J., Wang, J., & Gao, J. (2020). Effect of Green Consumption Value on Consumption Intention in a Pro-Environmental Setting: The Mediating Role of Approach and Avoidance Motivation. *SAGE Open*, 10(1).

Whitburn, J., Linklater, W., & Abrahamse, W. (2020). Meta-analysis of human connection to nature and proenvironmental behavior. *Conservation Biology, 34,* 180-193.

White, M.P., Alcock, I., Wheeler, B.W., & Depledge, M.H. (2013b). Would you be happier living in a greener urban area?: a fixed effects analysis of panel data. *Psychological Science,* 24, 920–928.

White, M.P., Pahl, S., Wheeler, B.W., Depledge, M.H., & Fleming, L.E. (2017). Natural environments and subjective wellbeing: Different types of exposure are associated with different aspects of wellbeing. *Health & place*, 45, 77–84.

Whitmarsh, L., & O'Neill, S. (2010). Green identity, green living? The role of pro-environmental self-identity in determining consistency across diverse pro-environmental behaviours. *Journal of Environmental Psychology*, 30 (3), 305–314.

Williams, A., Kennedy, S., Philipp, F., & Whiteman, G. (2017). Systems thinking: a review of sustainability management research. *Journal of Cleaner Production*, 148, 866–881.

Wilson, E. O. (1984). *Biophilia*. Cambridge: Harvard University Press.

Wilson, E.O. (1993). Biophilia and the conservation ethic, in S.R. Kellert and E.O. Wilson (eds.), *The Biophilia Hypothesis* (pp. 31–41). Washington DC: Island Press.

Wiman, I.M.B. (1990). Expecting the Unexpected: Some Ancient Roots to Current Perceptions of Nature. *Ambio*, 19, 62–69.

Worthington, E.L., Jr., Wade, N.G., Hight, T.L., Ripley, J.S., McCullough, M.E., Berry, J. W., Schmitt, M.M., Berry, J.T., Bursley, K.H., & Conner, L. (2012). The Religious Commitment Inventory-10 (RCI-10). *Measurement Instrument Database for the Social Science.* Retrieved from www.midss.ie

WWF (2019). Exploiting the ecosystem also threatens human lives. For a living planet: wwf.org, https://www.commarts.com/exhibit/wwf-print-campaign

Yaros, J., (n/d). *Nature And The Self: Dickinson, Bishop, Plath, And Oliver*. [Online] Available Online at: https://www.valpo.edu/vpr/yarosessaynature.html

Zhang, J. (1993). Environmental hazards in the Chinese public's eyes. Risk Analysis, 13, 509–513.

Zhang, J.W., Howell, R.T., & Iyer, R. (2014). Engagement with natural beauty moderates the positive relation between connectedness with nature and psychological well-being. *Journal of Environmental Psychology*, 38, 55–63.

Zimbardo, P.G., & Boyd, J.N. (1999). Putting time in perspective: A valid, reliable individual-differences metric. *Journal of Personality and Social Psychology*, 77, 1271−1288.

Zimbardo, P.G., & Boyd, J.N. (2008). *The time paradox: the new psychology of time that will change your life.* New York. NY: Free Press.

Appendix

Table A1. Description of the scales used in all studies

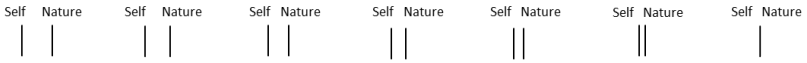
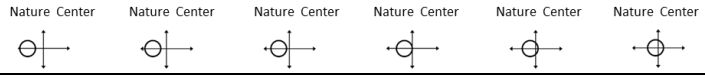
Measure	Items	Response format	Cronbach's alpha and descriptives statistics
Self-constructed (adapted from Lorenzoni et al., 2006)	1. "Please write down all the words that come to your mind when you think about 'NATURE'. Use one box per word and use up as many boxes as you can/like". 2. "Please evaluate the words that came to your mind when you thought about the concept of 'NATURE' on a scale from highly negative to highly positive." 3. "Please recall your exact thoughts when you wrote down each of your words related to 'NATURE'. Please sort those thoughts into the categories given below." Please choose the categories that fit best to each of your words.	Boxes (10 boxes maximum) 1 (Highly negative) – 4 (neutral) – 7 (Highly positive) Categories: My perceptions and feelings, My activities, Sky, Earth, Animals, Humans, Water, Trees and plants, Well-being, Spiritual aspects, High power	
EINS scale (Martin & Czellar, 2016)	1. "Please choose the picture below that best describes your relationship with the natural environment."  2. "Please choose the picture below that best describes nature when you think of your relationship with the natural environment."  3. "Please choose the picture below that best describes your relationship with the natural environment."  4. "Please choose the picture below that best describes your relationship with the natural environment." 	1 (distant) – 7 (close) graphical response options illustrating the relationship of the self with nature.	Study 1: α = .80; *M* = 4.96; *SD* = 1.47 Study 2: α = .91; *M* = 4.78; *SD* = 1.22 Study 3: α = .86; *M* = 4.84; *SD* = 1.23 Study 4: α = .90; *M* = 4.81; *SD* = 1.24

Table A2. Description of the scales used in Study 1

Measure	Items	Response format	Cronbach's alpha
Green consumption values scale (Haws et al., 2014)	"Please evaluate the following statements." 1. It is important to me that the products I use do not harm the environment. 2. I consider the potential environmental impact of my actions when making many of my decisions. 3. My purchase habits are affected by my concern for our environment. 4. I am concerned about wasting the resources of our planet. 5. I would describe myself as environmentally responsible. 6. I am willing to be inconvenienced in order to take actions that are more environmentally friendly.	1 (not at all) – 7 (very much)	α = .88 *M* = 5.08; *SD* = 1.06
Engagement in proenvironmental behaviors (Tam, 2013)	"Please evaluate how frequently you perform the following behaviors in daily life." 1. Looking for ways to reuse things. 2. Recycling things (e.g., papers, cans, bottles). 3. Encouraging friends or family to recycle. 4. Purchasing products in reusable containers. 5. Writing a letter to public authorities to support an environmental issue. 6. Volunteering time to help an environmentalist group. 7. Buying environmentally friendly products even if they may not work as well as competing products. 8. Purchasing something made of recycled materials even though it is more expensive. 9. Buying products only from companies that have a strong record of protecting the environment. 10. Contacting public authorities to complain about environmental problems.	1 (never) – 7 (very often)	α = .82 *M* = 4.07; *SD* = .92

	11. Taking a shorter shower to conserve water. 12. Using energy-efficient household devices such as light bulbs.		
Pro-social behaviors (Nickell, 1998)	"Please indicate how much each of the statements represents you." 1. Helping others is usually a waste of time. 2. If possible, I would return lost money to the rightful owner. 3. Helping friends and family is one of the great joys in life. 4. Volunteering to help someone is very rewarding. 5. I dislike giving directions to strangers who are lost. 6. I donate time or money to charities every month. 7. Unless they are part of my family, helping the elderly isn't my responsibility. 8. If the person in front of me in the check-out line at a store was a few cents short, I would pay the difference. 9. I feel proud when I know that my generosity has benefited a needy person. 10. Helping people does more harm than good because they come to rely on others and not themselves.	1 (Definitely does not apply to me) – 7 (Definitely applies to me)	α = .75 *M* = 5.09; *SD* = .62
List of values (LOV) (Homer & Kahle, 1988)	"The following is a list of things that some people look for or want out of life. Please study the list carefully and then rate each thing on how important it is in your daily life, where 1 = very unimportant, and 7 = very important." 1. Sense of belonging 2. Excitement 3. Warm relationships with others 4. Self-fulfillment 5. Being well respected 6. Fun and enjoyment of life 7. Security 8. Self-respect 9. A sense of accomplishment	1 (very unimportant) – 7 (very important)	LOV_interpersonal: α = .93 M = 5.59; SD = .81 LOV_apersonal: α = .74 M = 6.25; SD = .81 LOV_personal: α = .64 M = 6.05; SD = .65

Personal sense of power (Dubois et al., 2015)	"Please answer the following questions as accurately as possible using the following scale". 1. I can get people to listen to what I say. 2. My wishes don't carry much weight. 3. I can get others to do what I want. 4. Even if I voice them, my views have little sway. 5. I think I have a great deal of power. 6. My ideas and opinions are often ignored. 7. Even when I try, I am not able to get my way. 8. If I want to, I get to make the decisions.	1 (strongly disagree) – 7 (strongly agree)	α = .83 *M* = 4.85; *SD* = .89
Status consumption (Eastman et al., 1999)	"Please answer the following questions as accurately as possible using the following scale". 1. I would buy a product just because it has status. 2. I am interested in new products with status. 3. I would pay more for a product if it had status. 4. The status of a product is irrelevant to me. 5. A product is more valuable to me if it has some snob appeal.	1 (strongly disagree) – 7 (strongly agree)	α = .89 *M* = 3.15; *SD* = 1.46
Material values (Richins, 2004)	"Please evaluate the following statements." 1. My life would be better if I own certain things I don't have. 2. The things I own say a lot about how well I'm doing. 3. I'd be happier if I could afford to buy more things. 4. It bothers me that I can't afford to buy things I'd like. 5. Buying things gives me a lot of pleasure. 6. I admire people who own expensive homes, cars, clothes. 7. I like to own things that impress people. 8. I like a lot of luxury in my life. 9. I try to keep my life simple, as far as possessions are concerned.	1 (strongly disagree) – 7 (strongly agree)	α = .85 *M* = 3.47; *SD* = 1.20
New Ecological Paradigm (Dunlap et al., 2000)	"Listed below are statements about the relationship between humans and the environment. For each statement please indicate the extent to which you agree or disagree."	1 (strongly disagree) – 7 (strongly agree)	α = .72 *M* = 5.08; *SD* = .63

	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 unlivable. 5. Humans are seriously 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.		
The Self-Monitoring Scale (Lennox and Wolfe, 1984)	"Please indicate your level of agreement about the following statements about your attitudes, feelings and behaviors in everyday life". 1. I have not always been honest with myself. 2. I always know why I like things. 3. It is hard for me to shut off a disturbing thought. 4. I never regret my decisions. 5. I sometimes lose out on things because I can't make up my mind soon enough. 6. I am a completely rational person.	1 (strongly disagree) – 7 (strongly agree)	α = .83 *M* = 4.93; *SD* = .81

	7. I am very confident in my judgements. 8. I have sometimes doubted my ability as a lover. 9. I sometimes tell lies if I have to. 10. I never cover up my mistakes. 11. There have been occasions when I have taken advantage of someone. 12. I sometimes try to get even rather than forgive and forget. 13. I have said something bad about a friend behind his or her back. 14. When I hear people talking privately, I avoid listening. 15. I never take things that don't belong to me. 16. I don't gossip about other people's business.		
Satisfaction with life (Diener et al., 1985).	"Please evaluate the following statements." 1. In most ways my life is close to my ideal. 2. The conditions of my life are excellent. 3. I am satisfied with my life. 4. So far I have gotten the important things I want in life. 5. If I could live my life over, I would change almost nothing.	1 (strongly disagree) – 7 (strongly agree)	α = .84 *M* = 4.99; *SD* = 1.21
Egoistic, altruistic, and biospheric values (De Groot & Steg, 2007a)	"In the following, please rate the importance of each value "AS A GUIDING PRINCIPLE IN YOUR LIFE". Try to use the entire scale when rating the items. That is, some of your answers will likely be at the lower end of the scale, some will be in the middle, and others will be at the higher end of the scale. 1. Social power (control over others, dominance) 2. Wealth (material possessions, money) 3. Authority (the right to lead or command) 4. Influential (having an impact on people and events) 5. Ambitious (hard-working, aspiring) 6. Equality (equal opportunity for all) 7. A world at peace (free of war and conflict) 8. Social justice (correcting injustice, care for the weak) 9. Helpful (working for the welfare of others) 10. Preventing pollution (protecting natural resources)	-1 (opposed to my values) / 0 (not important) – 7 (extremely important)	Egoisitic_value α = .77 *M* = 3.77; *SD* = 1.39 altruistic_value α = .79 *M* = 5.83; *SD* = 1.22 biospheric_value α = .90 *M* = 5.32; *SD* = 1.47

	11. Respecting the earth (harmony with other species) 12. Unity with nature (fitting into nature) 13. Protecting the environment (preserving nature)		

Table A3. Description of the scales used in Study 2

Agency/communion traits (Bakan, 1966)	"Below are 12 values. Please tell us to what extent you would consider each value as a guiding principle if you were to take an important decision right now." 1. COMPETENCE (displaying mastery, being capable, effective) 2. FORGIVENESS (pardoning others' faults, being merciful) 3. ACHIEVEMENT (reaching lofty goals) 4. ALTRUISM (helping others in need) 5. LOYALTY (being faithful to friends, family, and group) 6. POWER (control over others, dominance) 7. HONESTY (being genuine, sincere) 8. STATUS (high rank, wide respect) 9. COMPASSION (caring for others, displaying kindness) 10. RECOGNITION (becoming notable, famous, or admired) 11. SUPERIORITY (defeating the competition, standing on top) 12. CIVILITY (being considerate and respectful toward others)	1 (not at all) – 7 (very much)	Agency_trait: α = .77 *M* = 4.40; *SD* = 1.12 Communion_trait: α = .71 *M* = 5.72; *SD* = .81
Moral foundations (Graham et al., 2011)	"Part 1. When you decide whether something is right or wrong, to what extent are the following considerations relevant to your thinking? Please rate each statement using this scale:" 1. Whether or not someone suffered emotionally 2. Whether or not some people were treated differently than others 3. Whether or not someone's action showed love for his or her country 4. Whether or not someone showed a lack of respect for authority 5. Whether or not someone violated standards of purity and decency 6. Whether or not someone was good at math 7. Whether or not someone cared for someone weak or vulnerable 8. Whether or not someone acted unfairly 9. Whether or not someone did something to betray his or her group 10. Whether or not someone conformed to the traditions of society 11. Whether or not someone did something disgusting	1 (not at all relevant) – 7 (extremely relevant)	MF_Harm/Care α = .74 *M* = 5.40; *SD* = .86 MF_Fairness/Reciprocit α = .72 *M* = 5.53; *SD* = .74 MF_Ingroup/Loyalty α = .72 *M* = 4.45; *SD* = .90

	12. Whether or not someone was cruel 13. Whether or not someone was denied his or her rights 14. Whether or not someone showed a lack of loyalty 15. Whether or not an action caused chaos or disorder 16. Whether or not someone acted in a way that God would approve of "Part 2. Please read the following sentences and indicate your agreement or disagreement:" 17. Compassion for those who are suffering is the most crucial virtue. 18. When the government makes laws, the number one principle should be ensuring that everyone is treated fairly. 19. I am proud of my country's history. 20. Respect for authority is something all children need to learn. 21. People should not do things that are disgusting, even if no one is harmed. 22. It is better to do good than to do bad. 23. One of the worst things a person could do is hurt a defenseless animal. 24. Justice is the most important requirement for a society. 25. People should be loyal to their family members, even when they have done something wrong. 26. Men and women each have different roles to play in society. 27. I would call some acts wrong on the grounds that they are unnatural. 28. It can never be right to kill a human being. 29. I think it's morally wrong that rich children inherit a lot of money while poor children inherit nothing. 30. It is more important to be a team player than to express oneself. 31. If I were a soldier and disagreed with my commanding officer's orders, I would obey anyway because that is my duty. 32. Chastity is an important and valuable virtue.	1 (strongly disagree) – 7 (strongly agree)	MF_Authority/Respect α = .75 *M* = 3.92; *SD* = .97 MF_Purity/Sanctity α = .68 *M* = 3.49; *SD* = 1.09
Tanscendental time perspective	"Please answer the following questions about yourself."	1 (very uncharacteristic) – 7 (very characteristic)	α = .91

(Zimbardo & Boyd, 2008)	1. Only my physical body will ever die. 2. My body is just a temporary home for the real me. 3. Death is just a new beginning. 4. I believe in miracles. 5. The theory of evolution adequately explains how humans came to be. 6. Humans possess a soul. 7. Scientific laws cannot explain everything. 8. I will be held accountable for my actions on earth when I die. 9. There are divine laws by which humans should live. 10. I believe in spirits.		*M* = 3.55; *SD* = 1.58
Big five personality trait (Gosling et al.,2003)	"Here are a number of personality traits that may or may not apply to you. Please indicate the extent to which you agree or disagree with each statement below. You should rate the extent to which the pair of traits applies to you, even if one characteristic applies more strongly than the other." 1. Extraverted, enthusiastic. 2. Critical, quarrelsome. 3. Dependable, self-disciplined. 4. Anxious, easily upset. 5. Open to new experiences, complex. 6. Reserved, quiet. 7. Sympathetic, warm. 8. Disorganized, careless. 9. Calm, emotionally stable. 10. Conventional, uncreative.	1 (Disagree strongly), 2 (Disagree moderately), 3 (Disagree a little), 4 (Neither agree nor disagree), 5 (Agree a little), 6 (Agree moderately), 7 (Agree strongly)	BF_Extraversion α = .68 *M* = 4.49; *SD* = 1.54 BF_Agreableness α = .72 *M* = 4.45; *SD* = 1.05 BF_Conscientiousness α = .84 *M* = 4.80; *SD* = 1.41 BF_Emotional_stability α = .72 *M* = 4.18; *SD* = 1.52 BF_Emotional_stability α = .73 *M* = 5.42; *SD* = 1.04
Self-control measure (Tangney et al., 2004)	"The following questions pertain to how you think and feel about yourself in this specific moment. Please be as honest and spontaneous as you can." 1. Right now, I feel I have a hard time breaking bad habits. 2. Right now, I get distracted easily. 3. In this moment, I feel I could say inappropriate things.	1 (definitely does not apply to me) – 7 (definitely applies to me)	α = .83 *M* = 4.15; *SD* = 1.16

	4. Right now, I could refuse things that are bad for me, even if they are fun. 5. Right now, I'm good at resisting temptation. 6. In this moment, people would say that I have very strong self-discipline. 7. Right now, pleasure and fun would keep me from getting work done. 8. Right now, I could do things that feel good in the moment but regret later on. 9. I feel I can't stop myself from doing something, even if I know it's wrong. 10. Right now, I could act without thinking through all the alternatives.		
Religious Commitment (Worthington et al., 2012)	"On the following pages, we present several statements regarding various topics. For each statement, please choose the option that best describes your views." 1. I often read books and magazines about my faith. 2. I make financial contributions to my religious organization. 3. I spend time trying to grow in understanding of my faith. 4. Religion is especially important to me because it answers many questions about the meaning of life. 5. My religious beliefs lie behind my whole approach to life. 6. I enjoy spending time with others of my religious affiliation. 7. Religious beliefs influence all my dealings in life. 8. It is important to me to spend periods of time in private religious thought and reflection. 9. I enjoy working in the activities of my religious organization. 10. I keep well informed about my local religious group and have some influence in its decisions.	1 (not at all true for me) – 7 (totally true for me)	α = .92 *M* = 2.14; *SD* = 1.31

Table A4. Description of the scales used in Study 3

Zimbardo Time Perspectives Inventory (ZTPI; Zimbardo and Boyd 1999)	"Please read each item and, as honestly as you can, answer the question: "How characteristic or true is this of you?"" 1. I believe that getting together with one's friends to party is one of life's important pleasures. 2. Familiar childhood sights, sounds, smells often bring back a flood of wonderful memories. 3. Fate determines much in my life. 4. I often think of what I should have done differently in my life. 5. My decisions are mostly influenced by people and things around me. 6. I believe that a person's day should be planned ahead each morning. 7. It gives me pleasure to think about my past. 8. I do things impulsively. 9. If things don't get done on time, I don't worry about it. 10. When I want to achieve something, I set goals and consider specific means for reaching those goals. 11. On balance, there is much more good to recall than bad in my past. 12. When listening to my favorite music, I often lose all track of time. 13. Meeting tomorrow's deadlines and doing other necessary work comes before tonight's play. 14. Since whatever will be will be, it doesn't really matter what I do. 15. I enjoy stories about how things used to be in the "good old times." 16. Painful past experiences keep being replayed in my mind. 17. I try to live my life as fully as possible, one day at a time. 18. It upsets me to be late for appointments. 19. Ideally, I would live each day as if it were my last. 20. Happy memories of good times spring readily to mind. 21. I meet my obligations to friends and authorities on time. 22. I've taken my share of abuse and rejection in the past.	1 (very untrue) – 7 (very true)	TP_Past_Positive α = .83 *M* = 5.33; *SD* = .85 TP_Past_Negative α = .87 *M* = 4.35; *SD* = 1.15 TP_Present_Hedonistic α = .84 *M* = 4.33; *SD* = .87 TP_Present_Fatalistic α = .80 *M* = 3.83; *SD* = 1.00 TP_Future α = .76 *M* = 4.73; *SD* = .76

	23. I make decisions on the spur of the moment. 24. I take each day as it is rather than try to plan it out. 25. The past has too many unpleasant memories that I prefer not to think about. 26. It is important to put excitement in my life. 27. I've made mistakes in the past that I wish I could undo. 28. I feel that it's more important to enjoy what you're doing than to get work done on time. 29. I get nostalgic about my childhood. 30. Before making a decision, I weigh the costs against the benefits. 31. Taking risks keeps my life from becoming boring. 32. It is more important for me to enjoy life's journey than to focus only on the destination. 33. Things rarely work out as I expected. 34. It's hard for me to forget unpleasant images of my youth. 35. It takes joy out of the process and flow of my activities, if I have to think about goals, outcomes, and products. 36. Even when I am enjoying the present, I am drawn back to comparisons with similar past experiences. 37. You can't really plan for the future because things change so much. 38. My life path is controlled by forces I cannot influence. 39. It doesn't make sense to worry about the future, since there is nothing that I can do about it anyway. 40. I complete projects on time by making steady progress. 41. I find myself tuning out when family members talk about the way things used to be. 42. I take risks to put excitement in my life. 43. I make lists of things to do. 44. I often follow my heart more than my head. 45. I am able to resist temptations when I know that there is work to be done. 46. I find myself getting swept up in the excitement of the moment. 47. Life today is too complicated; I would prefer the simpler life of the past. 48. I prefer friends who are spontaneous rather than predictable. 49. I like family rituals and traditions that are regularly repeated.		

	50. I think about the bad things that have happened to me in the past. 51. I keep working at difficult, uninteresting tasks if they will help me get ahead. 52. Spending what I earn on pleasures today is better than saving for tomorrow's security. 53. Often luck pays off better than hard work. 54. I think about the good things that I have missed out on in my life. 55. I like my close relationships to be passionate. 56. There will always be time to catch up on my work.		
Divine Nature scale (self-constructed based on Flint & Rea, 2009)	"To what extent do you associate NATURE with one of the following:" 1. Self-sufficiency 2. Omniscience 3. Eternity 4. Omnipresence 5. Omnipotence 6. Moral perfection	1 (very much dissociated), 2 (dissociated), 3 (somewhat dissociated), 4 (neutral), 5 (somewhat associated), 6 (associated), 7 (very much associated)	α = .84 *M* = 4.76; *SD* = 1.17
Balanced Inventory of Desirable Responding Short Form (Hart et al., 2015)	"Please indicate your level of agreement about the following statements about your attitudes, feelings and behaviors in everyday life." 1. I have not always been honest with myself. 2. I always know why I like things. 3. It is hard for me to shut off a disturbing thought. 4. I never regret my decisions. 5. I sometimes lose out on things because I can't make up my mind soon enough. 6. I am a completely rational person. 7. I am very confident in my judgements. 8. I have sometimes doubted my ability as a lover. 9. I sometimes tell lies if I have to. 10. I never cover up my mistakes. 11. There have been occasions when I have taken advantage of someone. 12. I sometimes try to get even rather than forgive and forget.	1 (strongly disagree) – 7 (strongly agree)	α = .72 *M* = 4.06; *SD* = .38

	13. I have said something bad about a friend behind his or her back. 14. When I hear people talking privately, I avoid listening. 15. I never take things that don't belong to me. 16. I don't gossip about other people's business.		
Power Nature (self-constructed)	"What is your perception about nature in general?" 1. I feel that the people in my country have power over nature. 2. I feel that the people in my area have power over nature. 3. I feel that I have power over nature. 4. I feel that nature has power over the people in my country. 5. I feel that nature has power over the people in my area. 6. I feel that nature has power over me. 7. I feel that nature has the same power as the people in my country. 8. I feel that nature has the same power as the people of my area. 9. I feel that nature has the same power as me.	1 (not at all) – 7 (very much)	Power_Nature α = .90 *M* = 4.99; *SD* = 1.51 Power_People α = .90 *M* = 3.78; *SD* = 1.67 Power_Same α = .93 *M* = 3.30; *SD* = 1.67

Table A5. Description of the scales used in Study 4

Personal cultural orientations (Sharma, 2010)	Independence (IND) 1. I would rather depend on myself than others 2. My personal identity, independent of others, is important to me 3. I rely on myself most of the time, rarely on others 4. It is important that I do my job better than others 5. I enjoy being unique and different from others in many respects 6. I often do 'my own thing' Interdependence (INT) 7. The well-being of my group members is important for me 8. I feel good when I cooperate with my group members 9. It is my duty to take care of my family members, whatever it takes 10. Family members should stick together, even if they do not agree 11. I enjoy spending time with my group members 12. Children must respect the decisions made by their parents	1 (strongly disagree) – 7 (strongly agree)	PC_IND α = .79 *M* = 5.53; *SD* = 1.07 PC_INT α = .66 *M* = 5.44; *SD* = .91 PC_POW α = .81 *M* = 3.94; *SD* = 1.28 PC_IEQ

	Power (POW) 13. I easily conform to the wishes of someone in a higher position than mine 14. It is difficult for me to refuse a request if someone senior asks me 15. I tend to follow orders without asking any questions 16. I find it hard to disagree with authority figures 17. People in higher positions have more power those in lower positions Social Inequality (IEQ) 18. A person's social status reflects his or her place in the society 19. It is important for everyone to know their rightful place in the society 20. It is difficult to interact with people from different social status than mine 21. Unequal treatment for different people is an acceptable way of life for me 22. I believe some people have an advantage over others in every society Risk Aversion (RSK) 23. I tend to avoid talking to strangers 24. I prefer a routine way of life to an unpredictable one full of change 25. I would not describe myself as a risk-taker 26. I do not like taking too many chances to avoid making a mistake 27. I am very cautious about how I spend my money 28. I am seldom the first person to try anything new Ambiguity Intolerance (AMB) 29. I find it difficult to function without clear directions and instructions 30. I prefer specific instructions to broad guidelines 31. I tend to get anxious easily when I don't know an outcome 32. I feel stressful when I cannot predict consequences 33. I feel safe when I am in my familiar surroundings 34. I get confused easily when dealing with complex problems Masculinity (MAS) 35 Women are generally more caring than men 36. Men are generally physically stronger than women		α = .67 *M* = 3.41; *SD* = 1.25 PC_RSK α = .79 *M* = 4.54; *SD* = 1.29 PC_AMB α = .78 *M* = 4.51; *SD* = 1.25 PC_AMB α = .78 *M* = 4.51; *SD* = 1.25 PC_MAS α = .71 *M* = 4.49; *SD* = 1.02 PC_GEQ α = .83 *M* = 6.14; *SD* = .95 PC_TRD α = .89 *M* = 5.06; *SD* = 1.39 PC_PRU α = .81 *M* = 5.43; *SD* = 1.07

	37. Men are generally more ambitious than women 38. Women are generally more modest than men 39. Men are generally more logical than women 40. Men are generally more aggressive than women Gender Equality (GEQ) 35. It is ok for men to be emotional sometimes 36. Men do not have to be the sole bread winner in a family 37. Men can be as caring as women 38. Women can be as as ambitious as men 39. Men and women can be equally aggressive 40. There is nothing that men can do but women can not Tradition (TRD) 47. I am proud of my culture 48. Respect for tradition is important for me 49. I value a strong link to my past 50. Traditional values are important for me 51. I care a lot about my family history 52. I always protect my family heritage Prudence (PRU) 53. I believe in planning for the long term 54. I work hard for success in the future 55. I am willing to give up today's fun for success in the future 56. I do not give up easily even if I do not succeed on my first attempt 57. I plan everything carefully 58. I consider many alternatives before making any decision Consumer Ethnocentrism (CET) 59. We should not buy foreign products, because it hurts our economy 60. Only products that are unavailable in our country should be imported 61. Purchasing foreign products allows other countries to get rich off of us 62. It may cost me in the long run but I support my own country's products		PC_CET α = .82 *M* = 4.02; *SD* = 1.27 PC_CIN α = .87 *M* = 4.07; *SD* = 1.30

	Consumer Innovativeness (CIN) 63. I am more interested in buying new than known products 64. I like to buy new and different products 65. I am usually among the first to try new products 66. I know more than others about latest new products		

Table A6. Summary of EFA results (Study 1, Study 2, Study 3, Study 4)

	Study 1 Factor Loadings		Study 2 Factor Loadings			Study 3 Factor Loadings			Study 4 Factor Loadings		
Item	*1*	*2*	*1*	*2*	*3*	*1*	*2*	*3*	*1*	*2*	*3*
My perceptions	.42	.71		.44			.70	.42		.69	
My activities		.60		.86			.49			.77	.46
Sky	.83		.70		.54	.83			.51		
Earth	.81		.69			.88					
Animals	.86		.86			.58			.89		
Humans	.63	.59	.53			.69			.72	.43	
Water	.89		.73			.77			.86		
Trees and plants	.87		.76			.84			.78		
Well-being		.50			.52			.80			.69
Spiritual aspects		.85			.49			.90			.73
High power		.67			.90			.83			.70

Note. Coefficients with absolute values above .4 are displayed to facilitate interpretation.

Table A7. Correlation table, types of nature-related associations (Study 1)

Correlations

		perceptions	activities	sky	earth	animals	humans	water	trees	wellbeing	spiritual	highpower
perceptions	Pearson Correlation	1	,268*	,454**	,368**	,421**	,327**	,367**	,336**	,446**	,534**	,458**
	Sig. (2-tailed)		,010	<,001	<,001	<,001	,001	<,001	<,001	<,001	<,001	<,001
	N	159	91	98	142	141	94	128	156	137	115	78
activities	Pearson Correlation	,268*	1	,218	,228*	,306**	,398**	,206	,231*	,305**	,401**	,361**
	Sig. (2-tailed)	,010		,065	,029	,003	<,001	,055	,020	,003	<,001	,004
	N	91	104	72	92	90	70	87	102	91	74	61
sky	Pearson Correlation	,454**	,218	1	,611**	,682**	,601**	,618**	,560**	,511**	,441**	,341**
	Sig. (2-tailed)	<,001	,065		<,001	<,001	<,001	<,001	<,001	<,001	<,001	,006
	N	98	72	126	117	115	80	107	125	111	88	64
earth	Pearson Correlation	,368**	,228*	,611**	1	,510**	,496**	,603**	,574**	,390**	,368**	,308**
	Sig. (2-tailed)	<,001	,029	<,001		<,001	<,001	<,001	<,001	<,001	<,001	,004
	N	142	92	117	182	158	107	150	178	149	119	84
animals	Pearson Correlation	,421**	,306**	,682**	,510**	1	,721**	,709**	,586**	,447**	,324**	,188
	Sig. (2-tailed)	<,001	,003	<,001	<,001		<,001	<,001	<,001	<,001	<,001	,088
	N	141	90	115	158	181	102	143	179	147	121	83
humans	Pearson Correlation	,327**	,398**	,601**	,496**	,721**	1	,521**	,565**	,433**	,479**	,346**
	Sig. (2-tailed)	,001	<,001	<,001	<,001	<,001		<,001	<,001	<,001	<,001	,005
	N	94	70	80	107	102	116	98	114	101	85	65
water	Pearson Correlation	,367**	,206	,618**	,603**	,709**	,521**	1	,587**	,440**	,327**	,239*
	Sig. (2-tailed)	<,001	,055	<,001	<,001	<,001	<,001		<,001	<,001	<,001	,035
	N	128	87	107	150	143	98	164	161	133	105	78
trees	Pearson Correlation	,336**	,231*	,560**	,574**	,586**	,565**	,587**	1	,358**	,361**	,203
	Sig. (2-tailed)	<,001	,020	<,001	<,001	<,001	<,001	<,001		<,001	<,001	,055
	N	156	102	125	178	179	114	161	205	166	132	90
wellbeing	Pearson Correlation	,446**	,305**	,511**	,390**	,447**	,433**	,440**	,358**	1	,514**	,371**
	Sig. (2-tailed)	<,001	,003	<,001	<,001	<,001	<,001	<,001	<,001		<,001	<,001
	N	137	91	111	149	147	101	133	166	169	125	80
spiritual	Pearson Correlation	,534**	,401**	,441**	,368**	,324**	,479**	,327**	,361**	,514**	1	,702**
	Sig. (2-tailed)	<,001	<,001	<,001	<,001	<,001	<,001	<,001	<,001	<,001		<,001
	N	115	74	88	119	121	85	105	132	125	134	77
highpower	Pearson Correlation	,458**	,361**	,341**	,308**	,188	,346**	,239*	,203	,371**	,702**	1
	Sig. (2-tailed)	<,001	,004	,006	,004	,088	,005	,035	,055	<,001	<,001	
	N	78	61	64	84	83	65	78	90	80	77	93

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Table A8. Correlation table, types of nature-related associations (Study 2)

Correlations

		perceptions	activities	sky	earth	animals	humans	water	trees	wellbeing	spiritual	highpower
perceptions	Pearson Correlation	1	,228*	,338**	,236**	,317**	,170	,354**	,309**	,305**	,408**	,335**
	Sig. (2-tailed)		,019	<,001	,003	<,001	,056	<,001	<,001	<,001	<,001	,002
	N	174	105	119	158	151	127	137	162	147	105	85
activities	Pearson Correlation	,228*	1	,268*	,203*	,211*	,235*	,185	,227*	,241*	,136	,075
	Sig. (2-tailed)	,019		,015	,033	,031	,025	,078	,017	,017	,269	,580
	N	105	117	82	111	105	91	92	109	97	68	57
sky	Pearson Correlation	,338**	,268*	1	,490**	,565**	,419**	,728**	,535**	,318**	,146	-,048
	Sig. (2-tailed)	<,001	,015		<,001	<,001	<,001	<,001	<,001	<,001	,179	,700
	N	119	82	136	128	122	102	122	132	117	86	68
earth	Pearson Correlation	,236**	,203*	,490**	1	,616**	,464**	,617**	,543**	,220**	,167	,273*
	Sig. (2-tailed)	,003	,033	<,001		<,001	<,001	<,001	<,001	,007	,082	,012
	N	158	111	128	184	163	139	146	171	147	109	85
animals	Pearson Correlation	,317**	,211*	,565**	,616**	1	,677**	,670**	,679**	,118	,140	,207
	Sig. (2-tailed)	<,001	,031	<,001	<,001		<,001	<,001	<,001	,160	,161	,063
	N	151	105	122	163	176	135	142	164	144	101	82
humans	Pearson Correlation	,170	,235*	,419**	,464**	,677**	1	,544**	,586**	,096	,045	,199
	Sig. (2-tailed)	,056	,025	<,001	<,001	<,001		<,001	<,001	,303	,673	,104
	N	127	91	102	139	135	148	118	136	117	90	68
water	Pearson Correlation	,354**	,185	,728**	,617**	,670**	,544**	1	,670**	,252**	,248*	,073
	Sig. (2-tailed)	<,001	,078	<,001	<,001	<,001	<,001		<,001	,004	,017	,523
	N	137	92	122	146	142	118	157	151	128	92	78
trees	Pearson Correlation	,309**	,227*	,535**	,543**	,679**	,586**	,670**	1	,165*	,043	,183
	Sig. (2-tailed)	<,001	,017	<,001	<,001	<,001	<,001	<,001		,042	,656	,090
	N	162	109	132	171	164	136	151	191	153	110	87
wellbeing	Pearson Correlation	,305**	,241*	,318**	,220**	,118	,096	,252**	,165*	1	,219*	,195
	Sig. (2-tailed)	<,001	,017	<,001	,007	,160	,303	,004	,042		,029	,077
	N	147	97	117	147	144	117	128	153	161	100	83
spiritual	Pearson Correlation	,408**	,136	,146	,167	,140	,045	,248*	,043	,219*	1	,312**
	Sig. (2-tailed)	<,001	,269	,179	,082	,161	,673	,017	,656	,029		,010
	N	105	68	86	109	101	90	92	110	100	117	68
highpower	Pearson Correlation	,335**	,075	-,048	,273*	,207	,199	,073	,183	,195	,312**	1
	Sig. (2-tailed)	,002	,580	,700	,012	,063	,104	,523	,090	,077	,010	
	N	85	57	68	85	82	68	78	87	83	68	91

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Table A9. Correlation table, types of nature-related associations (Study 3)

Correlations

		perceptions	activities	sky	earth	animals	humans	water	trees	wellbeing	spiritual	highpower
perceptions	Pearson Correlation	1	,465**	,255**	,377**	,204*	,237*	,196*	,125	,460**	,522**	,489**
	Sig. (2-tailed)		<,001	,005	<,001	,015	,043	,025	,115	<,001	<,001	<,001
	N	170	100	117	145	142	73	131	161	118	101	83
activities	Pearson Correlation	,465**	1	,352**	,323**	,248**	,575**	,476**	,335**	,513**	,499**	,568**
	Sig. (2-tailed)	<,001		<,001	<,001	,007	<,001	<,001	<,001	<,001	<,001	<,001
	N	100	142	102	117	116	68	108	133	101	78	62
sky	Pearson Correlation	,255**	,352**	1	,416**	,518**	,417**	,497**	,372**	,272**	,362**	,213
	Sig. (2-tailed)	,005	<,001		<,001	<,001	<,001	<,001	<,001	,002	<,001	,067
	N	117	102	213	189	181	98	164	200	130	102	75
earth	Pearson Correlation	,377**	,323**	,416**	1	,509**	,612**	,478**	,369**	,400**	,203*	,329**
	Sig. (2-tailed)	<,001	<,001	<,001		<,001	<,001	<,001	<,001	<,001	,026	,001
	N	145	117	189	284	243	115	209	264	157	120	93
animals	Pearson Correlation	,204*	,248**	,518**	,509**	1	,692**	,440**	,507**	,388**	,239**	,216*
	Sig. (2-tailed)	,015	,007	<,001	<,001		<,001	<,001	<,001	<,001	,007	,041
	N	142	116	181	243	297	117	213	275	155	125	90
humans	Pearson Correlation	,237*	,575**	,417**	,612**	,692**	1	,383**	,238**	,579**	,212	,288*
	Sig. (2-tailed)	,043	<,001	<,001	<,001	<,001		<,001	,009	<,001	,072	,021
	N	73	68	98	115	117	131	106	119	94	73	64
water	Pearson Correlation	,196*	,476**	,497**	,478**	,440**	,383**	1	,420**	,484**	,286**	,248*
	Sig. (2-tailed)	,025	<,001	<,001	<,001	<,001	<,001		<,001	<,001	,002	,024
	N	131	108	164	209	213	106	247	233	144	117	83
trees	Pearson Correlation	,125	,335**	,372**	,369**	,507**	,238**	,420**	1	,342**	,242**	,195
	Sig. (2-tailed)	,115	<,001	<,001	<,001	<,001	,009	<,001		<,001	,005	,054
	N	161	133	200	264	275	119	233	328	176	135	99
wellbeing	Pearson Correlation	,460**	,513**	,272**	,400**	,388**	,579**	,484**	,342**	1	,578**	,510**
	Sig. (2-tailed)	<,001	<,001	,002	<,001	<,001	<,001	<,001	<,001		<,001	<,001
	N	118	101	130	157	155	94	144	176	182	122	88
spiritual	Pearson Correlation	,522**	,499**	,362**	,203*	,239**	,212	,286**	,242**	,578**	1	,799**
	Sig. (2-tailed)	<,001	<,001	<,001	,026	,007	,072	,002	,005	<,001		<,001
	N	101	78	102	120	125	73	117	135	122	140	87
highpower	Pearson Correlation	,489**	,568**	,213	,329**	,216*	,288*	,248*	,195	,510**	,799**	1
	Sig. (2-tailed)	<,001	<,001	,067	,001	,041	,021	,024	,054	<,001	<,001	
	N	83	62	75	93	90	64	83	99	88	87	105

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table A10. Correlation table, types of nature-related associations (Study 4)

Correlations

		perceptions	activities	sky	earth	animals	humans	water	trees	wellbeing	spiritual	highpower
perceptions	Pearson Correlation	1	,492**	,350**	,225**	,272**	,261*	,316**	,220**	,442**	,546**	,501**
	Sig. (2-tailed)		<,001	<,001	,004	<,001	,012	<,001	,003	<,001	<,001	<,001
	N	200	109	136	162	167	93	151	186	133	112	86
activities	Pearson Correlation	,492**	1	,365**	,133	,232**	,501**	,344**	,212*	,494**	,406**	,421**
	Sig. (2-tailed)	<,001		<,001	,141	,008	<,001	<,001	,012	<,001	<,001	<,001
	N	109	149	118	124	130	85	123	141	108	82	71
sky	Pearson Correlation	,350**	,365**	1	,481**	,511**	,460**	,483**	,479**	,435**	,469**	,459**
	Sig. (2-tailed)	<,001	<,001		<,001	<,001	<,001	<,001	<,001	<,001	<,001	<,001
	N	136	118	261	230	217	106	209	242	143	113	91
earth	Pearson Correlation	,225**	,133	,481**	1	,498**	,576**	,496**	,531**	,325**	,226*	,399**
	Sig. (2-tailed)	,004	,141	<,001		<,001	<,001	<,001	<,001	<,001	,012	<,001
	N	162	124	230	319	262	120	239	297	167	124	97
animals	Pearson Correlation	,272**	,232**	,511**	,498**	1	,781**	,812**	,513**	,386**	,386**	,447**
	Sig. (2-tailed)	<,001	,008	<,001	<,001		<,001	<,001	<,001	<,001	<,001	<,001
	N	167	130	217	262	320	122	244	295	166	123	103
humans	Pearson Correlation	,261*	,501**	,460**	,576**	,781**	1	,724**	,553**	,458**	,236*	,419**
	Sig. (2-tailed)	,012	<,001	<,001	<,001	<,001		<,001	<,001	<,001	,033	<,001
	N	93	85	106	120	122	134	113	123	106	82	68
water	Pearson Correlation	,316**	,344**	,483**	,496**	,812**	,724**	1	,544**	,390**	,331**	,443**
	Sig. (2-tailed)	<,001	<,001	<,001	<,001	<,001	<,001		<,001	<,001	<,001	<,001
	N	151	123	209	239	244	113	289	274	156	115	104
trees	Pearson Correlation	,220**	,212*	,479**	,531**	,513**	,553**	,544**	1	,286**	,347**	,328**
	Sig. (2-tailed)	,003	,012	<,001	<,001	<,001	<,001	<,001		<,001	<,001	<,001
	N	186	141	242	297	295	123	274	367	182	133	111
wellbeing	Pearson Correlation	,442**	,494**	,435**	,325**	,386**	,458**	,390**	,286**	1	,559**	,509**
	Sig. (2-tailed)	<,001	<,001	<,001	<,001	<,001	<,001	<,001	<,001		<,001	<,001
	N	133	108	143	167	166	106	156	182	192	117	88
spiritual	Pearson Correlation	,546**	,406**	,469**	,226*	,386**	,236*	,331**	,347**	,559**	1	,552**
	Sig. (2-tailed)	<,001	<,001	<,001	,012	<,001	,033	<,001	<,001	<,001		<,001
	N	112	82	113	124	123	82	115	133	117	148	93
highpower	Pearson Correlation	,501**	,421**	,459**	,399**	,447**	,419**	,443**	,328**	,509**	,552**	1
	Sig. (2-tailed)	<,001	<,001	<,001	<,001	<,001	<,001	<,001	<,001	<,001	<,001	
	N	86	71	91	97	103	68	104	111	88	93	119

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table A11. ANOVA and descriptives tables, environmental identity content and gender (Study 1)

Descriptives

		N	Mean	Std. Deviation	Std. Error
valence of associations	Female	116	5,9787	,90282	,08382
	Male	94	6,0115	,86771	,08950
	Total	210	5,9934	,88532	,06109
frequency of associations	Female	116	8,7155	1,65664	,15382
	Male	94	8,4574	1,94364	,20047
	Total	210	8,6000	1,79099	,12359
my perceptions	Female	86	,3702	,23996	,02588
	Male	73	,3337	,21734	,02544
	Total	159	,3534	,22986	,01823
my activities	Female	53	,2344	,13471	,01850
	Male	51	,2698	,18489	,02589
	Total	104	,2518	,16147	,01583
sky	Female	70	,1997	,11415	,01364
	Male	56	,2496	,19424	,02596
	Total	126	,2219	,15625	,01392
earth	Female	100	,3704	,23991	,02399
	Male	82	,4241	,24567	,02713
	Total	182	,3946	,24333	,01804
animals	Female	100	,2214	,12932	,01293
	Male	81	,3068	,22537	,02504
	Total	181	,2596	,18327	,01362
humans	Female	63	,2388	,16552	,02085
	Male	53	,3145	,24288	,03336
	Total	116	,2734	,20707	,01923
water	Female	88	,2378	,14446	,01540
	Male	76	,3089	,20330	,02332
	Total	164	,2708	,17726	,01384
trees and plants	Female	114	,3823	,19861	,01860
	Male	91	,3937	,22575	,02367
	Total	205	,3874	,21063	,01471
well-being	Female	94	,3182	,21890	,02258
	Male	75	,3466	,24237	,02799
	Total	169	,3308	,22934	,01764
spiritual aspects	Female	77	,3047	,19575	,02231
	Male	57	,2890	,19522	,02586
	Total	134	,2980	,19494	,01684
high power	Female	54	,2714	,20101	,02735
	Male	39	,2719	,19292	,03089
	Total	93	,2716	,19659	,02039

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
valence of associations	Between Groups	,056	1	,056	,071	,790
	Within Groups	163,756	208	,787		
	Total	163,812	209			
frequency of associations	Between Groups	3,458	1	3,458	1,078	,300
	Within Groups	666,942	208	3,206		
	Total	670,400	209			
my perceptions	Between Groups	,053	1	,053	,995	,320
	Within Groups	8,296	157	,053		
	Total	8,348	158			
my activities	Between Groups	,033	1	,033	1,252	,266
	Within Groups	2,653	102	,026		
	Total	2,686	103			
sky	Between Groups	,078	1	,078	3,237	,074
	Within Groups	2,974	124	,024		
	Total	3,052	125			
earth	Between Groups	,130	1	,130	2,205	,139
	Within Groups	10,587	180	,059		
	Total	10,717	181			
animals	Between Groups	,327	1	,327	10,226	,002
	Within Groups	5,719	179	,032		
	Total	6,046	180			
humans	Between Groups	,165	1	,165	3,948	,049
	Within Groups	4,766	114	,042		
	Total	4,931	115			
water	Between Groups	,206	1	,206	6,805	,010
	Within Groups	4,915	162	,030		
	Total	5,122	163			
trees and plants	Between Groups	,007	1	,007	,147	,701
	Within Groups	9,044	203	,045		
	Total	9,051	204			
well-being	Between Groups	,034	1	,034	,636	,426
	Within Groups	8,803	167	,053		
	Total	8,837	168			
spiritual aspects	Between Groups	,008	1	,008	,211	,647
	Within Groups	5,046	132	,038		
	Total	5,054	133			
high power	Between Groups	,000	1	,000	,000	,990
	Within Groups	3,556	91	,039		
	Total	3,556	92			

Table A12. ANOVA and descriptives tables, environmental identity content and gender (Study 2)

Descriptives

		N	Mean	Std. Deviation	Std. Error
valence of associations	Female	96	5,9272	,91121	,09300
	Male	110	5,9357	,85271	,08130
	Total	206	5,9317	,87830	,06119
frequency of associations	Female	96	8,02	2,057	,210
	Male	110	7,47	2,106	,201
	Total	206	7,73	2,096	,146
my perceptions	Female	81	,4684	,23926	,02658
	Male	93	,4293	,25908	,02687
	Total	174	,4475	,25010	,01896
my activities	Female	54	,2646	,12449	,01694
	Male	63	,2948	,16686	,02102
	Total	117	,2809	,14897	,01377
sky	Female	66	,2771	,17275	,02126
	Male	70	,2912	,19804	,02367
	Total	136	,2843	,18565	,01592
earth	Female	86	,4702	,27576	,02974
	Male	98	,4198	,23717	,02396
	Total	184	,4434	,25646	,01891
animals	Female	80	,3509	,22471	,02512
	Male	96	,3334	,20798	,02123
	Total	176	,3413	,21530	,01623
humans	Female	72	,3497	,21754	,02564
	Male	76	,3585	,21668	,02485
	Total	148	,3542	,21640	,01779
water	Female	72	,3431	,21042	,02480
	Male	85	,3237	,19948	,02164
	Total	157	,3326	,20414	,01629
trees and plants	Female	90	,4472	,23371	,02463
	Male	101	,4165	,23217	,02310
	Total	191	,4310	,23279	,01684
well-being	Female	74	,4155	,24324	,02828
	Male	87	,3530	,20237	,02170
	Total	161	,3817	,22356	,01762
spiritual aspects	Female	55	,3339	,18817	,02537
	Male	62	,3362	,20121	,02555
	Total	117	,3351	,19436	,01797
high power	Female	45	,2938	,14824	,02210
	Male	46	,2541	,13626	,02009
	Total	91	,2738	,14292	,01498

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
valence of associations	Between Groups	,004	1	,004	,005	,945
	Within Groups	158,135	204	,775		
	Total	158,139	205			
frequency of associations	Between Groups	15,400	1	15,400	3,548	,061
	Within Groups	885,377	204	4,340		
	Total	900,777	205			
my perceptions	Between Groups	,066	1	,066	1,060	,305
	Within Groups	10,755	172	,063		
	Total	10,821	173			
my activities	Between Groups	,027	1	,027	1,198	,276
	Within Groups	2,548	115	,022		
	Total	2,574	116			
sky	Between Groups	,007	1	,007	,194	,660
	Within Groups	4,646	134	,035		
	Total	4,653	135			
earth	Between Groups	,116	1	,116	1,778	,184
	Within Groups	11,920	182	,065		
	Total	12,036	183			
animals	Between Groups	,013	1	,013	,286	,593
	Within Groups	8,098	174	,047		
	Total	8,112	175			
humans	Between Groups	,003	1	,003	,060	,807
	Within Groups	6,881	146	,047		
	Total	6,884	147			
water	Between Groups	,015	1	,015	,353	,553
	Within Groups	6,486	155	,042		
	Total	6,501	156			
trees and plants	Between Groups	,045	1	,045	,823	,365
	Within Groups	10,251	189	,054		
	Total	10,296	190			
well-being	Between Groups	,156	1	,156	3,161	,077
	Within Groups	7,841	159	,049		
	Total	7,997	160			
spiritual aspects	Between Groups	,000	1	,000	,004	,949
	Within Groups	4,382	115	,038		
	Total	4,382	116			
high power	Between Groups	,036	1	,036	1,771	,187
	Within Groups	1,802	89	,020		
	Total	1,838	90			

Table A13. ANOVA and descriptives tables, environmental identity content and gender (Study 3)

Descriptives

		N	Mean	Std. Deviation	Std. Error
valence of associations	Female	238	6,1593	,95778	,06208
	Male	123	5,7995	1,19437	,10769
	Total	361	6,0367	1,05665	,05561
frequency of associations	Female	238	7,6387	2,56800	,16646
	Male	123	6,9268	3,19880	,28843
	Total	361	7,3961	2,81482	,14815
my perceptions	Female	121	,4492	,32192	,02927
	Male	49	,4934	,32411	,04630
	Total	170	,4620	,32222	,02471
my activities	Female	90	,2778	,19708	,02077
	Male	52	,3104	,20644	,02863
	Total	142	,2898	,20045	,01682
sky	Female	137	,2709	,18946	,01619
	Male	76	,3081	,22951	,02633
	Total	213	,2842	,20489	,01404
earth	Female	189	,3968	,26027	,01893
	Male	95	,4515	,34435	,03533
	Total	284	,4151	,29164	,01731
animals	Female	194	,2965	,22441	,01611
	Male	103	,4011	,46089	,04541
	Total	297	,3328	,32943	,01912
humans	Female	75	,3073	,25352	,02927
	Male	56	,4571	,42325	,05656
	Total	131	,3713	,34338	,03000
water	Female	156	,2847	,17772	,01423
	Male	91	,3031	,21840	,02290
	Total	247	,2915	,19347	,01231
trees and plants	Female	220	,4089	,21367	,01441
	Male	108	,4015	,23466	,02258
	Total	328	,4065	,22047	,01217
well-being	Female	124	,3447	,24096	,02164
	Male	58	,3774	,29575	,03883
	Total	182	,3551	,25930	,01922
spiritual aspects	Female	93	,3300	,23260	,02412
	Male	47	,3639	,23371	,03409
	Total	140	,3414	,23268	,01967
high power	Female	69	,3095	,23282	,02803
	Male	36	,2913	,17165	,02861
	Total	105	,3033	,21315	,02080

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
valence of associations	Between Groups	10,498	1	10,498	9,628	,002
	Within Groups	391,447	359	1,090		
	Total	401,945	360			
frequency of associations	Between Groups	41,089	1	41,089	5,247	,023
	Within Groups	2811,266	359	7,831		
	Total	2852,355	360			
my perceptions	Between Groups	,068	1	,068	,652	,420
	Within Groups	17,479	168	,104		
	Total	17,547	169			
my activities	Between Groups	,035	1	,035	,870	,353
	Within Groups	5,630	140	,040		
	Total	5,665	141			
sky	Between Groups	,068	1	,068	1,613	,205
	Within Groups	8,833	211	,042		
	Total	8,900	212			
earth	Between Groups	,189	1	,189	2,236	,136
	Within Groups	23,881	282	,085		
	Total	24,070	283			
animals	Between Groups	,736	1	,736	6,916	,009
	Within Groups	31,386	295	,106		
	Total	32,122	296			
humans	Between Groups	,720	1	,720	6,357	,013
	Within Groups	14,609	129	,113		
	Total	15,329	130			
water	Between Groups	,019	1	,019	,513	,474
	Within Groups	9,188	245	,038		
	Total	9,208	246			
trees and plants	Between Groups	,004	1	,004	,083	,774
	Within Groups	15,891	326	,049		
	Total	15,895	327			
well-being	Between Groups	,042	1	,042	,630	,429
	Within Groups	12,127	180	,067		
	Total	12,169	181			
spiritual aspects	Between Groups	,036	1	,036	,662	,417
	Within Groups	7,490	138	,054		
	Total	7,526	139			
high power	Between Groups	,008	1	,008	,171	,680
	Within Groups	4,717	103	,046		
	Total	4,725	104			

Table A14. Correlation table, environmental identity content and age (Study 3)

Correlations

		Age	valence of associations	frequency of associations	my perceptions	my activities	sky	earth	animals	humans	water	trees and plants	well-being	spiritual aspects	high power
Age	Pearson Correlation	1	,216**	,133*	-,048	-,086	-,141*	-,067	-,146*	-,203*	,015	-,038	,000	,026	,068
	Sig. (2-tailed)		<,001	,011	,536	,310	,040	,264	,012	,020	,810	,490	,999	,758	,493
	N	361	361	361	170	142	213	284	297	131	247	328	182	140	105
valence of associations	Pearson Correlation	,216**	1	,088	,264**	,240**	,011	,004	-,230**	-,234**	,077	,124*	,232**	,223**	,260**
	Sig. (2-tailed)	<,001		,093	<,001	,004	,870	,944	<,001	,007	,227	,024	,002	,008	,007
	N	361	361	361	170	142	213	284	297	131	247	328	182	140	105
frequency of associations	Pearson Correlation	,133*	,088	1	-,205**	-,354**	-,429**	-,265**	-,418**	-,419**	-,370**	-,406**	-,218**	-,283**	-,337**
	Sig. (2-tailed)	,011	,093		,007	<,001	<,001	<,001	<,001	<,001	<,001	<,001	,003	<,001	<,001
	N	361	361	361	170	142	213	284	297	131	247	328	182	140	105
my perceptions	Pearson Correlation	-,048	,264**	-,205**	1	,465**	,255**	,377**	,204*	,237*	,196*	,125	,460**	,522**	,489**
	Sig. (2-tailed)	,536	<,001	,007		<,001	,005	<,001	,015	,043	,025	,115	<,001	<,001	<,001
	N	170	170	170	170	100	117	145	142	73	131	161	118	101	83
my activities	Pearson Correlation	-,086	,240**	-,354**	,465**	1	,352**	,323**	,248**	,575**	,476**	,335**	,513**	,499**	,568**
	Sig. (2-tailed)	,310	,004	<,001	<,001		<,001	<,001	,007	<,001	<,001	<,001	<,001	<,001	<,001
	N	142	142	142	100	142	102	117	116	68	108	133	101	78	62
sky	Pearson Correlation	-,141*	,011	-,429**	,255**	,352**	1	,416**	,518**	,417**	,497**	,372**	,272**	,362**	,213
	Sig. (2-tailed)	,040	,870	<,001	,005	<,001		<,001	<,001	<,001	<,001	<,001	,002	<,001	,067
	N	213	213	213	117	102	213	189	181	98	164	200	130	102	75
earth	Pearson Correlation	-,067	,004	-,265**	,377**	,323**	,416**	1	,509**	,612**	,478**	,369**	,400**	,203*	,329**
	Sig. (2-tailed)	,264	,944	<,001	<,001	<,001	<,001		<,001	<,001	<,001	<,001	<,001	,026	,001
	N	284	284	284	145	117	189	284	243	115	209	264	157	120	93
animals	Pearson Correlation	-,146*	-,230**	-,418**	,204*	,248**	,518**	,509**	1	,692**	,440**	,507**	,388**	,239**	,216*
	Sig. (2-tailed)	,012	<,001	<,001	,015	,007	<,001	<,001		<,001	<,001	<,001	<,001	,007	,041
	N	297	297	297	142	116	181	243	297	117	213	275	155	125	90
humans	Pearson Correlation	-,203*	-,234**	-,419**	,237*	,575**	,417**	,612**	,692**	1	,383**	,238**	,579**	,212	,288*
	Sig. (2-tailed)	,020	,007	<,001	,043	<,001	<,001	<,001	<,001		<,001	,009	<,001	,072	,021
	N	131	131	131	73	68	98	115	117	131	106	119	94	73	64
water	Pearson Correlation	,015	,077	-,370**	,196*	,476**	,497**	,478**	,440**	,383**	1	,420**	,484**	,286**	,248*
	Sig. (2-tailed)	,810	,227	<,001	,025	<,001	<,001	<,001	<,001	<,001		<,001	<,001	,002	,024
	N	247	247	247	131	108	164	209	213	106	247	233	144	117	83
trees and plants	Pearson Correlation	-,038	,124*	-,406**	,125	,335**	,372**	,369**	,507**	,238**	,420**	1	,342**	,242**	,195
	Sig. (2-tailed)	,490	,024	<,001	,115	<,001	<,001	<,001	<,001	,009	<,001		<,001	,005	,054
	N	328	328	328	161	133	200	264	275	119	233	328	176	135	99
well-being	Pearson Correlation	,000	,232**	-,218**	,460**	,513**	,272**	,400**	,388**	,579**	,484**	,342**	1	,578**	,510**
	Sig. (2-tailed)	,999	,002	,003	<,001	<,001	,002	<,001	<,001	<,001	<,001	<,001		<,001	<,001
	N	182	182	182	118	101	130	157	155	94	144	176	182	122	88
spiritual aspects	Pearson Correlation	,026	,223**	-,283**	,522**	,499**	,362**	,203*	,239**	,212	,286**	,242**	,578**	1	,799**
	Sig. (2-tailed)	,758	,008	<,001	<,001	<,001	<,001	,026	,007	,072	,002	,005	<,001		<,001
	N	140	140	140	101	78	102	120	125	73	117	135	122	140	87
high power	Pearson Correlation	,068	,260**	-,337**	,489**	,568**	,213	,329**	,216*	,288*	,248*	,195	,510**	,799**	1
	Sig. (2-tailed)	,493	,007	<,001	<,001	<,001	,067	,001	,041	,021	,024	,054	<,001	<,001	
	N	105	105	105	83	62	75	93	90	64	83	99	88	87	105

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table A15. ANOVA and descriptives tables, environmental identity content and gender (Study 4)

Descriptives

		N	Mean	Std. Deviation	Std. Error
valence of associations	Female	263	6,1906	,96729	,05965
	Male	142	5,8879	1,07619	,09031
	Total	405	6,0845	1,01584	,05048
frequency of associations	Female	264	7,77	2,666	,164
	Male	142	7,39	2,868	,241
	Total	406	7,63	2,741	,136
my perceptions	Female	136	,4096	,31042	,02662
	Male	64	,3849	,29377	,03672
	Total	200	,4017	,30467	,02154
my activities	Female	95	,3027	,21197	,02175
	Male	54	,3176	,25238	,03434
	Total	149	,3081	,22671	,01857
sky	Female	171	,2899	,24286	,01857
	Male	90	,2752	,18754	,01977
	Total	261	,2848	,22506	,01393
earth	Female	211	,4177	,30263	,02083
	Male	108	,3926	,27914	,02686
	Total	319	,4092	,29469	,01650
animals	Female	205	,3104	,28195	,01969
	Male	115	,3294	,36671	,03420
	Total	320	,3172	,31460	,01759
humans	Female	81	,3184	,29971	,03330
	Male	53	,3495	,32883	,04517
	Total	134	,3307	,31071	,02684
water	Female	185	,2808	,20748	,01525
	Male	104	,3635	,42939	,04210
	Total	289	,3105	,30826	,01813
trees and plants	Female	246	,4160	,24345	,01552
	Male	121	,4002	,26901	,02446
	Total	367	,4108	,25191	,01315
well-being	Female	133	,3846	,27609	,02394
	Male	59	,3590	,24852	,03235
	Total	192	,3768	,26753	,01931
spiritual aspects	Female	104	,3504	,24902	,02442
	Male	44	,3815	,28343	,04273
	Total	148	,3596	,25913	,02130
high power	Female	82	,3303	,26585	,02936
	Male	37	,2761	,20097	,03304
	Total	119	,3134	,24794	,02273

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
valence of associations	Between Groups	8,450	1	8,450	8,338	,004
	Within Groups	408,446	403	1,014		
	Total	416,896	404			
frequency of associations	Between Groups	13,181	1	13,181	1,758	,186
	Within Groups	3029,137	404	7,498		
	Total	3042,318	405			
my perceptions	Between Groups	,027	1	,027	,286	,594
	Within Groups	18,446	198	,093		
	Total	18,472	199			
my activities	Between Groups	,008	1	,008	,147	,702
	Within Groups	7,600	147	,052		
	Total	7,607	148			
sky	Between Groups	,013	1	,013	,249	,618
	Within Groups	13,157	259	,051		
	Total	13,169	260			
earth	Between Groups	,045	1	,045	,517	,473
	Within Groups	27,570	317	,087		
	Total	27,615	318			
animals	Between Groups	,026	1	,026	,266	,606
	Within Groups	31,547	318	,099		
	Total	31,573	319			
humans	Between Groups	,031	1	,031	,319	,573
	Within Groups	12,809	132	,097		
	Total	12,840	133			
water	Between Groups	,456	1	,456	4,863	,028
	Within Groups	26,911	287	,094		
	Total	27,367	288			
trees and plants	Between Groups	,020	1	,020	,317	,574
	Within Groups	23,205	365	,064		
	Total	23,225	366			
well-being	Between Groups	,027	1	,027	,374	,542
	Within Groups	13,644	190	,072		
	Total	13,671	191			
spiritual aspects	Between Groups	,030	1	,030	,443	,507
	Within Groups	9,841	146	,067		
	Total	9,871	147			
high power	Between Groups	,075	1	,075	1,223	,271
	Within Groups	7,179	117	,061		
	Total	7,254	118			

Table A16. Correlation table, environmental identity content and age (Study 4)

Correlations

		Age	valence of associations	frequency of associations	my perceptions	my activities	sky	earth	animals	humans	water	trees and plants	well-being	spiritual aspects	high power
Age	Pearson Correlation	1	,284**	,140**	,184**	,082	,001	-,070	-,062	-,069	-,009	-,038	,021	,133	,082
	Sig. (2-tailed)		<,001	,005	,009	,321	,992	,210	,266	,430	,884	,473	,771	,106	,377
	N	406	405	406	200	149	261	319	320	134	289	367	192	148	119
valence of associations	Pearson Correlation	,284**	1	,099*	,197**	,160	,087	,095	-,034	-,017	-,060	-,015	,241**	,152	,043
	Sig. (2-tailed)	<,001		,046	,005	,052	,160	,091	,543	,843	,308	,780	<,001	,065	,643
	N	405	405	405	200	149	260	318	319	134	289	366	192	148	119
frequency of associations	Pearson Correlation	,140**	,099*	1	-,173*	-,160	-,393**	-,245**	-,331**	-,414**	-,325**	-,396**	-,210**	-,340**	-,328**
	Sig. (2-tailed)	,005	,046		,014	,051	<,001	<,001	<,001	<,001	<,001	<,001	,004	<,001	<,001
	N	406	405	406	200	149	261	319	320	134	289	367	192	148	119
my perceptions	Pearson Correlation	,184**	,197**	-,173*	1	,492**	,350**	,225**	,272**	,261*	,316**	,220**	,442**	,546**	,501**
	Sig. (2-tailed)	,009	,005	,014		<,001	<,001	,004	<,001	,012	<,001	,003	<,001	<,001	<,001
	N	200	200	200	200	109	136	162	167	93	151	186	133	112	86
my activities	Pearson Correlation	,082	,160	-,160	,492**	1	,365**	,133	,232**	,501**	,344**	,212*	,494**	,406**	,421**
	Sig. (2-tailed)	,321	,052	,051	<,001		<,001	,141	,008	<,001	<,001	,012	<,001	<,001	<,001
	N	149	149	149	109	149	118	124	130	85	123	141	108	82	71
sky	Pearson Correlation	,001	,087	-,393**	,350**	,365**	1	,481**	,511**	,460**	,483**	,479**	,435**	,469**	,459**
	Sig. (2-tailed)	,992	,160	<,001	<,001	<,001		<,001	<,001	<,001	<,001	<,001	<,001	<,001	<,001
	N	261	260	261	136	118	261	230	217	106	209	242	143	113	91
earth	Pearson Correlation	-,070	,095	-,245**	,225**	,133	,481**	1	,498**	,576**	,496**	,531**	,325**	,226*	,399**
	Sig. (2-tailed)	,210	,091	<,001	,004	,141	<,001		<,001	<,001	<,001	<,001	<,001	,012	<,001
	N	319	318	319	162	124	230	319	262	120	239	297	167	124	97
animals	Pearson Correlation	-,062	-,034	-,331**	,272**	,232**	,511**	,498**	1	,781**	,812**	,513**	,386**	,386**	,447**
	Sig. (2-tailed)	,266	,543	<,001	<,001	,008	<,001	<,001		<,001	<,001	<,001	<,001	<,001	<,001
	N	320	319	320	167	130	217	262	320	122	244	295	166	123	103
humans	Pearson Correlation	-,069	-,017	-,414**	,261*	,501**	,460**	,576**	,781**	1	,724**	,553**	,458**	,236*	,419**
	Sig. (2-tailed)	,430	,843	<,001	,012	<,001	<,001	<,001	<,001		<,001	<,001	<,001	,033	<,001
	N	134	134	134	93	85	106	120	122	134	113	123	106	82	68
water	Pearson Correlation	-,009	-,060	-,325**	,316**	,344**	,483**	,496**	,812**	,724**	1	,544**	,390**	,331**	,443**
	Sig. (2-tailed)	,884	,308	<,001	<,001	<,001	<,001	<,001	<,001	<,001		<,001	<,001	<,001	<,001
	N	289	289	289	151	123	209	239	244	113	289	274	156	115	104
trees and plants	Pearson Correlation	-,038	-,015	-,396**	,220**	,212*	,479**	,531**	,513**	,553**	,544**	1	,286**	,347**	,328**
	Sig. (2-tailed)	,473	,780	<,001	,003	,012	<,001	<,001	<,001	<,001	<,001		<,001	<,001	<,001
	N	367	366	367	186	141	242	297	295	123	274	367	182	133	111
well-being	Pearson Correlation	,021	,241**	-,210**	,442**	,494**	,435**	,325**	,386**	,458**	,390**	,286**	1	,559**	,509**
	Sig. (2-tailed)	,771	<,001	,004	<,001	<,001	<,001	<,001	<,001	<,001	<,001	<,001		<,001	<,001
	N	192	192	192	133	108	143	167	166	106	156	182	192	117	88
spiritual aspects	Pearson Correlation	,133	,152	-,340**	,546**	,406**	,469**	,226*	,386**	,236*	,331**	,347**	,559**	1	,552**
	Sig. (2-tailed)	,106	,065	<,001	<,001	<,001	<,001	,012	<,001	,033	<,001	<,001	<,001		<,001
	N	148	148	148	112	82	113	124	123	82	115	133	117	148	93
high power	Pearson Correlation	,082	,043	-,328**	,501**	,421**	,459**	,399**	,447**	,419**	,443**	,328**	,509**	,552**	1
	Sig. (2-tailed)	,377	,643	<,001	<,001	<,001	<,001	<,001	<,001	<,001	<,001	<,001	<,001	<,001	
	N	119	119	119	86	71	91	97	103	68	104	111	88	93	119

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table A17. Summary of EFA results (types of nature-related associations, frequency of associations, valence of associations, five items of the scale divine nature, 9 items of power nature)

Rotated Factor Matrix[a]

	Factor							
	1	2	3	4	5	6	7	8
my perceptions		,676		,421			,503	
my activities		,569				,438		
sky			,554					
earth			,409					
animals			,570			,447		
humans			,534			,421		
water			,766					
trees and plants			,850					
well-being				,775				
spiritual aspects				,893				
high power				,857				
frequency of associations								,830
valence of associations							,844	
To what extent do you associate NATURE with one of the following: - Self-sufficiency		,459				,474		
To what extent do you associate NATURE with one of the following: - Omniscience						,771		
To what extent do you associate NATURE with one of the following: - Eternity						,855		
To what extent do you associate NATURE with one of the following: - Omnipresence						,801		
To what extent do you associate NATURE with one of the following: - Omnipotence						,754		
To what extent do you associate NATURE with one of the following: - Moral perfection						,901		
I feel that the people in my country have power over nature.	,891							
I feel that the people in my area have power over nature.	,894							
I feel that I have power over nature.	,890							
I feel that nature has power over the people in my country.					,944			
I feel that nature has power over the people in my area.					,918			
I feel that nature has power over me.					,897			
I feel that nature has the same power as the people in my country.	,888							
I feel that nature has the same power as the people of my area.	,921							
I feel that nature has the same power as me.	,924							

Extraction Method: Principal Axis Factoring.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 12 iterations.

Essay 2

And If Nature Was Not Enough? How Self-Nature Connection Boosts Pro-Environmental Behavior through Environmental Identity Salience

Leïla Rahmani, Simona Haasova, Sandor Czellar, Valentina Clergue, Christian Martin

Abstract

Today more than ever, it is crucial to curb the environmental impact of consumer behaviors. A popular strategy (by researchers, social marketers, and practitioners) seems to use nature references of different kinds. However, as of yet, no theory is available on the effectiveness of different kinds of nature reference-based interventions. We address this gap in the literature by proposing that strategies based on self-nature connection are more effective than strategies based on Nature (i.e., contact with or exposure to nature) alone. Our experimental studies implemented and tested a strategy for activating environmental identity, particularly focusing on the relational aspect of this identity. We have conducted 6 studies (laboratory and online experiments) using different types of manipulations and behavioral intentions and actual behaviors that confirmed the effectiveness of our proposed strategy. Thus, our findings carry substantial implications in the way these interventions should be framed and therefore, offer suggestions for educators, policymakers, and marketers interested to promote pro-environmental behaviors.

Keywords: self-nature connection, pro-environmental behavior, environmental identity, identity salience, identity-based processes, sustainable consumption

1. Introduction

We, as humans have significant responsibility for climate change, and today more than ever, it is crucial to curb the environmental impact of our individual behaviors. While a series of policy measures and governmental incentives have been set up globally, these market interventions alone will likely not be sufficient to reduce greenhouse gas emissions and their effect on global warming (Intergovernmental Panel on Climate Change, 2023). Therefore, the fight against negative environmental trends hinges upon a series of voluntary, and intrinsically motivated individual consumption-related actions ranging from product purchase decisions to waste disposal (Moran et al., 2020; Trudel, 2019). How can we nudge individuals to engage in pro-environmental actions in consumption situations? A popular approach, both by researchers, social marketers, and practitioners, is to reference nature in various forms to try to induce a sense of connection to nature and so instigate positive changes in behaviors relevant to environmental protection. However, a recent meta-analysis has shown that many studies struggle to indeed induce a sense of connection to nature while using varying strategies of nature exposure and self-reflection (Mackay & Schmitt, 2019). More importantly, the authors of the meta-analyses have concluded that the existing experimental evidence of the effects of nature referencing on pro-environmental behavior is quite small, and without theoretical guidance to study their effectiveness systematically (Mackay & Schmitt, 2019).

We intend to address this gap in the literature by studying the effectiveness of nature reference-based interventions on actual and observed pro-environmental behaviors based on clear theoretical accounts. We will expand on identity theory (Oyserman, 2009; Reed et al., 2012) to develop and test the effectiveness of a nature-referencing strategy based on the environmental identity concept (Clayton, 2003; Schultz, 2001; Stets & Biga, 2003). More specifically, we

suggest that by focusing consumer attention on its core aspect, one's personal relationship with the natural environment (rather than just referencing nature alone), environmental identity can be most easily made salient in a decision situation. Based on this premise, we develop and implement manipulations to influence pro-environmental attitudes, self-reported behavioral intentions, and actual consumption behaviors. We empirically show that using nature reference that makes consumers consider their own relationship with nature increases their sense of environmental identity, brings out identity-congruent attitudes and intentions, and nudges them toward more pro-environmental consumption choices in various decision-making situations. Considering that intrinsic pro-environmental motivations in daily consumption situations are essential to a more sustainable society, our research has broad appeal for various stakeholders, such as policymakers, marketers, and educators, interested in promoting sustainable individual behaviors and lifestyles.

1.1 Theoretical background

Extant research has demonstrated that consumers' likelihood of engaging in pro-environmental behaviors may depend on their individual connection to nature (Clayton, 2003; Schultz, 2001). Schultz (2002, p.67) defines the self-nature connection as "the extent to which an individual includes nature within his/her cognitive representation of self". Mayer & Frantz (2004, p.504) highlight the sense of interconnection as "the experiential sense of oneness with the natural world". Clayton (2003, p.45-46) further emphasizes the inclusion of nature in our environmental identity, referring to it as "the belief that the environment is important to us and an important part of who we are". These definitions underscore the significance and close relationship between individuals and the natural environment in shaping their sense of self.

Across the relevant literature, the concept of a "relationship" serves as a unifying thread across various theoretical and empirical approaches.

The self exerts a large impact on consumption attitudes, intentions, and behavior through identity motivations such as self-preservation and enhancement (Oyserman, 2009; Reed et al., 2012). We know from past research that one of the strongest motivational drives of consumption relates to how consumers view themselves, i.e., their individual identity (Reed et al., 2012). An identity is “any category label to which a consumer self-associates either by choice or endowment” (Reed et al., 2012, p. 312). In everyday life, most people tend to possess a multitude of identities, e.g., an individual self-concept may consist of an occupational identity, political identity, gender identity, ethnic identity, etc. As the person’s self-concept is multilayered (Oyserman, 2009; Stets & Burke, 2000), all these identities may exert a differential impact on consumer attitudes, intentions, and behaviors in a variety of behavioral domains, through identity motivations such as self-preservation and enhancement (Oyserman, 2009; Reed et al., 2012). While prior research suggests that multiple identities may motivate consumption decisions, the one that arguably affects pro-environmental consumption decisions the most is their environmental identity (Clayton, 2003; 2012). We refer to pro-environmental consumption as “behaviors that contribute to the sustainability of the natural environment” (Schultz & Kaiser, 2012, p. 557) and preference for products or services which do least damage to the environment (Harrison, Newholm, & Shaw, 2005) in domains such as daily consumption, transportation, and waste disposal choices (Schultz & Kaiser, 2012). Extant research shows that consumers who report stronger environmental identity are more likely to identify themselves as environmentalists, exhibit higher pro-environmental behavioral intentions, and tend to engage more in actual sustainable behaviors (e.g., Frantz & Mayer, 2014; Martin & Czellar, 2016; Mayer

& Frantz, 2004; Tam, 2013). Such relationship effects have also been evidenced in recent meta-analyses (e.g., Mackay & Schmitt, 2019; Whitburn et al., 2020; Vesely et al., 2021).

However, whether the environmental or another identity will exert its effect in a given consumption situation at any given moment largely depends on the salience of the identity (Reed et al., 2012). Identity salience defines the probability that a given identity will be invoked and performed in a given situation (Stryker, 1968 [1987]; Stryker & Serpe, 1982 [1994]). In other words, identity salience refers to the extent to which aspects of an identity occupy one's thoughts in a given context (Kettle, 2019). More specifically, Reed et al. (2012, p. 313) argue that "factors that increase the salience of a particular identity within a person's self-concept will increase the probability that the identity will have a subsequent influence on the person's attitudes and behavior." Similar principles are likely to apply to the influence of environmental identity on pro-environmental consumption—whether or not consumers engage in pro-environmental consumption behaviors may depend on the salience of their environmental identity in the concrete consumption context. Thus, if environmental identity and its congruent attitudinal and behavioral schemas happen to be active in specific decision-making situations, motivations related to their environmental identity will likely affect an individual's consumption behavior in ways congruent with these motivations. One of these primary motivations is ego-protection: "if people feel connected to nature, then they will be less likely to harm it, for harming it would in essence be harming their very self" (Mayer & Frantz, 2004, p. 512). In other words, this motivation is related to the drive to protect the environment because the environment is mentally construed as being part of one's sense of self (Mayer & Frantz, 2004). Taken together, making one's environmental identity salient in a consumption-related situation is hypothesized to lead to higher engagement in pro-environmental actions and consumption choices.

A dominant approach to environmental identity is the self-nature connection paradigm and the present research also follows this theoretical paradigm (Tam, 2013). We conceptualize environmental identity in the current research as self-nature connection (Schultz, 2001; Martin & Czellar, 2016), defined as "the extent to which an individual includes nature within his/her cognitive representation of self" (Schultz, 2002, p. 67). This perspective builds on the conceptual foundations of the self-expansion model of individual identity (Aron & Aron, 1986). According to this model of interconnectedness, an important motive for nurturing close human relationships is the expansion of the self "by including the resources, perspectives, and characteristics of the other in the self" (Aron et al., 1991, p. 243). In other words, individuals expand themselves through close relationships with others. Schultz (2001, 2002) builds on this theoretical model and suggests that traits and characteristics of the natural environment can also be used for self-expansion purposes; in this case, the self-expansion is enabled through a close relationship between nature and the self. The central idea of this perspective is the relational aspect defining environmental identity, i.e., an established relationship between two entities—the self and the natural environment. Leaning on this main feature of environmental identity, we hypothesize that a nature-reference intervention that emphasizes the relationship between oneself and the natural will activate environmental identity.

In a recent meta-analysis, Mackay and Schmitt (2019) reviewed 82 articles (published and unpublished) of which only six published papers included experimental (rather than correlational) studies using nature references of different kinds in order to induce actual behavioral change. As mentioned by the authors of this meta-analysis, the main purpose of these experimental studies was to manipulate exposure to nature (e.g., walking in nature, watching a nature documentary, anthropomorphizing references to nature techniques, etc.), and not the self-nature connection

conceptualized as environmental identity. However, the situational activation of self-nature connection presents a remarkable potential for promoting pro-environmental behaviors in public policy campaigns, corporate sustainability drives, and non-governmental initiatives (Clayton & Czellar, 2023).

On the basis of the above, we argue that to maximize the likelihood of activating environmental identity in a specific situation, the manipulation should make salient the relationship consumers have with nature. We hypothesize that if consumers are explicitly or through contextual cues encouraged to think about their connection with nature (rather than just nature alone), then consumption decisions and choices will more likely be considered, and enacted upon, through the prism of environmental identity, thus leading to more pro-environmental consumption behaviors. To determine the effectiveness of various nature-referencing strategies in nudging consumers toward more pro-environmental choices, we conduct a direct comparison between strategies that promote self-nature connection and those that focus on nature alone, as well as compare strategies with nature references that promote stronger vs. weaker self-nature connection. We also investigate the underpinnings of the nudges relying on self-nature connection in depth in accordance with identity theory, i.e., by examining their (environmental) identity-activation potential and salience mechanism. We test these strategies across forms of delivery and types of behavior.

1.2 Overview of studies

As a first step in our inquiry, studies 1a and 1b manipulate nature-related interventions (relationship-with-nature vs. nature alone) and find that the manipulation referencing participants' personal relationship with nature increases self-reported intentions to behave pro-environmentally to a larger extent than when the manipulation references nature only.

In a second step, we focus on the self-nature connection intervention using real behaviors in order to show that the salience of one's personal relationship with nature indeed leads to consumption choices congruent with the activated environmental identity. More specifically, Study 2 examines in more depth the mechanisms underlying identity activation resulting from the manipulated salience of individual's relationship with nature. Here, we focus on consumers' experiences and attitudes toward a concrete pro-environmental product. The data supports our assumption that the manipulation affects attention to identity-relevant information and congruently with this information (a product label) impacts the perception of the product (orange juice), resulting in more positive experiences and attitudes toward a pro-environmental product. This finding indicates that our manipulation of individual's relationship with nature indeed makes the environmental identity salient, because it lends individuals the environmental identity's prism to apprehend cues in the environment, in line with their identity-associated schemas (Reed et al., 2012). It also shows that in some cases, nature references alone (such as an organic food label) do not necessarily lead to favorable pro-environmental consumption behaviors. Study 3 shows that experimentally increased salience of one's personal relationship with nature leads to a higher portion of actual pro-environmental product choices by directly comparing two types of relational identity (namely environmental identity and family identity).

In the third step, we test our main hypotheses in the context of actual behavioral intervention campaigns. In Studies 4a – b we manipulate the salience of participants' personal relationship with nature with real marketing stimuli (posters) from a public pro-environmental campaign that were pretested on conveying a stronger vs. weaker relationship with nature to their target audience, while all referencing nature. We find that exposure to campaign posters perceived as

conveying a stronger relationship between oneself and nature leads participants to express higher intentions to donate to the focal pro-environmental organization.

2. Methods and Results

2.1 Study 1a

Method

The purpose of this study was to compare nature-reference manipulations (relationship-with-nature vs. nature vs. control) and their effect on intentions to engage in pro-environmental behaviors and to show that the relationship condition has a particular potential to enhance self-nature connection. Study 1a was an online study conducted on Amazon Mechanical Turk with 715 participants in exchange for a standard payment (M_{age} = 32.82, 41.9% male, 58.1% female, .9% missing). From the total of 715 participants, 62 participants (8.7 %) were removed because they had not completed the survey entirely (6 participants had completed it between 7 % and 92 %) or had failed the attention check (56 participants). This left 653 participants for the statistical analyses.

In this experiment, we manipulated the salience of individual's personal relationship with nature through two conditions: a relationship-with-nature reference task and a nature reference task. In the third control condition, participants had no task and directly started by responding to the dependent variables. In the first two experimental conditions, participants had 30 seconds to perform the task. Participants assigned to the relationship-with-nature reference condition received the following instructions: "Please describe in a few sentences the meaning of the following: YOUR RELATIONSHIP WITH THE NATURAL ENVIRONMENT". In the nature reference condition, participants received the following instructions: "Please describe in a few sentences the meaning of the following: THE NATURAL ENVIRONMENT". As a first

dependent variable, we used a 12-item scale to measure self-pro-environmental reported behaviors framed here as behavioral intentions for the upcoming week (M = 4.61, SD = 1.10, α = .88; Tam, 2013). We measured participants' hypothetical willingness to donate to a pro-environmental organization (i.e., WWF) as a second dependent variable. We designed it as a hypothetical scenario, asking participants how much of 100 dollars they would be willing to donate if they emerged as the contest winner. Then, participants completed a filler task. The experiment continued with two measures of self-nature connection the Extended Inclusion of Nature in Self scale (EINS, four seven-point items, M = 4.68, SD = 1.25, α = .88; Martin & Czellar, 2016) and the Connectedness to Nature scale (14 seven-point items, Mayer & Frantz, 2004, M = 4.73, SD = .93, α = .84), as well as a measure of socially desirable responding (four seven-points items from Hart et al., 2015, M = 4.31, SD = 1.13, α = .61). The study ended with attention check and demographic measures.

Results

To confirm the effectiveness of the manipulation, we examined whether changes in individuals' relationship with nature would be reflected in their perceived self-nature connection. To do so, we conducted two ANOVAs, alternately using our two self-nature connection measures as dependent variables. The manipulation had a significant effect on self-nature connection as measured with the EINS scale, $F(2, 650) = 7.13$, $p < .001$, $\eta^2_p = .021$. Planned contrasts revealed (see Table 1) that the manipulation in the relationship-with-nature reference condition increased the scores on our measurement in comparison to the control condition ($t(650) = 3.44$, $p < .001$) as well as in comparison to the nature reference condition ($t(650) = 3.79$, $p < .001$). As expected, there was no effect of the manipulation on individual's self-nature connection in the nature reference condition in comparison to the control condition ($t(650) = .22$, $p = .83$). Identical results

were obtained when using the Connectedness to Nature measure of self-nature connection. Thus, participants who were invited to describe the meaning of their relationship with the natural environment reported higher self-nature connection scores than those participants who were invited to reflect on the natural environment or those who did not engage in any of those two tasks.

Table 1

Mean self-nature connection scores for in the relationship-with-nature reference, nature reference and control conditions in Study 1a.

	EINS			Connectedness to Nature		
	M (*SD*)			*M* (*SD*)		
	Relationship-with-nature	Nature	Control	Relationship-with-nature	Nature	Control
	4.95_{a} (1.14)	4.57_{b} (1.33)	4.55_{b} (1.23)	4.97_{a} (0.93)	4.62_{ax} (0.90)	4.62_{ax} (0.93)

Note. M = mean*; SD* = standard deviation. Means with different subscripts a, b, c between columns are significantly different at $p < 0.05$ in paired contrasts.

Next, we examined the effect of our manipulation (i.e., relationship-with-nature reference, nature reference, and control) on each of our two dependent variables (self-reported pro-environmental behavioral intentions and WWF donation intentions). An ANOVA with relationship-with-nature reference as the independent variable and self-reported pro-environmental behavioral intentions as the dependent variable revealed a significant manipulation effect $F(2, 650) = 13.05$, $p < .001$, $\eta^2_p = .039$; see Table 2. We also found a marginally significant main effect for our second dependent measure, donation to the WWF $F(2, 650) = 5.65$, $p = .064$,

η^2_p = .008; see Table 2. These effects were still statistically significant after controlling for social desirability as well.

Planned contrasts revealed that participants in the relationship-with-nature reference condition reported significantly more pro-environmental behavioral (t(650) = 3.97, p < .001) and donation (t(650) = 5.10, p < .001) intentions than those in the control condition. Participants in the nature reference condition reported significantly more pro-environmental behavioral (t(650) = 2.36, p = .019) but not donation intentions (t(650) = –1.23, p = .964) than those in the control condition. Participants in the relationship-with-nature reference condition reported significantly more pro-environmental behavioral (t(650) = 2.71, p = .007) and donation (t(650) = 2.05, p = .040) intentions than those in the nature reference condition.

Table 2

Mean pro-environmental intentions and donations scores for in the relationship-with-nature reference, nature reference and control conditions in Study 1a.

	Pro-environmental behavior intentions			Intended amount to donate to WWF		
	M (*SD*)			*M* (*SD*)		
	Relationship-with-nature	Nature	Control	Relationship-with-nature	Nature	Control
	4.90_a (1.13)	4.61_b (1.06)	4.37_c (1.07)	29.77_a (26.50)	24.67_b (23.75)	24.78_b (24.75)

Note. M = mean*; SD* = standard deviation. Means with different subscripts a, b, c between columns are significantly different at p < 0.05 in paired contrasts.

In conclusion, across our two behavioral measures, the relationship-with-nature reference condition (which had been shown to induce a stronger self-nature connection) systematically produced significantly higher results than the control condition; this was not the case for the

nature reference condition. To fully examine our hypothesis, we designed another study (study 1b) with a different filler task in order to control for the individual level of self-nature connection (Brügger et al., 2011; Cheng & Monroe, 2012; Collado et al., 2015) which can possibly impact our results.

2.2 Study 1b

Method

In this study, the main purpose was to replicate the results from study 1a and to further investigate the effect of our experimental manipulations, while also considering and controlling for the level of individual self-nature connection as a potential influencing factor. An online study was conducted on M-Turk with 712 participants in exchange for a standard payment (M_{age} = 40.46, 51.7% male, 48.3% female). From the total of 712 participants, 35 participants (4.9%) were removed because they had failed the attention check, which left 677 participants for the statistical analyses.

We applied the same experimental manipulations as in Study 1a, resulting in three conditions: a relationship-with-nature reference task, a nature reference task and a control condition. As a first dependent variable, we again used the 12-item scale as in Study 1a to measure self-reported behaviors framed here as behavioral intentions for the upcoming week (M = 4.63, SD = 1.26, α = .91; Tam, 2013). We again measured participants' hypothetical willingness to donate to a pro-environmental organization (i.e., WWF) as a second dependent variable. Then, participants completed a long filler task in order to maintain a certain time interval between our manipulation and the control variables. After that, participants completed the EINS (M = 4.92, SD = 1.24, α = .88) and the Connectedness to Nature scales (M = 4.76, SD = .95, α = .85), and the measure of

socially desirable responding (M = 4.37, SD = 1.20, α = .67). The study ended with an attention check and demographic questions.

Results and discussion

First, we examined the effect of the manipulation (relationship-with-nature reference, nature reference, and control) on each of our dependent variables (self-reported pro-environmental behavioral intentions and WWF donation intentions). An ANOVA with the three conditions of the salience manipulation as an independent variable and self-reported pro-environmental behavioral intentions as the dependent variable revealed a significant effect of the manipulation $F(2, 674) = 7.53$, $p = .001$, $\eta^2_p = .022$; see Table 3. We found the same results for our second dependent measure, intended donation amount to the WWF, $F(2, 674) = 5.65$, $p = .004$, $\eta^2_p = .016$; see Table 3. These effects remained statistically significant after controlling for social desirability (self-reported pro-environmental behavioral intentions: $F(3, 673) = 9.52$, $p < .001$, $\eta^2_p = .028$; donation to the WWF: $F(3, 673) = 7.12$, $p < .001$, $\eta^2_p = .021$.

Second, we also wanted to control for the level of self-nature connection in this study. For this reason, we first examined whether our experimental manipulation had any effect on our measures of EINS and Connectedness with Nature scales. We conducted two ANOVAs, one for each of our two self-nature connection measures as dependent variables. The results revealed that the self-nature connection manipulation had no significant effect on self-nature connection scores as measured with the EINS, $F(2, 674) = 1.68$, $p = .188$, $\eta^2_p = .005$, (see Table 4); similar results were obtained with the Connectedness to Nature measure, $F(2, 674) = .71$, $p = .490$, $\eta^2_p = .002$. As our manipulation had no effect on our two self-nature connection measures, we used the latter two as covariates in our regression model and the experimental effects on donation to the WWF (EINS: $F(3, 673) = 5.25$, $p = .005$, $\eta^2_p = .015$; CNS: $F(3, 673) = 5.87$, $p = .003$, $\eta^2_p = .017$) and

self-reported pro-environmental behavioral intentions (EINS: $F(3, 673) = 8.32$, $p < .001$, $\eta^2_p = .024$; CNS: $F(3, 673) = 10.07$, $p < .001$, $\eta^2_p = .029$) remained still statistically significant.

Finally, planned contrasts revealed that participants in the relationship-with-nature reference condition reported significantly stronger pro-environmental behavioral ($t(674) = 3.88$, $p < .001$) and donation ($t(674) = 3.33$, $p = .001$) intentions than those in the control condition; we found the same pattern of results for the contrast between the relationship-with-nature condition and the nature reference condition for pro-environmental behavioral ($t(674) = 2.10$, $p = .036$) and donation intentions ($t(674) = 2.11$, $p = .036$). Participants in the nature reference condition reported marginally significantly stronger pro-environmental behavioral ($t(674) = 1.76$, $p = .079$) but not donation intentions ($t(674) = 1.23$, $p = .23$) than those in the control condition.

Table 3

Mean pro-environmental intentions and donations scores for in the relationship-with-nature reference, nature reference and control conditions in Study 1b.

	Pro-environmental behavior intentions			Intended amount to donate to WWF		
	M (*SD*)			*M* (*SD*)		
	Relationship-with-nature	Nature	Control	Relationship-with-nature	Nature	Control
	4.87_a (1.20)	4.62_b (1.26)	4.42_c (1.27)	30.22_a (28.15)	25.05_b (25.38)	22.16_b (23.70)

Note. *M* = mean; *SD* = standard deviation. Means with different subscripts a, b, c between columns are significantly different at $p < 0.05$ in paired contrasts.

Table 4

Mean self-nature connection scores in the relationship-with-nature reference, nature reference and control conditions in Study 1b.

	EINS			Connectedness to Nature		
	M (*SD*)			*M* (*SD*)		
	Relationship-with-nature	Nature	Control	Relationship-with-nature	Nature	Control
	5.02_a (1.21)	4.80_a (1.16)	4.92_a (1.32)	4.80_a (0.85)	4.70_a (0.97)	4.78_a (1.02)

Note. *M* = mean*; SD* = standard deviation. Means with different subscripts a, b, c between columns are significantly different at $p < 0.05$ in paired contrasts.

These results corroborate and extend our previous findings from Study 1a. The findings provide further support for the hypothesis that the relational component of self-nature connection can effectively prompt pro-environmental intentions, and more so than with a nudge that references only nature itself. Consistent with Study 1a, the current study suggests that emphasizing self-nature connection may be a more effective strategy for promoting pro-environmental behavior than simply exposing individuals to general cues and references of nature. Study 1b also shows that the proposed manipulation of self-nature connection is a short-term instrument (the effect likely lasting a few minutes). The next set of studies will further explore the potential underlying mechanism of experimental manipulations based on self-nature connection, specifically focusing on the hypothesis that they activate environmental identity. By investigating this relationship, we also aim to gain a deeper understanding of how the sense of connection to nature influences environmental attitudes and actual decisions.

2.3 Study 2

In this study, we hypothesized that the momentarily increased personal relationship with nature will lead to the salience of environmental identity. Accordingly, we expected that the activation of environmental identity would lead to more positive perception and consumption behavior toward a product that could be interpreted as having pro-environmental characteristics. In this study, we implemented an actual drink sample test to further evaluate participants' responses and behaviors in a tangible and practical context. In addition, we wanted to rule out the possibility that activating environmental identity would affect all types of behaviors similarly (and not just identity-congruent pro-environmental behaviors). By doing so, we aimed for a better understanding of the mechanisms and application potential that underlie the effects of nudges that reference not only nature, but rather self-nature connection, on individual behaviors.

Method

We conducted a laboratory study with 215 participants (M_{age} = 20.39, 53.5% male) in two sessions, including a product taste test, in exchange for a standard payment. We removed six participants who either failed the attention check or did not participate in the second part of the experiment; we also removed an additional six participants because, despite the instructions, they most likely did not taste the product (i.e., their consumed quantity measure was 0 grams, for details see below). Thus, the final sample consisted of 203 participants for the statistical analyses.

In the first session, participants took part in a product taste test study with a 2 (individual's relationship with nature: salient vs. control) × 2 (pro-environmental product information: disclosed vs. undisclosed) between-subjects design. Prior to the taste-test, we implemented the salience manipulation using a recall task – inspired by prior work on identity theory (Puntoni et al., 2011; Reed, 2004) – to increase the salience of one's relationship with nature, while

"relationship with one's university" served as a control condition (for details, see Table A3 in the Appendix). In addition, in the relationship-with-nature salience condition participants also completed the four-item self-nature connection scale (EINS) immediately before the recall task, and participants in the control condition completed its alternative (referring to the university instead of nature). In doing so, the purpose was to increase the personal relevance, and therefore the effectiveness, of the salience manipulation.

In the product taste test, participants were presented with the same drink: organic orange juice in its original, sealed, commercial 8-oz container with its package labeling removed. We manipulated the product description in a between-subjects design, by disclosing that the drink was "organic orange juice" (pro-environmental information disclosed) or "orange juice" (pro-environmental information undisclosed; see Table A4 in the Appendix). We chose the "organic" attribute to represent pro-environmental information because consumers associate organic food with natural production processes and low level of "processing" (Naspetti & Zanelli, 2009), as well as with contribution to environmental protection (Petrescu & Petrescu-Mag, 2015).

We asked participants to open the container and taste the juice for as long as they wanted. We then took a series of dependent variable measures. Participants answered seven-point-scaled questions related to their sensory perceptions (e.g., sugar level, healthfulness, color), product liking using an index of three items (α = .94), and the likelihood of them recommending the drink to others using another index of three items (α = .87). We also measured the amount they were willing to pay for the drink. In addition, we unobtrusively assessed the consumed quantity of orange juice—the experimenters measured, upon completion of each experimental session, the quantity each participant had drunk in grams. For comparison purposes with the previous studies, we also measured participants' willingness to donate to a pro-environmental organization in

Swiss Franc – CHF (i.e., WWF) should they be one of the two winners in a raffle organized after the experiment.

Two days after the main study, in the second lab session, we measured self-nature connection with the EINS embedded in a larger set of measures (M = 4.76, SD = 1.23, α = .88). An attention check and demographic questions ended each survey (in both sessions).

Results and Discussion

To examine the effects of our manipulations of self-nature relationship salience and information availability on a subsequent perception and reception of a pro-environmental product, we ran a series of two-way ANOVAs with the salience manipulation (0 = control, 1 = relationship-with-nature salient) and the pro-environmental product information manipulation (undisclosed = 0, disclosed = 1) as independent variables.

We found a significant two-way interaction effect on the willingness to recommend the drink to others (F(3, 199) = 4.87, p = .028, η^2_p = .024); no main effects were found. Participants would recommend the drink marginally more when their relationship-with-nature was salient and the juice was marked as organic ($M_{\text{organic\_salient}}$ = 4.02 (SD = 1.51), $M_{\text{undisclosed\_salient}}$ = 3.41 (SD = 1.64), p = .062); such an effect was not observed when the alternate identity was made salient ($M_{\text{organic\_notsalient}}$ = 3.46 (SD = 1.64), $M_{\text{undisclosed\_notsalient}}$ = 3.87 (SD = 1.46), p = .186).

We found a marginally significant two-way interaction effect on the liking of the juice (F(3, 199) = 3.14, p = .078, η^2_p = .016), no main effects were found. Participants liked the orange juice more when their relationship-with-nature was salient and the juice was marked as organic ($M_{\text{organic\_salient}}$ = 5.45 (SD = 1.43), $M_{\text{undisclosed\_salient}}$ = 4.88 (SD = 1.45), p = .044); such an effect was not observed when the alternate identity was made salient ($M_{\text{organic\_notsalient}}$ = 5.06 (SD = 1.48), $M_{\text{undisclosed\_notsalient}}$ = 5.20 (SD = 1.16), p = .581).

We have not found any effects of our manipulations on participants' willingness to pay for the orange juice ($p > .85$).

Regarding product evaluation, a marginally significant interaction with a similar pattern to the other dependent variables was found in the condition where relationship-with-nature salience was matched with the disclosure of the drink's pro-environmental characteristic ($F(3, 199) = 3.33$, $p = .070$, $\eta^2_p = .070$). Participants whose relationship with nature was made salient and who were at the same time aware that the orange juice was organic formed a more positive evaluation of the drink ($M_{organic\_salient} = 4.59$ ($SD = .79$), $M_{undisclosed\_salient} = 4.31$ ($SD = .72$), $p = .047$); such an effect was not evidenced when the alternate identity was made salient ($M_{organic\_notsalient} = 4.39$ ($SD = .67$), $M_{undisclosed\_notsalient} = 4.43$ ($SD = .60$), $p = .581$).

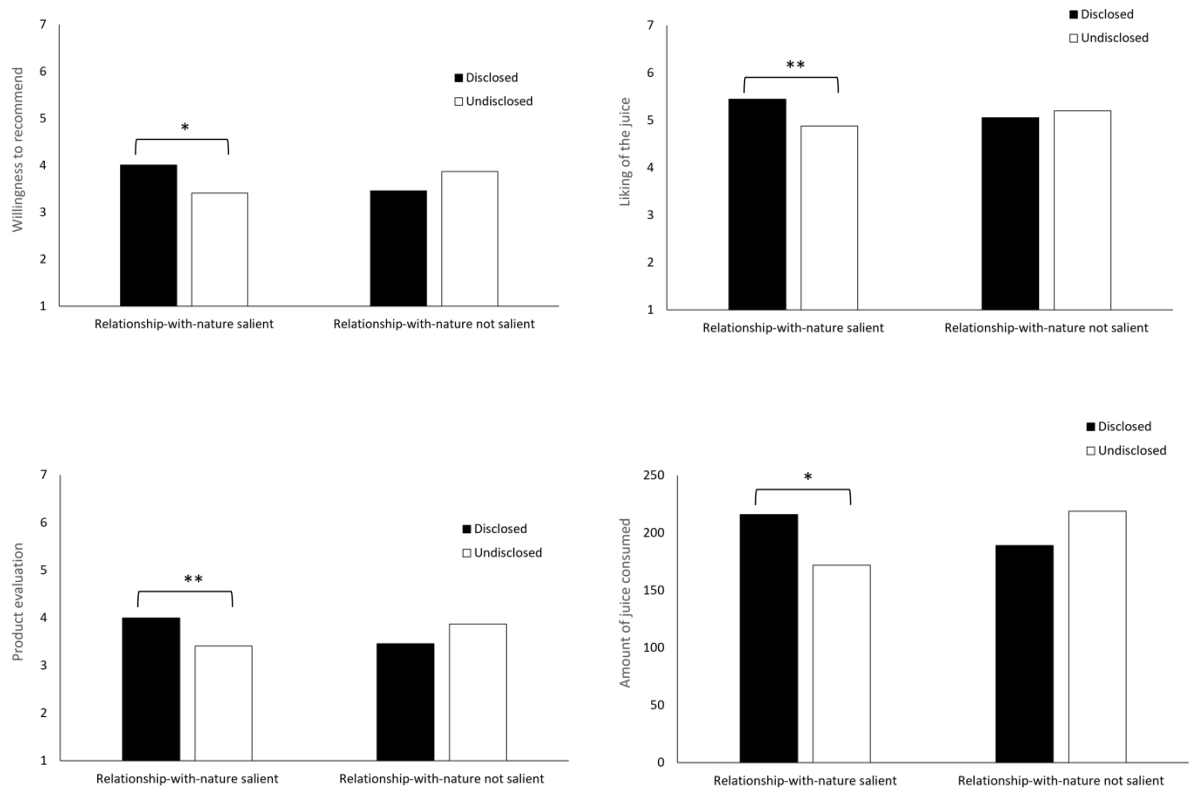


*Figure 1. Relationship-with-nature salient and pro-environmental product information disclosed (Study 2). *p < .1; **p < .05; ***p < .01*

We have also found a significant two-way interaction effect on the amount of orange juice consumed ($F(3, 199) = 4.30$, $p = .039$, $\eta^2_p = .021$). Participants seemed to consume marginally more orange juice when their relationship with nature was made salient and the juice was labeled as organic ($M_{organic\_salient} = .22$ ($SD = .12$), $M_{undisclosed\_salient} = .17$ ($SD = .12$), $p = .073$); such an effect was not observed when the alternate identity was made salient ($M_{organic\_notsalient} = .19$ ($SD = .12$), $M_{undisclosed\_notsalient} = .22$ ($SD = .12$), $p = .281$).

All the aforementioned results remained as reported (in many cases even stronger) after we controlled for participants' levels of self-nature connection (measured two days after the choice experiment).

Lastly, we performed an ANOVA of the salience manipulation (0 = relationship-with-nature not salient, 1 = relationship-with-nature salient) on the measure of willingness to donate to the WWF. Like previously, we found a main effect of the salience manipulation ($F(3, 199) = 3.69$, $p = .022$, $\eta^2_p = .018$). Participants whose relationship with nature was made salient during the study would have given to the WWF more from their lottery winning ($M_{salient} = 39.00$ CHF ($SD = 27.02$), $M_{notsalient} = 31.34$ CHF ($SD = 24.30$).

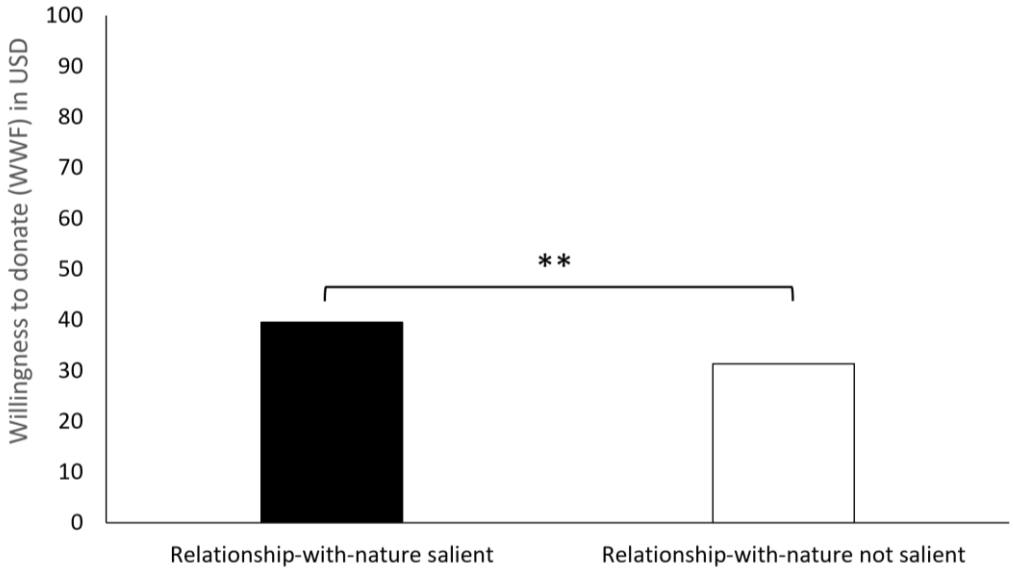


*Figure 2. Relationship-with-nature salient (Study 2). *p < .1; **p < .05; ***p < .01*

The results of this study have largely supported our hypotheses that the activation of environmental identity through an increased salience of individuals' relationship with nature leads to more positive perception and more positive actual subjective experience of a pro-environmentally framed product – an organic orange juice. Across various variables, the pattern of results suggests that activation of individuals' environmental identity facilitated their interpretation of the pro-environmental product information in a positive light. Our findings also suggest that increasing the salience of consumer's personal relationship with nature, i.e. their self-nature connection, might be helpful in communication campaigns to boost consumer's positive perceptions and attitudes toward pro-environmental products and behaviors.

2.4 Study 3

The primary objective of this study was to demonstrate the impact of experimentally enhancing the salience of one's personal relationship with nature in a context common in

everyday decision settings—the proportion of actual pro-environmental choices in a product choice task. To achieve this, we conducted a comparison between two types of relational identity: environmental identity and family identity. By examining these distinct relational frameworks, we aimed to gain further insight into the specific mechanism through which individuals' connection to nature influences their behavioral choices, particularly in the context of environmentally conscious consumer decisions.

Method

We conducted a laboratory study with 234 students (M_{age} = 21.21, 45% male) in two sessions in exchange for a standard payment.

In session 1, we experimentally manipulated the salience of individual's relationship with nature using a recall task inspired by prior work on identity theory (Puntoni et al., 2011; Reed, 2004). We asked participants to spend two minutes describing a recent experience in which their relationship with nature (vs. their relationship with family) had influenced a concrete decision. The "family" condition served as a control condition where the task remained the same but an unrelated, yet relationship-based identity type was made salient. For this recall task, participants assigned to the relationship-with-nature salient condition received the following instructions: "Please think of a recent experience in which your relationship with the natural environment affected an everyday decision. Please take your time to describe the concrete situation." In the control condition, participants read the same instructions, except that the word "nature" was replaced with "family" (for more details, see Table A5 in the Appendix). To ensure that participants would not guess the true purpose of the study, the next task was presented as an essay-writing task, for which participants were asked to choose from three pairs of different types of unopened, packed commercial products: a pen (blue vs. black), a correction pen (10ml vs.

20ml), and a notepad (the focal product pair) made either from recycled or not recycled paper, which was visibly, but not ostentatiously, indicated on the pack by the manufacturer. The product pairs were placed in front of participants on a desk in their laboratory cubicle (for pictures of the different product pairs, see Table A6 in the Appendix). Participants were asked to choose one product from each of the three pairs and then to use the selected material to write a 10-minute essay on any topic they deemed important. Two days after the main study, in session 2, participants completed the same self-nature connection measure as in the previous studies (EINS, M = 4.80, SD = 1.05, α = .87), as well as the biospheric environmental concerns scale (Schultz, 2002; M = 5.73, SD = 0.98, α = .85) which were embedded in a series of unrelated psychological measures. An attention check and demographic questions appeared at the end of the study in session 2. All participants passed the attention check.

Results and Discussion

From a qualitative perspective, the salience manipulation seemed to have functioned as intended as participants clearly recalled experiences according to instructions to describe a recent situation when their relationship with nature (family) had influenced a concrete decision (for characteristic quotes from the recall task, see Table A7 in the Appendix).

To investigate the effects of our relationship manipulation on a subsequent real product choice, we have performed a logistic regression by using notepad choice as the dependent variable and the manipulation (0 = control, 1 = relationship-with-nature salient) as a predictor. The analysis revealed a significant effect of the manipulation on the choice likelihood of the recycled versus the regular notepad (β = .52, χ^2 (1) = 3.83, p = .050), see Figure 3. This effect remained rather stable (β = .48, χ^2 (1) = 3.11, p = .078), even after we controlled for participant's levels of self-nature connection (EINS, measured two days after the choice experiment, no

differences between the two manipulation conditions) and biospheric environmental concerns (β = .48, χ^2 (1) = 3.34, p = .068).

These results indicate once again that increasing the salience of individual's personal relationship with nature by referencing their self-nature connection as a means of activation of their environmental identity affects individual choices of more (vs. less) pro-environmental products in a real decision-making situation. The product pairs in the choice task were not explicitly framed as more or less pro-environmental choices and the importance of "pro-environmental" product characteristics was not particularly highlighted. This points toward a possible mechanism underlying the effects of our salience manipulation—increased attention to cues congruent with the activated identity, which is in line with the theoretically articulated underpinnings of how identities influence attitudes and behaviors (Oyserman, 2009; Reed et al., 2012).

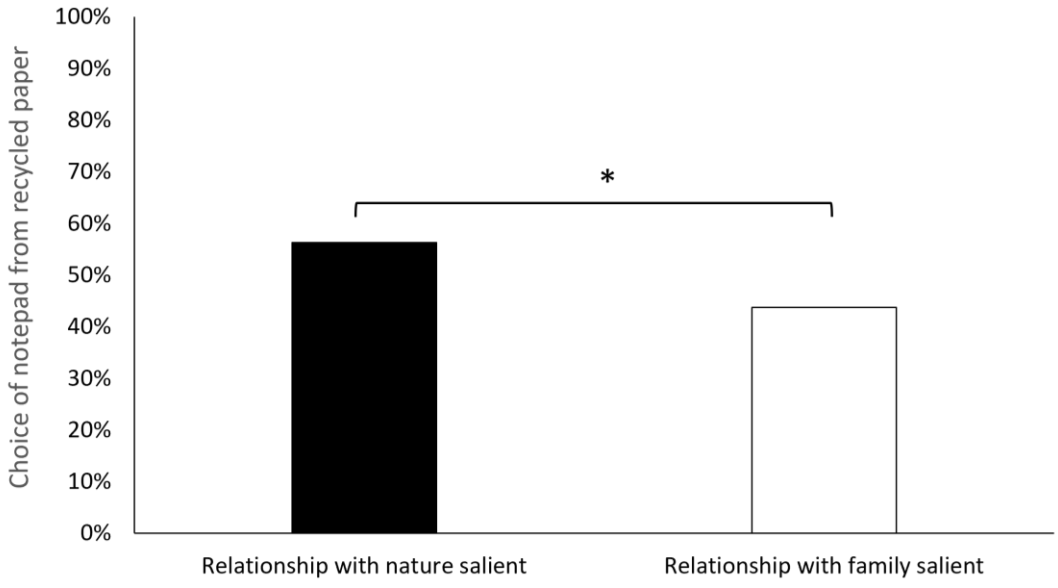


*Figure 3. Relationship with nature salient (Study 2). *p < .1; **p < .05; ***p < .01*

In the next set of studies, we examine the potential of actual persuasive content to activate environmental identity and consequently encourage pro-environmental behavior. To show the superior potential of using self-nature reference over just nature reference, in the next set of studies we have varied the strength of self-nature connection spontaneously evoked by ads all referencing nature, specifically nature-protection.

2.5 Study 4a

In this study, we used existing promotional material (meant to promote awareness of and financial contribution to pro-environmental campaigns) to make one's personal relationship with nature salient. Specifically, we used publicly available advertisements designed and distributed by the WWF in support of its #Together4Forests campaign and investigate its potential to activate environmental identity and ensuing pro-environmental behaviors by stimulating a sense of personal relationship with nature.

The purpose of this study is twofold. First, we propose a preliminary examination of the assumption that promotional material can activate environmental identity by conveying a stronger (vs. weaker) sense of personal relationship with nature. We expected that materials that suggest a sense of personal relationship with nature will be associated with a more positive attitude toward the promotional material itself and with higher willingness to support the focal organization, in this case by being willing to donate to the promoted pro-environmental cause. Second, we aimed to pretest materials, allowing us to choose experimental stimuli for the subsequent confirmatory study (Study 4b).

Method

The study was conducted online on Amazon Mechanical Turk through the CloudResearch platform with 106 participants in exchange for a standard payment, of which we removed 7 (7.42 %) because they failed the attention check, which left 99 participants for statistical analyses (M_{age} = 37.74; 43.4 % female, 55.6 % male, 1 % non-binary).

In a within-subjects design, participants were presented with 10 ads promoting WWF's #Together4Forests campaign distributed throughout the global and regional WWF websites and social media channels (see Figure 4). We included ads that represented a wide variation in terms of visuals, graphics and messages. We graphically standardized the campaign ads to avoid perceptual differences based on arbitrary factors. Thus, we removed any irrelevant information (e.g., the mark of the website or of the creator where the ad was originally published), added a standard WWF logo when it was missing from the ad and standardized ad size. Participants saw each of the 10 campaign ads three times in a random order in three different evaluation blocks. In the first evaluation block, we assessed participants' general attitude toward each ad by asking them to "Please rate the presented environmental campaign ad on the following attributes to best reflect your attitude. I find this ad..." and supplied four bipolar seven-point scales, which were adapted from other previously used ad attitude measures (Lichtlé, 2007; Wonneberger, 2018): not appealing-appealing; not convincing-convincing; not important-important; pessimistic-optimistic; each on a seven-point scale (general attitude index: M = 4.82, SD = 0.85, α = .85). In the second evaluation block, we measured the strength of the sense of personal relationship with nature as induced by the campaign ad using a one-item, seven-point scale adapted from the INS (Schultz, 2002, illustrating various levels of overlap between circles denoting oneself and nature). After a brief and unrelated filler task (of approx. 1.5 min duration across participants), in the third

evaluation block participants were instructed to imagine they had won $ 100 and were presented with the opportunity to donate to WWF in support of the #Together4Forests campaign that was promoted by the posters. Then, we presented them with each of the campaign ads again and measured their willingness to donate with the following question: “How much of the won $ 100 would you want to donate to WWF, basing your decision on this particular ad below?” on a slider scale with $ 0 - $ 100 endpoints and $ 1 units. The study ended with an attention check and demographic questions.

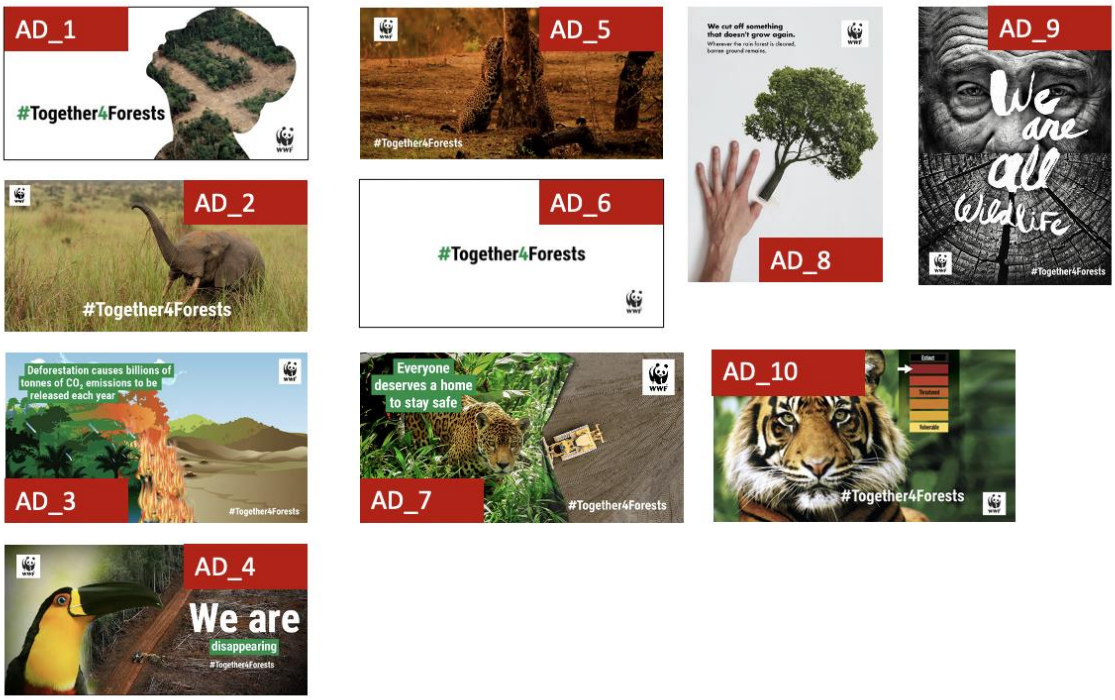


Figure 4. WWF posters used in Study 4a

Results and Discussion

Our results show that promotional material induced varyingly strong sense of personal relationship with nature that significantly differed between many of the presented ads. This was

revealed by pairwise comparisons in a repeated measures ANOVA (more suited for preliminary analyses as they account for repeated testing, adjustment for repeated comparisons: Bonferroni) with ad-associated sense of personal relationship with nature as a dependent variable and ad number as a between-subjects factor, see Table 5 (for matching promotional material see Figure 4). The main effect of ad number on ad-associated sense of personal relationship with nature was significant, $F(1, 9) = 18.947$, $p < .001$, $\eta^2_p = .162$.

Table 5

Descriptive statistics and statistical differences between ad-associated perception of one's self-nature connection

		Scores on perceived environmental identity									
		Ad 1	Ad 2	Ad 3	Ad 4	Ad 5	Ad 6	Ad 7	Ad 8	Ad 9	Ad 10
	M	3.23	3.96	3.15	3.88	3.69	2.64	4.01	4.32	4.78	3.92
	(SD)	(1.77)	(1.66)	(1.59)	(1.50)	(1.77)	(1.61)	(1.59)	(1.80)	(1.96)	(1.52)
Ad 1		-									
Ad 2			-								
Ad 3		*	*	-							
Ad 4				*	-						
Ad 5						-					
Ad 6		*	*		*	*	-				
Ad 7				*			*	-			
Ad 8				*			*		-		
Ad 9			*	*	*	*	*			-	
Ad 10				*			*			*	-

Note. The statistically significant differences (*) are a result of pairwise comparisons in repeated measures ANOVA ($p < .05$).

Furthermore, our results also show that the ad-associated strength of one's sense of personal relationship with nature is positively correlated with the general attitude toward the campaign ad, $r = .630$, $p < .001$.

To investigate the relative predictive power of the ad-associated strength of one's sense of personal relationship with nature, while controlling for the general attitude toward the ad, on the ad-associated willingness to donate money in support of the promoted WWF campaign, we used linear mixed-effect model analyses with random intercept that allowed us to account for the inter-correlated and nested nature of the ad ratings (a consequence of a within-subject design with sequential measurements). The analyses revealed that the perceived sense of personal relationship with nature induced by an ad significantly predicted willingness to donate to the WWF (increasing donation on average by 3.28 $, $b = 3.28$, $t(889) = 10.44$, $p < .001$), even when controlling for the general attitude toward the ad (increasing donation on average by 4.40 $, $b = 4.40$, $t(889) = 10.02$, $p < .001$).

These results are supportive of our assumptions that promotional material conveying the salience of one's personal relationship with nature can activate environmental identity, depending on the strength of one's sense of personal relationship construed as a function of the ad's perception. We found that a momentarily perceived stronger sense of personal connection with nature was positively correlated with one's general attitude toward the ad that had already referenced nature, and more importantly, distinctively predicted willingness to donate to the campaign promoted by the ad.

Study 4a offers only preliminary evidence of our hypotheses as the design of the study does not allow us to investigate causality and it also creates a rather unrealistic scenario—in reality,

individuals rarely face numerous campaign ads and their comparisons when forming their intentions to donate. Thus, in Study 4b, we aim to address these limitations and offer a more stringent test of our hypotheses with a choice of campaign ads that reference nature and induce either stronger or weaker self-nature connection. Based on reports from Study 4a (see Tables 5 and Figure 4), we chose ads that were perceived as inducing stronger or weaker sense of closeness between oneself and nature while being perceived rather equally in terms of the general ad attitudes (appeal, ability to convince, importance and optimism). We also made sure that the ads were similar in terms of the graphical elements used (e.g., presence of campaign message, absence of animal pictures, etc.). On the basis of these criteria, we chose the campaign ads number 3 and 8 (see Figure 4) to test our hypotheses in a confirmatory fashion in Study 4b.

2.6 Study 4b

In this study, we hypothesized that activating environmental identity through an increase of individual's personal relationship with nature conveyed by a promotional campaign ad will lead to higher donation intentions toward the promoted pro-environmental campaign.

Based on the insights from our study 4a, we manipulated the salience of individual's personal relationship with nature through two specific WWF #Together4Forests promotional campaign ads that elicited either stronger or weaker self-nature connection. The present study was preregistered, materials can be found here: https://aspredicted.org/7ML_XHT (any deviations from the pre-registration are mentioned in the text).

Method

The study was conducted online on Amazon Mechanical Turk through the CloudResearch platform with 504 participants in exchange for a standard payment, with 250 and 254 participants

in the experimental conditions, respectively (due to simultaneous participation it was not possible to stop the data collection at exactly 500 participants as outlined in our preregistration). From these, we removed 2 (0.4 %) because they had failed the attention check, which left 502 participants for statistical analyses (M_{age} = 40.52; 53.6 % female, 45.6 % male, 0.8 % non-binary/other).

In a between-subjects design, we manipulated the perceived salience (high vs. low) of individual's personal relationship with nature through two conditions: participants were randomly assigned to see one of two WWF #Together4Forests campaign ads inducing either a strong or weak sense of personal relationship with nature (see Figure 5). The ad was introduced as follows: "The ad presented below promotes the #Together4Forests campaign that was launched internationally by the WWF (World Wide Fund for Nature) to protect the world's forests and other ecosystems." Below the presented campaign ad, participants were instructed to imagine they had won $ 100 and were presented with the opportunity to donate to WWF in support of the #Together4Forests campaign. Their willingness to donate to WWF was measured with a "How much of the won $ 100 would you want to donate to the WWF?" on a slider scale with $ 0 - $ 100 endpoints and $ 1 units.

After the measurement of this main dependent variable, as means of a manipulation check, we presented participants with the ad again and assessed the sense of personal relationship between oneself and nature induced by the campaign ad and general ad attitudes (M = 4.62, SD = 1.37, α = .82), both measured as per Study 4a. The study ended with an attention check and demographic questions.

Figure 5. WWF campaign ads used in Study 4b

Results and Discussion

We tested our hypotheses as preregistered with an ANOVA with the type of ad (high vs. low salience of one's relationship with nature) as a between-subjects factor and donation intentions as the dependent variable. The analyses revealed a significant main effect of the type of ad, $F(1, 500) = 3.73$, $p = .05$, $\eta^2_p = .007$, showing higher donation intentions when presented with a campaign ad with higher salience of one's relationship with nature ($M = 25.60$, $SD = 26.55$) and lower donation intentions when presented with a campaign ad with lower associated salience of ones relationship with nature ($M = 21.45$, $SD = 21.41$). In other words, in the higher (vs. lower) nature-relationship salience condition, participants were willing to donate around 19 % more to the WWF.

An analysis of the donation intentions data showed that while the variable had a similar distribution between the two experimental conditions (the independent samples Kolmogorov-

Smirnov test: p =.36), it was not normally distributed (Shapiro-Wilkinson test: $p < .001$) but skewed right, thus warranting an additional analysis with log-transformed donations intentions data. The ANOVA using log-transformed data, excluding donations of \$ 0[1] thus analyzing only data of those who would donate *some* money, also shows a significant main effect of the type of ad, $F(1, 433) = 4.01$, $p = .05$, $\eta^2_p = .009$, showing higher donation intentions when presented with a campaign ad with higher salience of one's relationship with nature ($M = 1.3$, $SD = 0.44$) and lower donation intentions when presented with a campaign ad with lower salience of one's relationship with nature ($M = 1.22$, $SD = 0.41$).

In order to perform a manipulation check on the two campaign ads representing the experimental conditions, we compared them on the INS scores measured after ad exposure. We found that the ad with higher vs. lower pretested closeness between oneself and nature induced higher INS scores ($M_{high} = 3.89$, $SD_{high} = 1.70$; $M_{low} = 3.61$, $SD_{low} = 1.50$; $F(1, 500) = 3.90$, $p = .05$, $\eta^2_p = .008$). The general attitude toward the ad was also marginally higher for the ad with higher vs. lower pretested closeness between oneself and nature ($M_{high} = 4.73$, $SD_{high} = 1.44$; $M_{low} = 4.52$, $SD_{low} = 1.29$; $F(1, 500) = 3.18$, $p = .08$, $\eta^2_p = .006$).

The results of this study have two implications: First of all, they again support our general hypothesis that individuals' environmental identity can be activated through referencing self-nature connection (visually in this case) and thus positively impact pro-environmental behavioral tendencies by increasing the salience of individual's own relationship with nature. Second, this study implies that this can be done also visually and through marketing stimuli-(in contrast to directly inviting a person to consider their relationship with nature as demonstrated in Studies 1-

[1] Logarithm log(x). Commonly used transformation, the strength of this transformation can be somewhat altered by the root of the logarithm. It can not be used on negative numbers or 0.

3) by means of exposure to promotional stimuli that have the potential to induce stronger (rather than weaker) sense of personal relationship with nature.

3. General Discussion

The present set of studies aimed to examine the role of self-nature connection and environmental identity in promoting pro-environmental behavior. Specifically, we applied the lens of identity theory and the concept of environmental identity activation to systematically study how nature references can nudge consumers toward pro-environmental consumption. The results of the six studies consistently supported our hypothesis that increasing the salience of individuals' personal relationship with nature leads to the activation of their environmental identity and subsequent pro-environmental behavioral tendencies. In particular, Study 1a and Study 1b provided evidence that self-nature references are more likely to activate environmental identity and induce stronger pro-environmental intentions, than nature-based references. Subsequent studies (Study 2, 3, 4a and 4b) confirmed that increasing the salience of individual's relationship with nature leads to stronger pro-environmental intentions as well as real behaviors, more positive attitudes toward pro-environmental products, and increased willingness to donate to environmental causes, and that self-nature connection can be referenced alone or in addition to other nature references in marketing stimuli. The results of our studies indicated that the relationship with nature has a greater potential to activate environmental identity compared to nature alone.

This paper proposes that a crucial aspect of environmental identity lies in its self-defining attributes, signifying an individual's relationship with nature (Schultz, 2001; Clayton, 2003). The realization and quality of this relationship serve as the active components that translate one's environmental identity into congruence, specifically those aligned with pro-environmental

actions (Oyserman, 2009; Reed et al., 2012). According to Oyserman et al. (2012), when a specific identity becomes salient within one's self-concept, it activates the associated content and a broader framework for perceiving the world, interpreting situations, and aligning one's actions with the activated identity.

In studies 1a and 1b, we activate elements of identity content and a sense of commitment, both of which are interconnected in identity theory and are integral to the theoretical framework (Davis et al., 2009) about the feeling of interdependence with the natural environment. Commitment to the natural environment is a theoretical construct that has demonstrated the ability to predict pro-environmental behavior. According to Oyserman (2001), when a specific identity is activated in an individual's mind, the content of that identity is also activated. In essence, the content of environmental identity becomes temporarily accessible (in this case, the relational component), which can lead to feelings of interdependence (Davis et al., 2009) and a sense of care for nature (Perkins & Forehand, 2012). This effect is analogous to a human-to-human relationship. It yields relational consequences when connected to nature, including feelings of love, care, active participation in a mutual relationship, respect, responsibility, mutual influence, and concern for actions and their consequences (Perkins & Forehand, 2012). It is essential to clarify that this argument forms the basis for our entire paper.

The original INS measure (Schultz, 2001) draws from the concept developed by Aron (1986, 1991), which focuses on the closeness of relationships. A more behavioral dimension of this closeness is interconnection and interdependence, mirroring what we observed in our exploratory analysis of qualitative data (see Appendix A2), which included factors such as the impact on nature, influence, emotional aspects, etc. Interdependence signifies the mutual influence of

oneself on nature and vice versa. Moreover, interdependence nurtures sentiments of care for the natural environment (see Appendix A2).

The manipulation implemented in studies 2 and 3, which involves asking participants about their past experiences and assessing how salience effects might influence their current behavior, is indeed rooted in established paradigms of experimental identity research. In their study, Puntoni et al. (2011) employed a gender identity salience manipulation method with increased internal validity. They achieved this by tasking participants with writing essays and examining actual donations to ovarian cancer research. In the gender prime condition, participants composed two essays discussing the impact of their gender (vs. control) on their decision-making processes and interpersonal relationships. Another line of research, as seen in the works of Verrochi et al. (2013, 2015), involved the activation of distinct identities (such as athlete versus volunteer) by instructing participants to recall and describe a specific time they performed in that role for five minutes. Similarly, Reed (2004) activated the family identity, as opposed to an independent adult identity, by instructing participants to write five sentences detailing this particular aspect of themselves. According to Kettle (2019), identity manipulations that describe identity-related actions or situations have been demonstrated to activate that identity in individuals' thoughts. In general, employing a recall task to manipulate identity salience provides a high degree of experimental control (Puntoni et al., 2011). This manipulation aligns with a well-established paradigm in experimental identity research. It has been used in various studies and is, thus, a reliable and standardized approach. Recalling past experiences can act as a cognitive priming mechanism. It brings the relevant aspects of one's identity to the forefront of their thoughts, potentially making them more influential in their current decision-making processes. Furthermore, as Bandura (1986) suggests, prior experiences with a behavior serve as the foremost

source of information regarding behavior intentions (Ajzen & Fishbein, 1980). Other theoretical frameworks also rely on past behaviors to predict future behavioral intentions or actions, as demonstrated in concepts like self-efficacy (Bandura, 1977) and goal activation (Förster et al., 2007). While past-focused manipulation has its merits regarding ecological validity and behavioral predictions, it is essential to recognize its limitations. As this committee pointed out, there is a temporal discrepancy between the manipulation (past-focused recall task) and the desired outcome (immediate behavior). Identity salience might indeed operate in the present, and a past-focused manipulation may not fully capture this immediacy. There is also a potential positive and subjective bias, in the sense that asking participants to recall past experiences can introduce recall bias. People might not accurately remember their past experiences or might construct biased memories, or only remember positive events, which could affect the validity of the manipulation. In addition, it could have a potential demand effect; participants may develop suspicions about the purpose of the research when asked to recall past experiences. This could introduce biases or social desirability effects in their responses and behaviors.

These pros and cons further illustrate our rationale for employing various manipulation strategies within our research to activate environmental identity. Specifically, we utilized a tagline manipulation in studies 1a and 1b, incorporated a recall task based on prior research (Kettle, 2019) in studies 2 and 3, and employed an advertising visual manipulation with high external validity and identity-relevant cues, as suggested by Kettle (2019) and Forehand et al. (2001), in studies 4a and 4b—the latter studies aimed to present a more realistic scenario, closely resembling real-world contexts.

The decision to utilize the strength of environmental identity as a control variable rather than as a moderator in our research paper is grounded in several important rationales. First, a

fundamental distinction between environmental identity and other identity types investigated in prior research, such as gender or ethnicity, lies in its association with the self primarily with a global, nonsocial, non-human category—the natural environment (Clayton, 2003). Additionally, consumers may perceive pro-environmental consumption behaviors as potentially costlier and more challenging to enact than other identity-relevant behaviors (Trudel, 2019). The unique attributes of environmental identity raise intriguing questions about its distinctiveness from other identity types, as evidenced by prior studies (e.g., Deshpande et al., 1986; Puntoni et al., 2011; Chattaraman et al., 2010). These distinctive characteristics set environmental identity apart and prompt us to consider the necessity of a specialized conceptual framework tailored to its unique features. In light of these distinctions, exploring how environmental identity operates in its own capacity becomes increasingly relevant, potentially deviating from social identities. Notably, the reported levels of environmental identity strength in our samples appeared relatively high (with means ranging between 4.68 and 5.02 on a seven-point scale). It is essential to recognize that the essence of environmental identity may significantly differ from other more commonly researched identities within the consumer domain. This distinction constitutes one of the primary reasons for employing environmental identity strength as a control variable in our research. Secondly, environmental identity is a foundational psychological construct that significantly influences individuals' attitudes and actions related to pro-environmental behaviors. Recognizing the pervasive role of this identity, we deemed it essential to include it in our study. By using it as a control variable, we effectively minimize the potential confounding effects that variations in the strength of environmental identity might introduce. By controlling for the strength of environmental identity, we ensure that any observed changes are more likely attributed to the salience manipulation itself rather than differences in baseline identity strength among

participants. Furthermore, controlling for environmental identity as a baseline variable allows us to isolate the effects of our manipulation techniques. If we were to treat environmental identity as a moderator, we would be focusing on how its strength moderates the relationship between the manipulations and the outcomes. However, our primary research focuses on understanding the direct impact of our manipulations rather than the conditional effects they might have based on the participants' baseline identity strength. In summary, treating the strength of environmental identity as a control variable enhances the internal validity of our study by reducing potential confounding effects. It facilitates a more accurate assessment of the direct effects of our identity salience manipulations on pro-environmental behaviors, ultimately strengthening the robustness and reliability of our research findings.

These findings have important implications for understanding the underlying psychological mechanisms of pro-environmental behavior and designing effective interventions to promote sustainable behavior. We suggest that drawing on the concept and content of consumers' environmental identity and fostering individuals' connection with nature can be a powerful strategy for promoting environmental behaviors. By activating environmental identity, individuals may be more likely to engage in sustainable behaviors not only because of external pressure or social norms (Farrow et al., 2017; Keizer & Schultz, 2018) but also because of their internal motivation and values that are aligned with environmental goals.

3.1 Theoretical contribution

On the theoretical side, the present research contributes to the environmental psychology literature by advancing the understanding of the role of environmental identity in promoting pro-environmental behavior. Specifically, this research demonstrates that activating individuals' environmental identity by increasing the salience of their personal relationship with nature leads

to more positive attitudes and behavioral intentions toward pro-environmental actions, products, and causes. Whereas prior research has identified several meaningful relationships between nature referencing and pro-environmental behavior (for a review, see Mackay & Schmitt, 2019), our research is the first of its kind to detail the specific aspect that can help drive these relationships more effectively.

The concept of a "relationship" unites many of the theoretical and empirical approaches to environmental identity. For example, "relationship with nature" is considered a core theoretical element in Clayton's (2003) approach to environmental identity, defined as "a sense of connection to some part of the nonhuman environment that affects the way we perceive and act toward the world; the belief that the environment is important to us and an important part of who we are" (Clayton, 2003, pp. 45–46). Contemporary work in the area is similarly using the associated interdependence theory to examine consumers' relational commitment to nature and its effects on pro-environmental behaviors (Davis et al., 2009). From a developmental perspective, environmental identity seems to form primarily through long-term relational processes involving repeated personal contact, and experience with, various natural surroundings (Brügger et al., 2011; Cheng & Monroe, 2012; Collado et al., 2015).

Our findings contribute to the theoretical understanding of the mechanisms underlying pro-environmental behavior by highlighting the importance of people's conscious connections with nature and the non-human environment in shaping attitudes and behavior toward the environment. In addition, our findings can help explain, at least partially, why past research on nature that might have been affecting a person's self-nature connection to varying extents depending on the focus of their nature exposure and nature referencing manipulations has often

found mixed evidence about environmental identity activation, which was highlighted in a meta-analysis by Mackay and Schmitt (2019).

At a conceptual level, our findings corroborate advances in identity theory suggesting that identity salience plays an important role in identity-relevant consumption (Reed et al., 2012). This seems also to be the case in environmental and sustainable consumption domains. Consumers may hold various identities across situations and whether they will engage in pro-environmental behaviors may depend on the salience of their environmental identity in a given, or across multiple, consumption contexts. We indeed show that identity salience can be influenced by different types of identity cues stemming from a specific social context, media, or marketing stimuli (Forehand et al., 2002). More specifically, we show that identity-based processing is facilitated when a relevant identity frequently becomes a situationally active element of the self (Reed et al., 2012).

Furthermore, the present research adds to the literature by examining the role of nature alone versus self-nature connection in activating environmental identity. The findings suggest that self-nature connection may be a more effective means of activating environmental identity than nature alone. This distinction is important because it sheds light on the conditions under which environmental identity is most likely to be activated and thus on the factors that may facilitate pro-environmental behavior in decision and consumption contexts.

Finally, our findings provide a valuable extension to the existing body of research on environmental identity and identity theory in general. Drawing on theoretical developments in identity theory (Oyserman, 2009) and the conceptual framework of environmental identity (Clayton, 2003), our study successfully developed and tested a strategy for activating environmental identity, particularly focusing on its relational aspect. Identity theory posits that

individuals' self-concept is shaped by their social relationships and interactions (Tajfel & Turner, 2004). It suggests that the relational aspect of identity plays a crucial role in defining who we are and how we perceive ourselves in relation to others and the world around us (Reed et al., 2012). Building on this theoretical perspective, our study focused on the relational component of environmental identity, highlighting the significance of the personal connection individuals have with nature in shaping their environmental identity. By specifically targeting and enhancing the relationship with nature, we aimed to activate environmental identity more effectively compared to approaches that solely emphasize the presence of nature. This approach aligns with the premise of environmental identity theory, which emphasizes the role of personal experiences and connections with nature in shaping individuals' sense of environmental self (Clayton, 2003). Our findings support the notion that a relationship with nature can serve as a powerful catalyst for the activation of environmental identity.

Regarding the psychological processes underlying the predicted identity salience effects, our research posits the involvement of several possible theoretical processes, each contributing to these main effects. First, the self-preservation and self-expansion mechanism, as proposed by Aron and Aron (1986, 1991), emphasizes the importance of close relationships and the expansion of the self in the context of identity activation (Reed et al., 2012). Regarding environmental identity, this suggests that when individuals activate their environmental identity, they may perceive a closer, more interdependent relationship with nature. This, in turn, may lead to an increased sense of responsibility and care toward the natural environment. In essence, activating environmental identity can trigger identity-based processes, wherein incorporating the natural environment into one's self-concept may invoke self-protective motivations. In this perspective, harming the environment equates to harming oneself (Mayer & Frantz, 2004, p. 512). Second,

our study aligns with the impact of identity activation on mindset, particularly the shift from abstract to concrete mindsets, as highlighted in Oyserman's work (2001, 2009). Activating environmental identity may encourage individuals to adopt a more concrete mindset, focusing on specific actions and behavioral congruence with their environmental identity. This shift might be akin to identity-based motivation (IBM), where dynamic construction, procedural readiness, and the interpretation of ease and difficulty play a role in mindset transformation (Oyserman et al., 2012). With the self-concept acting as a cognitive structure, activating one's environmental identity could change the mindset (the use of identity-congruent mindsets), simplifying the interpretation of the world to promote identity-congruent behaviors while reducing cognitive effort. According to Oyserman (2009), the self-concept is a cognitive structure that helps understand and make sense of the world. Priming self-concept structure with first person singular (I, me) vs. plural (we, us) pronouns influences not only how people think about themselves but how they think generally by shifting their mindset and their interpretation of the world (Trafimow et al., 1991; Triandis, 1989). Research by Oyserman and Lee (2007, 2008a, 2008b) provides a comprehensive review of this evidence. For example, in an experiment by Kühnen and Oyserman (2002), participants primed with 'us' pronouns recalled better spatial relationships among unrelated objects, whereas 'me' primed participants remembered the objects but not their relationships. To continue along this line of thought, activating the relational component of environmental identity can shift people's mindset to a more immersed (as opposed to distal) perspective (Kross, 2009; Kross et al., 2005). In one scenario, individuals may position themselves as active agents, with their lives intricately intertwined with the natural environment (Jones & Nisbett, 1972). Lastly, the process of mental simulation may come into play, as suggested. Our self-concept functions as both an active agent and a memory structure, shaping

how we remember and experience the world around us (Oyserman, 2001). As an information processor, our self-concept influences how we perceive and process information, constructing a framework through which we interpret our experiences and memories (Decety & Stevens, 2009). This intricate interplay between identities, memory, and perception underscores the significance of our self-concept in not only shaping our past and present but also in guiding our future interactions with the world. Mental simulation, a cognitive process that allows us to create and manipulate mental representations of scenarios and experiences (Kosslyn et al., 2006), may play a pivotal role in this dynamic. It could be through mental simulation that we actively engage with and simulate potential experiences, influencing our self-concept's continuous evolution and its impact on how we perceive, remember, and interact with the world. In identity theory, the salience of an identity means that this identity and what constitutes this identity are temporarily made salient and accessible at that point in time (Oyserman, 2001; Reed et al., 2012). Regarding environmental identity, its activation through the relational component may trigger mental simulation as it can help with memory processes. When recalling information, individuals may mentally reconstruct events or information as a form of simulation, enhancing memory retrieval and influencing intentions and behaviors (Elder & Krishna, 2012). Mental simulation involves creating mental representations of scenarios or experiences, even when they are not physically present (Pylyshyn, 2002). When it comes to one's environmental identity, mental simulation can be used to imagine and explore various aspects of one's relationship with the natural environment, such as reliving past experiences, remembering interactions with nature, and even imagining emotions or feelings. This process allows individuals to mentally engage with their surroundings, even when they are not physically present in those environments. Mental simulations can contribute to one's sense of connection with nature by allowing them to imagine

this relationship and its personal significance vividly. This can reinforce the emotional attachment and sense of connection with nature. Mental simulation through the activation of the relational component of environmental identity can be a valuable instrument for researchers to explore and explain how consumers mentally engage with nature. In summary, these three processes—self-preservation/expansion, mindset shift, and mental simulation—potentially contribute to the observed effects of identity salience by shaping individuals' cognitions, motivations, and behaviors.

Overall, this research contributes to a deeper understanding of the relationship between environmental identity and pro-environmental behaviors. By recognizing the importance of the relational aspect of environmental identity and its potential influence on behavior, sustainability-focused campaign managers we can develop more targeted interventions and strategies to foster conservational attitudes and actions among individuals.

3.2 Practical contribution

In a recent paper, Kettle (2019) emphasized the importance of broadening the scope of identity research to encompass less-studied identity types by going beyond the already extensively researched identities, such as ethnicity, gender, nationality, and political affiliations. A key difference between environmental identity and the other types of identities examined in prior research (e.g., gender, ethnicity) is that the former associates the self primarily with a global nonsocial, non-human category—the natural environment (Clayton, 2003). At the same time, consumers may perceive pro-environmental consumption behaviors as potentially costlier and more difficult to enact than other types of identity-relevant behaviors (Trudel, 2019). This fundamental distinction may suggest unique specificities of environmental identity processes concerning the more common social identities assessed in prior research. As mentioned in the

opening of the general discussion, the mean reported levels of environmental identity strength were seemingly high in our samples (means ranged between 4.68 and 5.02 on a seven-point scale). It is essential to consider that the essence of environmental identity may differ from other, frequently researched identities in the consumer domain. For example, environmental identity triggers self-identification through ties with the natural environment, a nonsocial, non-human object at a high level of abstraction (Clayton, 2003). It could be that the link between individual behavior and the often remote natural environment is shaped and construed quite differently than the link between behavior and the dynamic and ever-present social environment. A theoretical account that aligns with such presumptions is the biophilia hypothesis. This hypothesis maintains that, for a long time, human evolution occurred within and depended on the natural environment, fulfilling most human needs and potentially leading to a deep appreciation for nature. Some scholars refer to this as a "biophilic instinct" or "innate love of nature" (Saad, 2013, p. 360), and others even suggest that it is encoded in human genes (Kahn, 1997). Relevantly, the common finding that consumers experience greater well-being when they live closer to or are exposed to nature is attributed to this biophilic instinct of consumers (White et al., 2013, 2017). As such, even though a substantial part of the population now lives in urban areas, biophilia's evolutionary perspective could partly explain why our participants scored relatively high on the environmental identity strength measure. The biophilia concept offers a compelling explanation for environmental identity's fundamental distinction and unique characteristics compared to the more prevalent (social) identities explored in prior research. This perspective suggests that due to evolutionary factors, humans inherently possess an identification with nature, or rather, a seamless connection with it. In essence, we are an integral part of the natural world, and this

relationship between humans and nature is considered unbreakable. Consequently, environmental identity emerges as a distinct form of identity that warrants closer examination.

A parallel can be drawn between brand identity and environmental identity. Indeed, these two identities share a relational component, just as is also the case with other identities we have used in our research as control conditions (such as family identity and university identity). Based on identity theory, we could assume two possible outcomes by using the relational component within the context of brand identity. In the field of marketing, there is extensive research on building brand communities, cultivating customer loyalty, and fortifying the connection between a brand and an individual (Hollebeek, 2011; Hur et al., 2011; Johnson et al., 2006). Therefore, exploring this conceptualization concerning the relationships within a brand identity context would be interesting. Our first assumption is that utilizing the relational aspect of an individual's brand identity would function as an instrument to activate the salience of that identity. In essence, we might observe a similar pattern with environmental identity, which could have broader implications beyond the scope of our empirical findings, making a significant contribution to the marketing field as well. Hence, future research could explore the potential activation of brand identity through the relational component of that specific identity. Our second assumption is that the relational component differs in the conceptualization of brand identity compared to environmental identity. According to Reed et al. (2012), a distinction exists between two significant categories of identity known as objective identity and subjective identity. Objective identities tend to be more stable over time, whereas subjective identities are more fluid and can change over time or in response to specific events. Therefore, we assume that the activation of the relational component would behave differently in the context of brand identity when contrasted with environmental identity. Let us further explore this concept through a hypothetical

scenario: imagine an individual who strongly identifies as a Mac user, forming a deep association between their identity and the brand's distinctive characteristics and values. Unlike more stable objective identities, this subjective brand identity is susceptible to shifts based on experiences. Consider a situation where this devoted Mac user encounters a single negative experience with an Apple product—a malfunction or disappointment. Unlike objective identities that may weather such incidents, subjective identities like brand identity are more fragile. In this case, the negative encounter can significantly influence, or even fracture, the connection between the individual's sense of self and the brand. This phenomenon aligns with the theoretical framework that Reed and Forehand (2016) established, highlighting the malleability of subjective identities in response to specific events. As a consequence of the negative encounter with the Apple product, the individual may experience a suppression of their brand identity within their self-concept. In the case of environmental identity, the relational component remains largely stable, as humans are inherently connected to nature, as posited by the biophilia theory (Wilson, 1984). The connection between humans and their environmental identity remains constant and unbreakable, as it is an inherent aspect of being human. Future research could delve into the potential activation of brand identity through the relational component of that specific identity, as this may hold broader implications beyond the scope of our empirical findings and significantly contribute to the marketing domain.

Broadly speaking, effective marketing materials should strategically underscore the relational component to evoke environmental identity activation. This approach underscores the intricate interplay and mutual dependence between humans and nature, shedding light on the consequential outcomes of individual behaviors. Previous research indicates that while goal activation tends to have a transient impact, it often triggers a licensing effect (Reed & Forehand,

2019). Drawing from identity theory, integrating the relational component diminishes the cognitive effort required and facilitates the seamless adoption of future pro-environmental behaviors (Oyserman et al., 2012). According to Kettle (2019), the repeated activation of an environmental identity enhances its chronic salience, mitigating the short-term effects of marketing stimuli and fostering a more enduring connection between individuals and the natural environment.

Furthermore, this paper carries significant practical implications for communications and marketing focused on environmental protection. The findings suggest that promoting personal relationships with nature (evoking human-nature connections rather than descriptive representations of nature) may be an effective means of encouraging pro-environmental behavior. For instance, environmental campaigns could use messages or images that emphasize the importance of consumers' personal connections with nature. These materials can take on various forms, either as a small interactive task on a website, a promotional leaflet in a physical store, or a billboard poster in outside areas. Considering and improving the aspect of how "closely connected to nature" a campaign might make customers feel may be more effective than campaigns that focus solely on the importance of protecting the natural environment or on referencing various aspects of the natural environment.

The findings also suggest that businesses could benefit from emphasizing the personal connections consumers have with nature when marketing pro-environmental products. For instance, they could use storytelling techniques to create a narrative around the product that promotes environmental sustainability to emphasize its connection to nature and how it relates to one's own personal connections and experiences. This approach may be particularly effective for

products that are marketed as environmentally friendly but that may not be perceived as such by all consumers, such as organic products.

In addition, the present research has implications for environmental education. The results indicate that emphasizing personal connections with nature may be an effective means of promoting pro-environmental behavior among children and adults. Environmental education programs could incorporate activities or lessons that highlight and explain the link between nature and individuals to view themselves as stewards of the environment.

3.3 Future Research and Limitations

While our research contributes to the literature, it is not without limitations, which, in turn, present opportunities for future research. A first limitation could be the large variance in the impact of environmental identity activation across different pro-environmental behaviors. This limitation highlights the importance of developing strong enough nudges for specific decision-making situations and behaviors. This dependence on the specific content of one's environmental identity suggests that interventions should be designed with careful consideration of the specific behaviors being targeted and the associations that individuals make between those behaviors and their environmental identity. These insights could inform the development of more effective interventions aimed at promoting pro-environmental behaviors. This point is also closely related to the fact that the effect sizes evidenced in our research are often rather small. The likelihood of engaging in identity-relevant behaviors may depend on the level of importance/prominence of a specific identity in the self-concept and its specific situations (Oyserman, 2009; Reed et al., 2012). How much and in which situations are consumers more vs. less prone to be considering the environment in consumption decisions? Bringing answers to this open question should be clearly be a priority for future research.

Another limitation of our research is that we mostly tested relatively easy-to-enact behaviors. Such behaviors have become rather ubiquitous across broader consumer populations. Recent research indicates that consumers' self-views as environmentalists (Moser & Kleinhückelkotten, 2018) and environmental concerns (Alcock et al., 2017) may not be predictive of certain high-impact behaviors, such as overall household energy usage or amount of air travel. It is important to note that these studies did not investigate environmental identity or its specific aspects. Future research could therefore test whether our results hold with high-involvement, high-impact behaviors such as energy-efficient household refurbishment decisions or transportation choices.

In addition, this paper focused on two specific strategies for promoting pro-environmental behavior, namely, activating environmental identity through self-nature connection vs. nature references alone. While the self-nature connection strategy has shown promising results, it is not the only strategy that relies on the concept of environmental identity that can be effective in promoting sustainable behavior. Future research could investigate other strategies that may complement or enhance the effects of self-nature connection interventions.

Furthermore, some of our studies were conducted in laboratory settings, which may not fully capture the complexity and diversity of real-world environmental problems and behaviors. Although the choice tasks and product evaluations in Studies 3 and 4 aimed to simulate realistic environmental decision-making situations, they did not involve actual purchases or monetary donations. Future research could incorporate more naturalistic and ecologically valid settings to examine the effectiveness of self-nature connection interventions in promoting sustainable behaviors.

Another area for future development relates to exploring how the activation of environmental identity might influence other domains beyond pro-environmental behavior. For example, studies

could investigate whether the activation of environmental identity might lead to changes in health behaviors or social behaviors (Hatfield & Job, 2000; Shimoda et al., 2018). For example, if individuals view themselves as environmentalists (Mayer & Frantz, 2004; Nisbet et al., 2009), they may be more likely to engage in other health behaviors that are consistent with this identity, such as eating a plant-based diet or using products with fewer chemical ingredients. Alternatively, activating environmental identity may influence individuals' social behaviors, such as their willingness to volunteer for environmental causes or their willingness to be part of a nature preservation association.

Finally, future research could explore how the activation of environmental identity through self-nature connection with the help of other available information and cues might be harnessed for promoting sustainable behaviors in different contexts. We know from past research (Geiger et al., 2017; Trudel, 2019; Zorell, 2020) that contextual factors influence pro-environmental behavior. For example, studies could examine how the activation of environmental identity might be used to encourage sustainable behaviors in workplaces, schools, or other community settings.

4. Conclusion

In conclusion, our research demonstrates that activating environmental identity through increasing the salience of individuals' personal relationship with nature can positively impact pro-environmental behavior across a variety of domains. The findings have important theoretical and practical implications for understanding and promoting pro-environmental behavior and highlight the potential of environmental identity activation as an effective strategy for promoting sustainable behavior. Our results serve as an initial step and future research can build on our findings by exploring new directions and expanding our knowledge of how environmental

identity can be activated and harnessed to promote pro-environmental behaviors in various contexts of everyday life.

References

Alcock, I., White, M., Taylor, T., Coldwell, D., Gribble, M.O., Evans, K.L., Corner, A., Vardoulakis, S., & Fleming, L. E. (2017). “Green” on the ground but not in the air: Proenvironmental attitudes are related to household behaviours but not discretionary air travel. *Global Environmental Change*, *42*, 136–147.

Aron, A., & Aron, E. N. (1986). Love and the expansion of self: Understanding attraction and satisfaction. New York, NY, US: Hemisphere Publishing Corp/Harper & Row Publishers.

Aron, A., Aron, E. N., Tudor, M., & Nelson, G. (1991). Close relationships as including other in the self. Journal of Personality and Social Psychology, 60(2), 241–253.

Ajzen, I., & Fishbein, M. (1980). Understanding attitudes and predicting social behavior. *Englewood Cliffs*, NJ: Prentice-Hall.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84, 191–215.

Bandura, A. (1986). Social foundations of thought and action: *A social cognitive theory*. Prentice-Hall.

Brügger, A., Kaiser, F. G., & Roczen, N. (2011). One for all? Connectedness to nature, inclusion of nature, environmental identity, and implicit association with nature. *European Psychologist, 16,* 324–333.

Chattaraman, V., Rudd, N.A. & Lennon, S.J. (2010). The malleable bicultural consumer: effects of cultural contexts on aesthetic judgments. *Journal of Consumer Behaviour*: *An International Research Review*, 9 (1), 18–30.

Cheng, J. C. H., & Monroe, M. C. (2012). Connection to nature: Children's affective attitude toward nature. *Environment and Behavior*, *44*, 31–49.

Clayton, S. (2003). Environmental identity: A conceptual and operational definition. In S. Clayton & S. Opotow (Eds.), *Identity and the natural environment* (pp. 45–65). Cambridge, MA: MIT Press.

Clayton S. & Czellar, S. (2023). Environmental identity as a motivator of pro-environmental behaviour. Forthcoming in the Handbook on Pro-Environmental Behaviour Change, Gatersleben B. & Murtagh, N. (Eds), Edward Elgar.

Collado, S., Corraliza, J. A., Staats, H., & Ruiz, M. (2015). Effect of frequency and mode of contact with nature on children's self-reported ecological behaviors. *Journal of Environmental Psychology*, *41*, 65–73.

Davis, J. L., Green, J. D., and Reed, A. (2009). Interdependence with the environment: commitment, interconnectedness, and environmental behavior. *Journal of Environmental Psychology*, 29, 173–180.

Decety, J., and Stevens, J. (2009). "Action Representation and its Role in Social Interaction" *in Handbook of Imagination and Mental Simulation*, eds K. D. Markman, W. M. P. Klein, and J. A. Suhr (New York, NY: Psychology Press), 3–20.

Deshpandé, R., Hoyer, W. D., & Donthu, N. (1986). The intensity of ethnic affiliation: A study of the sociology of Hispanic consumption. *Journal of Consumer Research*, 13, 214–220.

Elder, R. S., & Krishna, A. (2012). The “visual depiction effect” in advertising: Facilitating embodied mental simulation through product orientation. *Journal of Consumer Research*, 38(6), 988–1003.

Farrow, K., Grolleau, G., & Ibanez, L. (2017). Social norms and pro-environmental behavior: A review of the evidence. *Ecological Economics*, *140*, 1–13.

Forehand, Mark R. & Deshpandé, R. (2001). What we see makes us who we are: priming ethnic self-awareness and advertising response. *Journal of Marketing Research,* 38 (3), 336–348.

Forehand, M. R., Deshpandé, R., & Reed II, A. (2002). Identity salience and the influence of differential activation of the social self-schema on advertising response. *Journal of Applied Psychology, 87,* 1086–1099.

Förster, J., Liberman, N., & Friedman, R. S. (2007). Seven principles of goal activation: A systematic approach to distinguishing goal priming from priming of non-goal constructs. *Personality and Social Psychology Review,* 11, 211–233

Frantz, C. M., & Mayer, F. S. (2014). The importance of connection to nature in assessing environmental education programs. *Studies in Education Evaluation, 41,* 85–89.

Geiger, N., Swim, J., & Fraser, J. (2017). Creating a climate for change: Interventions, efficacy and public discussion about climate change. *Journal of Environmental Psychology*, 51, 104–116.

Hatfield, J., & Soames Job, R. F. (2000). Pro-environmental behaviour as a health behaviour—I: A review of the role of environment-related optimism bias and other factors. *Journal of Applied Health Behaviour, 2(2),* 7–13.

Harrison, R., Newholm, T., Shaw, D., 2005. The Ethical Consumer. Sage Publications Ltd., Thousand Oaks, CA.

Hart, C. M., Ritchie, T. D., Hepper, E. G., & Gebauer, J. E. (2015). The balanced inventory of desirable responding short form (BIDR-16). *Sage Open, 5,* 2158244015621113.

Hollebeek, L.D., 2011. Exploring customer brand engagement: definition and themes. *Journal of strategic Marketing,*19 (7), 555–573.

Hur, W.M., Ahn, K.H., Kim, M., 2011. Building brand loyalty through managing brand community commitment. *Management Decision*, 49 (7), 1194–1213.

Intergovernmental Panel on Climate Change. (2023). Climate Change 2023: Synthesis Report. A Report of the Intergovernmental Panel on Climate Change. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC, Geneva, Switzerland, (in press).

Johnson, M.D., Herrmann, A., Huber, F., 2006. The evolution of loyalty intentions. *Journal of marketing*, 70, 122–132.

Jones, E. E. & Nisbett, R. (1972). The Actor and the observer: Divergent perceptions of the causes of behavior. In E. E. Jones, D. E. Kanouse, H. H. Kelley, R. E. Nisbett, S. Valins, & B. Weiner (Eds). *Attribution: perceiving the causes of behavior* (pp. 79–94). Morristown, NJ: General Learning Press.

Kahn, P. Jr. (1997). Development Psychology and the Biophilia Hypothesis: Children's Affiliation with Nature. *Developmental Review*, 17, 1–61.

Keizer, K., & Schultz, P. W. (2012). Social norms and pro-environmental behavior. In L. Steg, A. E. van den Berg, J. M. de Groot, L. Steg, A. E. van den Berg, & J. M. de Groot (Eds.). *Environmental psychology: An introduction* (pp. 153–163). BPS Blackwell.

Kettle, K. L. (2019). Identity salience: Understanding when identity affects consumption. In A. Reed & M. R., Forehand (Eds.). *Handbook of research on identity theory in marketing* (pp. 30–43). Edward Elgar.

Kosslyn, S.M., Thompson, W.L., & Ganis, G. (2006). *The case for mental imagery*. New York: Oxford University Press.

Kross, E. (2009), When the self becomes other. *Annals of the New York Academy of Sciences*, 1167, 35–40.

Kross, E., Ayduk O., & Mischel, W. (2005). When asking 'why' does not hurt: Distinguishing rumination from reflective processing of negative emotions. *Psychological Science*, 16, 709–715.

Kühnen, U., & Oyserman, D. (2002) Thinking about the self influences thinking in general: Cognitive consequences of salient self-concept. *Journal of Experimental Social Psychology*, 38, 492-499.

Lichtlé, M.-C. (2007). The effect of an advertisement's colour on emotions evoked by attitude towards the ad: the moderating role of the optimal stimulation level. *International Journal of Advertising*, 26, 37–62.

Mackay, C. M., & Schmitt, M. T. (2019). Do people who feel connected to nature do more to protect it? A meta-analysis. *Journal of Environmental Psychology*, *65*, 101323.

Martin, C., & Czellar, S. (2016). The extended Inclusion of Nature in Self scale. *Journal of Environmental Psychology*, *47*, 181–194.

Mayer, F. S., & Frantz, C. M. (2004). The connectedness to nature scale: A measure of individuals' feeling in community with nature. *Journal of Environmental Psychology*, *24*, 503–515.

Moran, D., Wood, R., Hertwich, E., Mattson, K., Rodriguez, J.F.D., Schanes, K., Barrett, J. (2020). Quantifying the potential for consumer-oriented policy to reduce European and foreign carbon emissions. *Climate Policy*, 20, 28–38

Moser, S., & Kleinhückelkotten, S. (2018). Good intents, but low impacts: Diverging importance of motivational and socioeconomic determinants explaining pro-environmental behavior, energy use, and carbon footprint. *Environment and Behavior, 50,* 626–656.

Naspetti, S., & Zanoli, R. (2009). Organic food quality and safety perception throughout Europe. *Journal of Food Products Marketing, 15(3),* 249–266.

Nisbet, E. K., Zelenski, J. M., & Murphy, S. A. (2009). The nature relatedness scale: Linking individuals' connection with nature to environmental concern and behavior. *Environment and Behavior, 41,* 715–740.

Oyserman, D. (2001). Self-concept and identity. In A. Tesser & N. Schwarz (Eds.). Blackwell *Handbook of Social Psychology* (pp. 499-517). Malden, MA: Blackwell Press.

Oyserman, D., & Lee, S. W. S. (2007). Priming 'culture': Culture as situated cognition. In S. Kitayama and D. Cohen (Eds.), *Handbook of Cultural Psychology*. (pp. 255-279). New York, NY: Guilford Press.

Oyserman, D. & Lee, S. W. S. (2008a). Does culture influence what and how we think? Effects of priming individualism and collectivism. *Psychological Bulletin*, 134, 311-342.

Oyserman, D., & Lee, S. W. S. (2008b). A situated cognition perspective on culture: Effects of priming cultural syndromes on cognition and motivation. In R. Sorrentino & S. Yamaguchi (Eds.), *Handbook of Motivation and Cognition across Cultures*. (pp. 237-265) New York, NY: Elsevier.

Oyserman, D. (2009). Identity-based motivation: Implications for action-readiness, procedural-readiness, and consumer behavior. *Journal of Consumer Psychology, 19,* 250–260.

Oyserman, D., Elmore, K. & Smith, G. (2012). Self, self-concept and identity. In M.R. Leary and J.P. Tangney (eds), *Handbook of Self and Identity* (pp. 69‑104). New York: Guilford Press.

Perkins, A., & Forehand, M. (2012). Implicit self-referencing: the effect of non-volitional self-association on brand and product attitude. *Journal of Consumer Research*, 39, 142–156.

Petrescu, D. C., & Petrescu-Mag, R. M. (2015). Organic food perception: Fad, or healthy and environmentally friendly? A case on Romanian consumers. *Sustainability*, 7(9), 12017-12031.

Puntoni, S., Sweldens, S., & Tavassoli, N. (2011). Gender identity salience and perceived vulnerability to breast cancer. *Journal of Marketing Research, 48*, 413–424.

Pylyshyn, Z. W. (2002). Mental imagery: In search of a theory. *Behavioral and Brain Sciences,* 25, 157–238.

Reed II, A. (2004). Activating the self-importance of consumer selves: Exploring identity salience effects on judgments. *Journal of Consumer Research, 31*, 286–295.

Reed II, A., Forehand, M. R., Puntoni, S., & Warlop, L. (2012). Identity-based consumer behavior. *International Journal of Research in Marketing, 29*, 310–321.

Reed, A., & Forehand, M. R. (2016). The ebb and flow of consumer identities: The role of memory, emotions and threats. *Current Opinion in Psychology*, 10, 94–100.

Reed A, Forehand M. (2019). *Handbook of Research on Identity Theory in Marketing*. Northampton, MA: Elgar.

Trafimow, D., Triandis, H., & Goto, S. (1991). Some tests of the distinction between the private self and the collective self. *Journal of Personality & Social Psychology*, 60, 649-655.

Triandis, H. C. (1989). The self and social behavior in differing cultural contexts. *Psychological Review*, 96, 506-520.

Saad, G. (2013). Evolutionary consumption. *Journal of Consumer Psychology,* 23, 351–371.

Schultz, P. W. (2001). The structure of environmental concern: Concern for self, other people, and the biosphere. *Journal of Environmental Psychology*, *21*, 327–339.

Schultz, P. W. (2002). Inclusion with nature: The psychology of human-nature relations. In P. Schmuck & P. W. Schultz (Eds.), *Psychology of sustainable development* (pp. 61-78). Kluwer Academic Publishers.

Schultz, P. W., & Kaiser, F. G. (2012). Promoting proenvironmental behavior. In S. Clayton (Ed.), *Handbook of environmental and conservation psychology* (pp. 556–580). Oxford University Press.

Shimoda, Y., Ishizu, K., & Ohtsuki, T. (2018). The reciprocal relations between experiential avoidance and social anxiety among early adolescents: A prospective cohort study. *Journal of Contextual Behavioral Science,* 10, 115–119.

Stets, J. E., & Biga, C. F. (2003). Bringing identity theory into environmental sociology. *Sociological Theory*, *21(4)*, 398–423.

Stets, J. E., & Burke, P. J. (2000). Identity theory and social identity theory. *Social Psychology Quarterly, 63(3),* 224.

Stryker, S. (1968). Identity salience and role performance: the relevance of symbolic interaction theory for family research. *Journal of Marriage and the Family, 30*, 558-564.

Stryker, S. (1987). Identity theory: Development and extensions. In K. Yardley, & T. Honess (Eds.), *Self and identity (pp. 89–103).* New York: Wiley.

Stryker, S., & Serpe, R. T. (1982). Commitment, identity salience, and role behavior: A theory and research example. In W. Ickes & E. S. Knowles (Eds.), *Personality, roles, and social behavior (pp.199–218)*. New York: Springer-Verlag.

Stryker, S., & Serpe, R. T. (1994). Identity salience and psychological centrality: Equivalent, overlapping, or complementary concepts? *Social Psychology Quarterly, 57,* 16-35.

Tajfel, H., Turner, J.C., 2004. The social identity theory of intergroup behavior. In: Jost, J.T., Sidanius, J. (Eds.), Key Readings in Social Psychology. Political Psychology: Key Readings. Psychology Press, pp. 276e293.

Tam, K.-P. (2013). Concepts and measures related to connection to nature: Similarities and differences. *Journal of Environmental Psychology, 34*, 64–78.

Trudel, R. (2019). Sustainable consumer behavior. *Consumer Psychology Review, 2,* 85–96.

Verrochi Coleman, N. & Williams, P. (2013). Feeling like myself: emotion profiles and social identity. *Journal of Consumer Research,* 40 (2), 203‑222.

Verrochi Coleman, N. & Williams, P. (2015). Looking for myself: identity driven attention allocation. *Journal of Consumer Psychology,* 25 (3), 504‑511.

Vesely, S., Masson, T., Chokrai, P., Becker, A. M., Fritsche, I., Kl¨ockner, C. A., Tiberio, L., Carrus, G., & Panno, A. (2021). Climate change action as a project of identity: Eight meta-analyses. *Global Environmental Change, 70*, 102322.

Whitburn, J., Linklater, W., & Abrahamse, W. (2020). Meta-analysis of human connection to nature and proenvironmental behavior. *Conservation Biology, 34*, 180-193.

White, M.P., Alcock, I., Wheeler, B.W., Depledge, M.H. (2013b). Would you be happier living in a greener urban area? A fixed effects analysis of panel data. *Psychological science, 24*, 920–928.

White, M. P., Pahl, S., Wheeler, B. W., Depledge, M. H., & Fleming, L. E. (2017). Natural environments and subjective wellbeing: Different types of exposure are associated with different aspects of wellbeing. *Health & place, 45*, 77–84.

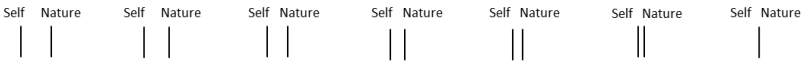
Wilson, E. O. (1984). *Biophilia*. Cambridge: Harvard University Press.

Wonneberger, A. (2018). Environmentalism—A Question of Guilt? Testing a Model of Guilt Arousal and Effects for Environmental Campaigns. *Journal of Nonprofit & Public Sector Marketing 30 (2),* 168–186.

Zorell, C. V. (2020). Nudges, norms, or just contagion? A theory on influences on the practice of (non-) sustainable behavior. *Sustainability, 12(24),* 10418.

Appendix

Table A1. Description of the Scales Used

Measure	Items	Response format
EINS scale (Martin & Czellar, 2016)	1. "Please choose the picture below that best describes your relationship with the natural environment."  2. "Please choose the picture below that best describes nature when you think of your relationship with the natural environment."  3. "Please choose the picture below that best describes your relationship with the natural environment."  4. "Please choose the picture below that best describes your relationship with the natural environment." 	1 (distant) – 7 (close) graphical response options illustrating the relationship of the self with nature.
CNS scale (Mayer and Frantz, 2004)	"Please rate the extent to which you agree or disagree with each statement. Please respond as you really feel, rather than how you think "most people" feel". 1. I often feel a sense of oneness with the natural world around me. 2. I think of the natural world as a community to which I belong. 3. I recognize and appreciate the intelligence of other living organisms. 4. I often feel disconnected from nature. 5. When I think of my life, I imagine myself to be part of a larger cyclical process of living. 6. I often feel a kinship with animals and plants. 7. I feel as though I belong to the Earth as equally as it belongs to me. 8. I have a deep understanding of how my actions affect the natural world. 9. I often feel part of the web of life. 10. I feel that all inhabitants of Earth, human, and nonhuman, share a common 'life force'. 11. Like a tree can be part of a forest, I feel embedded within the broader natural world. 12. When I think of my place on Earth, I consider myself to be a top member of a hierarchy that exists in nature. 13. I often feel like I am only a small part of the natural world around me, and that I am no more important than the grass on the ground or the birds in the trees. 14. My personal welfare is independent of the welfare of the natural world.	1 (strongly disagree) – 7 (strongly agree)

Frequency of pro-environmental behaviors (Tam, 2013)	"Please evaluate how frequently you perform the following behaviors in daily life." 13. Looking for ways to reuse things. 14. Recycling things (e.g., papers, cans, bottles). 15. Encouraging friends or family to recycle. 16. Purchasing products in reusable containers. 17. Writing a letter to public authorities to support an environmental issue. 18. Volunteering time to help an environmentalist group. 19. Buying environmentally friendly products even if they may not work as well as competing products. 20. Purchasing something made of recycled materials even though it is more expensive. 21. Buying products only from companies that have a strong record of protecting the environment. 22. Contacting public authorities to complain about environmental problems. 23. Taking a shorter shower to conserve water. 24. Using energy-efficient household devices such as light bulbs.	1 (never) – 7 (very often) response options
Environmental motives (Schulz, 2001)	People around the world are generally concerned about environmental problems because of the consequences that result from harming nature. However, people differ in the consequences that concern them the most. Please rate each of the following items from 1 (not important) to 7 (supreme importance) in response to the question: I am concerned about environmental problems because of the consequences for… - Plants - Me - People in my country - Marine life - My lifestyle - All people - Birds - My health - Children - Animals - My future - My children	1 (not important) – 7 (supreme importance)
Social desirability scale (Hart et al., 2015)	Please answer the following questions. 1. I never regret my decisions. 2. I am very confident in my judgements. 3. When I hear people talking privately, I avoid listening. 4. I don't gossip about other people's business.	1 (strongly disagree) – 7 (strongly agree)

Table A2. Exploratory Qualitative Analysis (Study 1a)

A2.1. Coding – Insights

Relationship condition	Nature condition
• Nature needs to be protected • Impact of nature on me • Respect for the natural environmental • Emotional and physical impact of nature on me • Take care of nature/ protect nature • Enjoying nature / spending time in nature • Mutual relationship (“I can endure only as long as nature endures”) • Treat nature with respect • Beauty of the natural environmental • Impact of the natural environment on lifestyle • Relating to the natural environment • The positive effect of nature on me (“relaxing,” “feeling better,” “increasing my well-being,” “lowering my blood pressure, reducing stress,” “providing a sense of freedom”, “peace,” etc..) • Interconnection (“I am one with nature,” “I am part of it as it’s part of me,” “When I hurt nature, I hurt myself,” “I interact with nature very often”) • Reducing my impact (pollution, trash, consumption, etc.)	• Free of human interaction • Untouched • An entity • Without anything manmade • Description (plants, animals, wood, water, etc.) • Without human involvement • People were not present • Without manmade intervention • The world around you • An untouched world/earth • Undisturbed nature • The state of the world or universe • The part of the environment that would be there if humans did not exist • The natural environment is what is around us • The environment is not artificial • The world around us that hasn't been influenced by humans • All things God-made • The world without human presence

In exploring the dynamics between individuals and nature, we identified distinct elements between the relationship condition and nature condition. The relationship condition encompasses elements such as responsibility, respect, care, protection, impact, preservation, love, living in harmony, treasuring nature, and a poignant acknowledgment of its absence, particularly during the COVID-19 pandemic. Conversely, the nature condition revealed that simply referring to the "natural environment" creates a sense of disconnection. When participants articulated their thoughts solely in terms of nature without emphasizing the relationship component, it resulted in

a distancing effect, as if humans were excluded from the natural world. Intriguingly, participants tended to produce shorter essays under this condition, indicating a potential correlation between the depth of their connection and the richness of their expression. Building on these insights, we developed an exploratory set of 14 categories to systematically code the diverse essays composed by participants. Below are the coding instructions provided to two independent coders (see A2.2. Coding Instructions and A2.3. Coding Categories & Explanations), and any disagreements were resolved through discussions and agreements.

A2.2. Coding Instructions

Qualitative coding of essays - descriptions written by study participants

1. How to code? We have developed 14 categories that represent the presence (usually coded as 1) or absence (usually coded as 0) of specific aspects in the written essays. For example: "Does the essay mention an emotion?" Yes = 1, No = 0. Some categories apply to every essay, but others are dependent, meaning that they are coded only if a preceding category is coded as present (1). For instance, if a participant mentions a concrete action in the essay (action - Yes = 1), then one should also code the next category, which might be, for example, "type of action." All the categories and how they should be coded, along with already coded examples, are explained in detail in the "Coding Scheme" tab. Additionally, there is a column for the number of words (word count) contained in an essay.
2. Which essays to code? All the essays to code are in the tab "Data to Code" together with the coding categories. (Due to copying from SPSS, sometimes there are blank rows between the essays; please just ignore them; it is not a mistake).

3. Where to code? You can code all the essays directly in the respective coding categories in the tab "Data to Code."

*Please keep the filter in the "Data to Code" set to 0.

*Please note that "nature" and "natural environment" are used interchangeably and mean the same thing.

A2.3. Coding Categories & Explanations

A1. *Relationship with Nature:* Yes = 1 (No = 0) --> The essay contains a mention of one's relationship with nature/natural environment, either by using the word "relationship" (or its synonyms such as "connection") or by describing some aspect, feeling, interaction, or situation when the person puts itself or others in relation or in context with nature, usually using verbs. !! Attention: applies also to when the relationship with nature is attributed to 'people'/'humans'/'mankind', such as influenced or not influenced by humans ('without anything handmade' is no expression of a relationship, just a characteristic; correct coding is No = 0).

A2. Description of Nature: Yes = 1 (No = 0) --> The participant describes "nature" or "natural environment" as an entity, an object, and defines it with its properties and characteristics.

B. Only when A2 = Yes (1) --> *Nature Description:* Yes = 1 (No = 0) --> The participant explicitly mentions the following words or similar in meaning to them: "non-human," "untouched by human," "independent from humans," "not man-made."

C. Only when A1 = Yes (1) --> *Relationship I*: Yes = 1 (No = 0) --> The participant explicitly writes "I/my/mine." !! Attention: This does not apply when "I/my/mine" is used in an

introduction of what the person thinks, e.g., “In my opinion, I think.”; but “to me nature means this” is correctly coded as 1.

D. Only when A1 = Yes (1) --> *Relationship WE:* Yes = 1 (No = 0) --> The participant explicitly writes “We/our/humans/people/men”

E. Only when A1 = Yes (1) --> *Relationship Interdependence Me-Nature:* Yes = 1 (No = 0) --> The participant mentions a causal action, impact, or influence from the participant or humans/people to nature/natural environment (What I/humans do to nature).

F. Only when A1 = Yes (1) --> *Relationship Interdependence Nature-Me:* Yes = 1 (No = 0) --> The participant mentions a causal action, impact, or influence from nature/natural environment to the participant/humans (What nature does to me/humans, How it makes me/humans feel).

G. Only when A1 = Yes (1) --> *Relationship Quality:* Yes =1 (No = 0) --> The participant expresses the quality of the relationship with nature (for example: it's close, deep, important, hard, easy, conflictious); explicitly defining the relationship, using adjectives to qualify the relationship with nature.

H. *Care of Nature:* Yes =1 (No = 0) --> The participant explicitly mentions words (often verbs) expressing active care for nature, for example, words like “preservation,” “protection,” “helping,” “taking care of.”

I. *Experience with Nature:* Yes = 1 (No = 0) --> Participants mention or describe in more detail a concrete interaction/activity/action/experience with the natural environment or in the natural environment. It could be an event that the person takes part in and involves nature or the natural

environment, such as going hiking, collecting rainwater, or engaging in waste reduction and recycling.

J. *Emotions:* Yes = 1 (No = 0) --> Participants explicitly mention various emotions in the essay (for example: love, fear, joy, pride, excitement, anger, exhilaration, alertness, sadness, feelings of connectedness, determination, respect, awe, etc.).

K. *Environmentalist Topic:* Yes = 1 (No = 0) --> Participants explicitly mention words referring to typical environmentalist jargon or sustainability in life, consumption, traveling, waste disposal. For example: "pro-environmental actions, sustainability, saving resources, carbon footprint, pollution, zero waste, destroying nature, recycling, climate change."

L. Only when A1 = Yes (1) --> *Identification with Nature:* Yes = 1 (No = 0) --> Participants explicitly mention the identification between themselves (or humanity/people in general) and nature. For example: "Me and nature are one," "I identify with nature," "I am connected with nature," "I am part of nature."

M. *Animals:* Yes = 1 (No = 0) --> Participants explicitly mention animals in their essay.

A2.4. Results

Several univariate analyses of variance were conducted, utilizing the 14 predefined categories for coding. The reported results below focus on the significant outcomes, specifically highlighting the categories of "Care of Nature" and "Environmental Topic."

H. *Care of Nature:*

Between-Subjects Factors

Manipulation of salience (2 = self-nature connection condition; 1 = nature condition; 0 = control)			N
1	H. Care of nature: Yes =1 (No = 0)	,00	194
		1,00	5
2	H. Care of nature: Yes =1 (No = 0)	,00	109
		1,00	73

Descriptive Statistics

Dependent Variable: Self-reported proenvironmental behaviors scale (Tam, 2013) - 12-item

Manipulation of salience (2 = self-nature connection condition; 1 = nature condition; 0 = control)	H. Care of nature: Yes =1 (No = 0)	Mean	Std. Deviation	N
1	,00	4,5013	1,23001	194
	1,00	5,0833	1,71594	5
	Total	4,5159	1,24199	199
2	,00	4,5940	1,21970	109
	1,00	4,9600	1,15780	73
	Total	4,7408	1,20551	182

Tests of Between-Subjects Effects

Dependent Variable: Self-reported proenvironmental behaviors scale (Tam, 2013) - 12-item

Manipulation of salience (2 = self-nature connection condition; 1 = nature condition; 0 = control)	Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
1	Corrected Model	1,651[a]	1	1,651	1,071	,302	,005
	Intercept	447,784	1	447,784	290,395	<,001	,596
	Care_nature_F	1,651	1	1,651	1,071	,302	,005
	Error	303,771	197	1,542			
	Total	4363,722	199				
	Corrected Total	305,422	198				
2	Corrected Model	5,857[b]	1	5,857	4,099	,044	,022
	Intercept	3990,763	1	3990,763	2793,093	<,001	,939
	Care_nature_F	5,857	1	5,857	4,099	,044	,022
	Error	257,183	180	1,429			
	Total	4353,597	182				
	Corrected Total	263,040	181				

a. R Squared = ,005 (Adjusted R Squared = ,000)

b. R Squared = ,022 (Adjusted R Squared = ,017)

K. *Environmentalist Topic:*

Between-Subjects Factors

Manipulation of salience (2 = self-nature connection condition; 1 = nature condition; 0 = control)			N
1	K. Environmentalist topic: Yes = 1 (No = 0)	,00	173
		1,00	23
2	K. Environmentalist topic: Yes = 1 (No = 0)	,00	123
		1,00	54

Descriptive Statistics

Dependent Variable: Self-reported proenvironmental behaviors scale (Tam, 2013) - 12-item

Manipulation of salience (2 = self-nature connection condition; 1 = nature condition; 0 = control)	K. Environmentalist topic: Yes = 1 (No = 0)	Mean	Std. Deviation	N
1	,00	4,5164	1,20295	173
	1,00	4,4312	1,57045	23
	Total	4,5064	1,24716	196
2	,00	4,6077	1,21610	123
	1,00	5,2670	1,18620	54
	Total	4,8089	1,24159	177

Tests of Between-Subjects Effects

Dependent Variable: Self-reported proenvironmental behaviors scale (Tam, 2013) - 12-item

Manipulation of salience (2 = self-nature connection condition; 1 = nature condition; 0 = control)	Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
1	Corrected Model	,147[a]	1	,147	,094	,759	,000
	Intercept	1625,268	1	1625,268	1040,061	<,001	,843
	Enviro_F	,147	1	,147	,094	,759	,000
	Error	303,157	194	1,563			
	Total	4283,563	196				
	Corrected Total	303,305	195				
2	Corrected Model	16,309[b]	1	16,309	11,192	,001	,060
	Intercept	3659,092	1	3659,092	2511,126	<,001	,935
	Enviro_F	16,309	1	16,309	11,192	,001	,060
	Error	255,002	175	1,457			
	Total	4364,444	177				
	Corrected Total	271,311	176				

a. R Squared = ,000 (Adjusted R Squared = -,005)

b. R Squared = ,060 (Adjusted R Squared = ,055)

Table A3. Description of the Relationship-with-Nature Manipulation (Study 2)

Relationship-with-Nature condition	**Control condition**
Step 1: EINS scale (Martin & Czellar, 2016) **Step 2:** Please think of a recent experience in which your relationship with nature affected an everyday decision. Please take your time to describe the concrete situation.	**Step 1:** Same scale as the treatment condition but with the word "university" replacing "nature" **Step 2:** Please think of a recent experience in which your relationship with your university affected an everyday decision. Please take your time to describe the concrete a situation.

Table A4. Product: Drink Test (Study 2)

Product 1: Organic orange juice (8-oz)	
SAMPLE: ORGANIC ORANGE JUICE  On the table, next to you, you have one drink sample. We are interested in your evaluation and opinion of it. Please take the drink, **ORGANIC (BIO) ORANGE JUICE** from a Swiss retailer, from the table and take your time to carefully open, inspect and taste it. You can drink as much as you wish but you need to return the bottle to the experimenter before you leave the room.	**ORANGE JUICE**  On the table, next to you, you have one drink sample. We are interested in your evaluation and opinion of it. Please take the drink, **ORANGE JUICE** from a Swiss retailer, from the table and take your time to carefully open, inspect and taste it. You can drink as much as you wish but you need to return the bottle to the experimenter before you leave the room.

Table A5. Description of the Environmental Identity Manipulation (Study 3)

Experimental condition	**Control condition**
RELATIONSHIP WITH NATURE Please think of a recent experience in which **your relationship with nature** affected an everyday decision. Please take your time to describe the concrete situation.	**RELATIONSHIP WITH FAMILY** Please think of a recent experience in which **your relationship with your family** affected an everyday decision. Please take your time to describe the concrete situation.

Table A6. Product Choices (Study 3)

Product 1: pen	Product 2: correction pen	Product 3: notepad (manipulated by recycled vs. not)
		

Table A7. Manipulation Check (Study 3)

Nature condition (examples of sentences)	Family condition (examples of sentences)
"I decided to go for a walk in the nature, next to a river instead of going straight home. During the walk I felt soothed and relaxed. It allowed me to regain my strength and think about something other than life." "I like to be in contact with nature, it helps me to breathe, to rest and to think well. Lately it has helped me to overcome a state of intense stress and helped me to calm down." "For me, nature means above all freedom. Spending my time in nature, without any other people, but maybe with animals, always helps me to make decisions."	"When I make personal decisions, I always pay attention to what my family will think." "Having a very close relationship with my family, I always make my own decisions and most of the time they don't object." "We were discussing whether to do a master's or stop studying after my bachelor's. My parents' opinion had a real impact on my decision."

Note. These examples show that, in general, the participants followed the experiment instructions for each condition.

Table A8. Description of the Scales Used (Study 4a and 4b)

Adapted scale (Lichtlé, 2007; Wonneberger, 2018)	Please rate the ad presented above on the following attributes to best reflect your opinion. I find the ad ... - not appealing/appealing - not Convincing/ convincing - not important/ important This ad makes me feel ... - Pessimistic/Optimistic	1– 7
Item adapted from INS (Schultz, 2002)	How do you perceive this particular ad? Please choose the picture below that best describes how close to nature this particular ad makes you feel: 	1 (distant) – 7 (close) graphical response options illustrating the relationship of the self with nature.

Essay 3

How Often Do You Think about Your Relationship with Nature? The Measurement of Environmental Identity Salience and Its Relationship with Proenvironmental Behaviors

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Abstract

Extant research finds that environmental identity is an important motivational factor for proenvironmental behavior. However, studies typically focus on investigating the effects of the strength of this identity. Based on insights from identity research, we theorize that the influence of individuals' environmental identity on their proenvironmental behavior may depend on other identity dimensions as well. We argue that the frequency of activation of environmental identity in relevant life domains – environmental identity salience – may predict proenvironmental behavior beyond what environmental identity strength can explain. To test our theorizing, we propose a parsimonious measure of environmental identity salience. In four empirical studies, we establish that the new measure has sound psychometric properties in terms of internal consistency and discriminant validity with regard to measures of environmental identity strength. Importantly, our measure of environmental identity salience reliably predicts a range of self-reported and actual proenvironmental behaviors beyond the effects of environmental identity strength. In line with theoretical predictions, our data suggests that environmental identity salience and strength are related but distinct constructs. We conclude that investigating the nature and effects of environmental identity salience leads to a fruitful path to a more comprehensive understanding of proenvironmental behavior. The proposed new measure may serve as a helpful tool in this endeavor.

Keywords: proenvironmental behaviors, environmental identity, identity strength, identity salience, measurement development, nature connectedness

1. Introduction

Since its advent in the early 2000's, the concept and relevant measures of environmental identity have become central elements in research focusing on the psychological processes underlying proenvironmental behavior (e.g., Clayton 2003, 2012; Lou & Li, 2021; Pritchard, et al., 2020; Schultz, 2001). The bulk of this research has focused on one specific aspect of environmental identity, *identity strength*, which refers to the intensity of an individual's sense of psychological relation between the natural environment and the self. Literature suggests that individuals who report a stronger (weaker) environmental identity are more (less) likely to exhibit proenvironmental attitudes and behavioral intentions, and engage in concrete sustainable behaviors (e.g., Frantz & Mayer, 2014; Martin & Czellar, 2016; Mayer & Frantz, 2004; Tam, 2013). Indeed, the relationship between environmental identity strength and behavioral tendencies has consistently been shown to be positive in meta-analytical reviews (Mackay & Schmitt, 2019; Vesely et al., 2021; Whitburn et al., 2020). Yet, research in identity theory suggests that there might be further explanatory constructs underlying the influence of environmental identity on engagement in proenvironmental behaviors.

In the current research, we present evidence suggesting that the salience of an individual's environmental identity may predict proenvironmental behavior above and beyond the effect attributable to environmental identity strength when individuals engage in environmentally relevant behaviors. Salience of an identity pertains to the likelihood of its activation in an individual's mind, which is an important factor for identity-congruent behavioral motivations to occur (Reed, 2004). Nature-protecting motivations, which represent focal drives of identity-based behaviors in a conservational context, are particularly pertinent for shaping behavior in environmentally relevant domains (Schultz & Kaiser, 2012). We thus conceptualize

environmental identity salience as the frequency of the identity's activation in behavioral domains of everyday life that are environmentally relevant. We argue that individuals whose environmental identity is more (less) frequently salient in common proenvironmental domains will be more (less) likely to engage in proenvironmental behavior.

Based on this theorizing, the present research introduces a novel perspective on the assessment of environmental identity and provides its first applications in the prediction of various proenvironmental behaviors. In four studies, we show that a proposed new tool for the measurement of environmental identity salience meaningfully and uniquely predicts both self-reported and actual conservational behavior in a variety of domains ranging from product choices to donations to support for environmental policies. Our findings indicate that considering the salience of individual environmental identity, in addition to its strength, may result in more accurate predictions of identity-based proenvironmental behaviors. Our studies also show that strength and salience are related, yet distinct dimensions of environmental identity, each being uniquely associated with behavioral tendencies. Our empirical results suggest that future inquiries into identity-based conservational behavior may benefit from adopting a more comprehensive perspective on environmental identity that goes beyond identity strength and includes considerations related to other identity dimensions as well.

1.1. Conceptual Framework

In recent years, research in environmental psychology has devoted considerable attention to the study of self-definitional mechanisms underlying proenvironmental behavior. For example, the metapersonal self-construal (i.e., the extent to which people see themselves as being interdependent with all living beings on Earth) seems positively associated with environmental conservation tendencies (Arnocky et al., 2007). Research also indicates that interpersonal

variations in perceived global self-definition, corresponding to a sense of identification with all humans, positively relates to self-reported proenvironmental behavior (Loy & Reese, 2019). Place attachment and its sub-dimension of place identity, the latter being defined as a sense of relating the self to a specific geographical location, are also associated with a more pronounced propensity for proenvironmental behavior (Daryanto & Song, 2021; Ramkissoon & Mavondo, 2015; Ramkissoon, Smith, & Weiler, 2013).

The self-definitional concept that is particularly prominent in the study of identity-based processes in proenvironmental behavior is environmental identity. One of the most influential and comprehensive definitions of environmental identity refers to it as "a sense of connection to some part of the nonhuman environment that affects the way we perceive and act toward the world; the belief that the environment is important to us and an important part of who we are" (Clayton, 2003, pp. 45–46). Environmental identity is thus conceptualized as a working relationship between the self and the natural environment that can affect the way humans view their surroundings and behave with respect to them. Extant research has proposed a series of measurement tools to gauge environmental identity, including versions of the Environmental Identity Scale (Clayton, 2003; Clayton et al., 2021), versions of the Inclusion of Nature in Self Scale (Schultz, 2001; Martin & Czellar, 2016), the Connectedness to Nature Scale (Mayer & Frantz, 2004), the Nature Relatedness Scale (Nisbet et al., 2009) and the Nature Connection Index (Richardson et al., 2019). A common feature of these psychometric scales is an emphasis on the assessment of the perceived relational strength between humans' self and the natural environment, a dimension of environmental identity that can be qualified as *identity strength*. Using mostly these scales, findings regarding the behavioral implications of environmental identity have been summarized in two meta-analyses (Mackay & Schmitt, 2019; Whitburn, et al.,

2020). A third, comprehensive set of meta-analyses by Vesely et al. (2021) included a review of the relationship between connectedness to nature and climate-friendly intentions and self-reported behavior. The results of these reviews indicate a consistently positive, albeit varying in strength and context-dependent, relationship between individual environmental identity and conservational behavioral tendencies.

While the focus on the general strength of individual's environmental identity has substantially contributed to advancing our knowledge about the importance of humans' relationships with the natural environment, a more comprehensive stance may help us improve our understanding of the complexity of the linkages between environmental identity and ensuing sustainable behaviors. We propose that, in an effort to better apprehend identity-based individual behavior, research may benefit from a more global approach to the assessment of environmental identity characteristics by measuring other dimensions of environmental identity as well. In the present research, we propose to study the effects of one such dimension—the salience of environmental identity in common proenvironmental domains.

The conceptual backbone of our research is derived from identity theories (Oyserman, 2009; Reed, et al., 2012), which posit that a key condition for the enactment of a given identity in a decision context is the activation of that identity in an individual's mind, defined as the identity's salience. When an identity is salient, the attitudes and behavioral intentions that are congruent with it are brought to the forefront of an individual's mind and are more likely to be acted upon (Reed, 2004). If, for instance, an identity such as 'athlete' is salient for an individual, that individual might be more likely to heed to information that is relevant to that identity, such as sports news, or consume athletics-related products, such as protein bars (Reed & Forehand, 2016). Importantly, while an identity can be situationally activated through identity-related cues,

it can also be more or less chronically salient across behavioral domains (Reed et al., 2012). That is, for some individuals it can be generally on their minds across different areas of decision making, while for some other individuals, the identity may occupy their thoughts less across various domains (Oyserman, 2009). It is therefore theorized that the frequency of activation of an environmental identity in identity-relevant domains increases the probability that the identity will have a subsequent influence on the person's behavioral tendencies and actual behaviors (Reed et al. 2012; Reed, 2004).

On the basis of the preceding theoretical insights, we propose the construct of *environmental identity salience,* conceptualized as the frequency of activation of an individual's environmental identity in proenvironmental domains of everyday life. We contend that assessing whether environmental identity is more or less frequently salient, and thus active, for individuals in various decision domains will be an important and valuable predictor of proenvironmental behaviors. Such a measure would indicate to what extent an individuals' connection to nature is factored into individual decisions in various fields of environmentally relevant behaviors (e.g., consumption, transport or waste disposal). However, in our reading, the commonly used scales, referred to above, do not directly capture the salience dimension of environmental identity.

We thus argue that environmental identity salience could be a meaningful and complementary identity aspect that can help us better understand, and predict, identity-based proenvironmental behaviors. In line with previous research (e.g., Mackay & Schmitt, 2019; Whitburn et al., 2020, Vesely et al., 2021), we expect that individuals will be more motivated to engage in proenvironmental actions if their environmental identity is stronger. Theory suggests that environmental identity salience and strength are related yet distinct constructs in their functions and effects (Reed et al., 2012; Reed, 2004; Stryker & Serpe 1994).We thus predict that for

individuals with similarly strong environmental identities, those with more salient identities should engage more in proenvironmental behavior than those who experience lower levels of environmental identity salience.

Therefore, in an attempt to predict proenvironmental behavior on the grounds of identity-based measures, it could be worthwhile to include not only individuals' baseline environmental identity strength, but also the frequency with which environmental identity is salient in domains that are most relevant to environmental protection. The main hypothesis of our research is that by considering the salience of environmental identity, it may be possible to predict individual variations in proenvironmental behavioral tendencies over and above the effects attributable to the general strength of environmental identity alone.

1.2. Overview of Studies

We test this hypothesis in four empirical studies by distinguishing between two particular aspects of environmental identity—*environmental identity strength and environmental identity salience*. We first asses the dimensionality, internal consistency and discriminant validity of the proposed environmental identity salience measure, and then examine the predictive power of the environmental identity strength and salience measures using a series of self-reported and actual proenvironmental behaviors.

To assess environmental identity salience, we propose a new measure based on definitions of identity salience by Reed et al. (2012) and Kettle (2019), assessing the extent to which environmental identity occupies one's thoughts in common proenvironmental domains. We do so by measuring how frequently individuals think of their environmental identity in relevant behavioral domains. To capture the latter comprehensively, we use the broad environmentally-

relevant domains of behavior that were identified by Schultz & Kaiser (2012), i.e., consumption, transportation, housing-related activities, and waste disposal.

Studies 1 and 1b represent a preliminary, cross-sectional investigation of our hypothesis about the distinctive effects of environmental identity strength and salience on the self-reported enactment of proenvironmental behaviors. Data from studies 1 and 1b are also used for in-depth analyses of the salience measure in regard to its internal consistency, dimensionality and its relationship with measures of environmental identity strength. Study 2 tests our theorizing with observed, actual proenvironmental behaviors in a controlled laboratory setting. Study 3 examines the effects of environmental identity strength and salience in a longitudinal study using a nationally representative sample of citizens. Compared to the previous studies, we test our hypothesis with yet another type of proenvironmental action—public voting on support/rejection of environmental policy implementation for global corporations. The longitudinal nature of the data also allows us to assess the temporal stability of the proposed new tool for the assessment of environmental identity salience.

The exhaustive list of the relevant measures, their sources, concrete items and response formats, including scale reliability statistics and descriptive statistics for each study in this paper can be found in the Supplementary Material. The datasets can be found here: https://drive.switch.ch/index.php/s/oUkl0sQ4VnFhc8p

2. Study 1

Study 1 is a preliminary investigation of our prediction about the effects of environmental identity strength and salience with regard to the enactment of a series of proenvironmental behaviors.

2.1. Participants

We conducted an online survey on Amazon Mechanical Turk with 502 participants (M_{age} = 36.48, 53% male) in exchange for a standard payment. We removed 25 participants (4.98% of the initial sample) because they failed an embedded attention check or did not complete the survey entirely, which resulted in a final sample of 477 participants for data analysis.

2.2. Design and Procedure

We measured the strength of participants' environmental identity with the four-item seven-point Extended Inclusion of Nature in Self (EINS) scale (M = 4.88, SD = 1.19, α = .87; Martin & Czellar, 2016; for details, see Table B1 in the Supplementary Material). Environmental identity salience was measured with our newly developed four-item seven-point scale (M = 4.83, SD = 1.27, α = .80; for details, see Table B1 in the Supplementary Material). This measure assesses salience of an identity as a function of the frequency with which it is considered and occupies one's thoughts in various situations. Specifically, participants were asked the question: "In the following aspects of your daily life, how often do you think about your relationship with the natural environment?". They reported answers on a four-item, seven-point scale anchored with "never" and "very often" that included the four main domains relevant to proenvironmental behavior: House-related activities, activities related to transportation and traveling, activities related to waste disposal and consumption-related activities. These categories were created based on the classification of proenvironmental action domains proposed by Schultz and Kaiser (2012).

Engagement in self-reported proenvironmental behaviors was measured with a 12-item seven-point scale (M = 4.45, SD = 1.25, α = .91; Tam, 2013; for details, see Table B1 in the Supplementary Material) assessing how frequently a participant performed various proenvironmental behaviors. Sample items from the scale included statements such as

"purchasing products in reusable containers," "volunteering time to help an environmentalist group," and "taking a shorter shower to conserve water" (Tam, 2013).

To avoid order effects, we randomized the order of presentation of the three scales and additionally embedded them within a larger set of unrelated measures. An attention check item was incorporated in an unrelated set of questions that was also presented within the random order of the questionnaire. Demographic information appeared at the end of the survey.

2.3. Results and Discussion

We first intended to establish that environmental identity strength and salience indeed represented two related but distinct constructs. The correlation between the measures of the two constructs was positive ($r = .56$, $p < .001$). We used exploratory factor analysis (EFA) for the set of eight items composing the two scales. The Kaiser–Meyer–Olkin value was .87, which is above the recommended threshold of .6 (Kaiser, 1974), and Bartlett's Test of Sphericity achieved statistical significance ($p < .001$), indicating that the correlations were large enough for EFA. Two factors explaining 67.38% of the variance in the data were extracted. We decided on the number of factors from the eigenvalues, cumulative variance, and inspection of the scree plot. We rotated the factors obliquely using Promax rotation (correlated data); interpretation of the two factors was in line with our two-dimensional conceptualization of environmental identity (i.e., strength and salience). Each item loaded on its expected respective factor (for details, see Table 1).

Table 1. Summary of EFA results (Study 1)

	Factor loadings	
Item	1	2
Overlap[a]	**.77**	.53
Size[a]	**.69**	.47
Distance[a]	**.86**	.52
Central[a]	**.83**	.54
House-related activities[b]	.45	**.65**
Activities related to transportation and traveling[b]	.51	**.73**
Activities related to waste disposal[b]	.42	**.64**
Consumption-related activities[b]	.52	**.83**

Note. Instructions preceding each item: [a] "Below, please choose the pictures which best describe your relationship with the natural environment"; [b] "In the following aspects of your daily life, how often do you think about your relationship with the natural environment."

We next regressed engagement in proenvironmental behaviors on the mean-centered environmental identity strength and salience measures separately (model 1 and model 2) and jointly (model 3). For an overview of the statistical results, see Table 2. We found effects for both, environmental identity strength and salience as single predictors, with salience seemingly having a more pronounced main effect. When both were entered into the model simultaneously, the main effects of strength and salience became weaker but remained statistically significant. Salience predicted engagement in proenvironmental behaviors more strongly compared to strength in that model.

Table 2. Linear regression models (Study 1)

		Dependent variable	
		Engagement in proenvironmental behaviors	
Model	Predictors	Coefficients	Model statistics
Model 1	*EI strength*	ß = .59, t = 15.84, p < .001	$F(1, 475) = 250.85$, $p < .001$, $_{adj}R^2 = .34$
Model 2	*EI salience*	ß = .73, t = 23.19, p < .001	$F(1, 475) = 537.54$, $p < .001$, $_{adj}R^2 = .53$
Model 3	*EI strength*[a]	ß = .26, t = 7.13, p < .001	$F(2, 474) = 322.42$, $p < .001$, $_{adj}R^2 = .58$
	EI salience	ß = .58, t = 16.07, p < .001	

Note. EI = Environmental identity. The effects are in standardized beta coefficients. [a]VIF = 1.47.

In a follow-up Study 1b, we aimed to replicate these results using the Revised Environmental Identity scale (Clayton et al., 2021) instead of the Extended Inclusion of Nature in Self scale (Martin & Czellar, 2016). The results of Study 1b corroborate Study 1 with a different measure of environmental identity strength. This suggests that our findings from Study 1 are not specific to a particular operationalization of environmental identity strength (for detailed statistics, see "Study 1b" in the Supplementary Material).

Overall, Studies 1 and 1b provide preliminary evidence for the relation of environmental identity salience, in addition to strength, with engagement in proenvironmental behaviors. This evidence should be considered as preliminary due to methodological limitations, which include in particular: (1) the self-reports of engagement in proenvironmental behavior and (2) the concurrent measurement of the independent and dependent variables in a (randomized) sequence. Both of these concerns may have inflated our correlational results. To strengthen the validity and generalizability of our findings, we address these limitations in the next two studies.

3. Study 2

The purpose of Study 2 was to further examine the predictive effects of environmental identity strength and salience on actual, rather than self-reported, proenvironmental behaviors in

consumer product choices. Previous research indicates that consumers often use products to enact their identities. Thus, product choices provide a relevant and meaningful context for the investigation of identity-based effects in individual behavior (Kleine et al, 1993).

3.1. Participants

We conducted a laboratory study with 391 participants (M_{age} = 21.16, 47% male) in exchange for a standard payment. We removed three participants (0.8%) who had failed an embedded attention check, which left a final sample of 388 participants for our main analyses.

3.2. Design and Procedure

The study comprised two parts. In the first part (embedded among other unrelated materials) participants were presented with two choice tasks and, for each of those, were instructed to choose one of two product alternatives: apple (organic vs. conventionally grown) and regular Coke (in a glass vs. a plastic bottle). The choice task was framed as a choice of an additional reward for study participation that the participants could take with them and consume after the end of the study. The product pairs were placed in front of the participants on a desk in their laboratory cubicle (for pictures of the products, see Table B2 in the Supplementary Material). A small commercial “Bio” label was affixed to the organic apple, while the conventionally grown apple was unmarked. Both Coke alternatives used their original packaging. Choice of an organic (vs. conventional) apple and glass (vs. plastic) bottle of Coke corresponded to more (vs. less) proenvironmental behaviors. To create a tradeoff between choosing the more, or the less, proenvironmental product alternative, the organic apples were smaller than the conventional apples, though the variety (Golden) was the same in both conditions. The glass bottle was also smaller (250ml) than the plastic bottle (450ml) of the Coke. After that, we also measured

participants' willingness to donate to a proenvironmental organization, the World Wide Fund for Nature (WWF). To do so, we told participants that they would enter a raffle after the experiment in which two participants would be drawn to win the equivalent of US $100. We then asked them how much of that money they would be willing to donate to the WWF should they be one of the winners (we eventually indeed donated the amount the two winners had specified, and they received the difference between their prize and the donated amount). In the second part of the study, participants completed the environmental identity strength (M = 4.72, SD = 1.02, α = .86) and salience (M = 5.04, SD = 1.14, α = .67) measures, which were the same as those in Study 1. These measures were randomized and embedded in a larger set of unrelated measures that also included an attention check item. Demographic questions appeared at the end.

3.3. Results and Discussion

In line with the results of Study 1, we found a positive correlation between the two characteristics of environmental identity: strength and salience (r = .56, $p < .001$).

Next, we performed a series of logistic regressions by separately regressing each of the choice measures on the mean-centered environmental identity strength and salience measures in models with the two measures as separate predictors (model 1 and model 2) and also entered simultaneously (model 3)—for an overview of the statistical results, see Tables 3 and 4. We found separate and similarly strong main effects for both, environmental identity strength and salience, on more sustainable product choice of Coke (glass bottle) and apple (organic). When both predictors were entered into the model simultaneously, the strength and salience effects remained both statistically significant in the case of apple choice, but the strength main effect became statistically non-significant in the choice of the Coke bottle.

Table 3. Logistic regression models (Study 2)

		Dependent variable			
		Coca cola bottle choice[a]		*Apple type choice*[a]	
Model	Predictors	Coefficients	Model statistics	Coefficients	Model statistics
Model 1	*EI strength*	$\beta = .31$, $\chi^2(1) = 8.85$, $p = .003$	$\chi^2(1) = 9.17$, $p < .001$, Nagelkerke $R^2 = .03$	$\beta = .70$, $\chi^2(1) = 34.88$, $p < .001$	$\chi^2(1) = 40.73$, $p < .001$, Nagelkerke $R^2 = .14$
Model 2	*EI salience*	$\beta = .33$, $\chi^2(1) = 12.29$, $p < .001$	$\chi^2(1) = 12.87$, $p < .001$, Nagelkerke $R^2 = .04$	$\beta = .63$, $\chi^2(1) = 35.43$, $p < .001$	$\chi^2(1) = 41.08$, $p < .001$, Nagelkerke $R^2 = .14$
Model 3	*EI strength*	$\beta = .15$, $\chi^2(1) = 1.55$, $p = .214$	$\chi^2(2) = 14.42$, $p < .001$, Nagelkerke $R^2 = .05$	$\beta = .46$, $\chi^2(1) = 12.05$, $p < .001$	$\chi^2(2) = 53.21$, $p < .001$, Nagelkerke $R^2 = .17$
	EI salience	$\beta = .25$, $\chi^2(1) = 5.17$, $p = .023$		$\beta = .42$, $\chi^2(1) = 11.56$, $p < .001$	

Note. EI = Environmental identity. [a] 0 = less sustainable / 1 = more sustainable choice

Table 4. Linear regression models (Study 2)

		Dependent variable	
		Donation to WWF	
Model	Predictors	Coefficients	Model statistics
Model 1	*EI strength*	$\beta = .11$, $t = 2.17$, $p = .030$	$F(1, 386) = 4.724$, $p = 03$, $_{adj}R^2 = .01$
Model 2	*EI salience*	ß = .15, $t = 3.00$, $p = .003$	$F(1, 386) = 8.99$, $p = 003$, $_{adj}R^2 = .02$
Model 3	*EI strength*[a]	$\beta = .04$, $t = .61$, $p = .543$	$F(2, 385) = 4.67$, $p = 01$, $_{adj}R^2 = .02$
	EI salience	$\beta = .13$, $t = 2.14$, $p = .033$	

Note. EI = Environmental identity. [a] VIF = 1.46.

Furthermore, linear regressions revealed a significant main effect of environmental identity strength and environmental identity salience on the amount participants were willing to donate to the WWF, when entered as single predictors. When both measures were entered into the model, we found a main effect of salience but no longer a main effect of environmental identity strength. The models including environmental identity salience explained more variance in the data than the model without it.

Using real product choices and donation behavior, this study corroborates our initial findings and provides additional support for the potential value of our measure of individual's environmental identity salience with respect to predicting engagement in proenvironmental behaviors. We also found evidence for a relationship between environmental identity strength and engagement in some proenvironmental consumption behaviors, in line with the empirical literature (e.g., Mackay & Schmitt, 2019). Importantly, our results indicate that environmental identity salience (vs. strength) had a more consistent, and in some instances also stronger, association with a large variety of proenvironmental choices and behaviors.

It appears from our findings that environmental identity salience predicts individuals' proenvironmental actions above and beyond environmental identity strength (and in some cases even more reliably). However, there is an alternative possibility—because in Study 2 participants first made their product choices, reported their donation amount and subsequently answered questions pertaining to their environmental identity strength and salience, the proenvironmental behavioral enactments could have made some participants' environmental identities temporarily more salient during the study. It could be that our environmental identity salience measure was more sensitive to this effect than the identity strength measure. In order to control for this alternative explanation, the next study tests our predictions using a longitudinal setup.

4. Study 3

The purpose of Study 3 was to test our hypotheses in a setting with clear and prolonged temporal distance between the measurement of environmental identity strength/salience and real proenvironmental action—voting behavior in a nation-wide referendum attempting to pass a law ascribing, among others, obligations and responsibilities for environmental protection to multinational businesses (i.e., the Responsible Business Initiative referendum in Switzerland). In

addition, we wanted to check if we could corroborate our previous results regarding the significant relations of environmental identity strength and salience to proenvironmental behaviors in a real-life longitudinal context. Lastly, we also intended to test our predictions using another alternative conceptualization and measure of environmental identity strength—environmental self-identity (i.e., personal self-definition as a proenvironmentally acting person; Vesely et al., 2020).

4.1. Participants

Data for this study were collected as part of two waves of a multiple-wave longitudinal study of the general population investigating citizens' environmental attitudes and behaviors, voting behavior and the impact of the voting outcome in the Responsible Business Initiative referendum that took place on the 29th of November 2020 in Switzerland. Participants for the survey were recruited by a commercial marketing research company that ensured the representativeness of the data in terms of gender, age, and geographical location. Only those who passed an attention check implemented at the very beginning of the survey and fit the available quota combinations (gender, age, region) could complete the survey.

In the first wave, a total of 1101 Swiss residents participated in the survey in exchange for a standard payment between November 20 and 27, 2020. Data for the second wave were collected between December 14 and 23, 2020, approximately two to four weeks after the first wave of data collection. A total of 794 participants completed both waves, out of which 535 reported having participated in the voting and 527 also reported how they had voted in the referendum. The demographic characteristics of this sample are as follows: 44.4 % women, 53.7 % men, 0.4 % non-binary (1.9 % no response), with a mean age of 50.76 years (*SD* = 16.59, min = 18, max = 86; 3 no response). The formal level of education was university degree for 38.7 % of the

respondents, high school and similar for 53.7 %, and lower than high school and similar for 7.2 % (no response: .4 %).

4.2. Design and Procedure

The study's design was longitudinal and we measured environmental identity strength, environmental identity salience and self-reported engagement in proenvironmental behaviors across all data collection waves, among other questions. The basic measures of environmental identity strength and salience were identical to studies 1 and 2, but we also measured environmental identity strength with an environmental self-identity measure (the Green Consumer Self-Identity scale, two items, Sparks & Shepherd, 1992, for details, see Supplementary Material). In the presented analyses, we use the measurements of participants' environmental identity strength (Extended Inclusion of Nature in Self: M = 5.14, SD = 1.06, α = .86; Green Consumer Self-Identity: M = 4.90, SD = 1.24, α = .83) and salience (M = 5.08, SD = 1.23, α = .84) from wave 1 (before the actual referendum) as predictors of participants' voting behavior in the referendum and engagement in proenvironmental behaviors measured in wave 2 (administered several weeks later and after the actual referendum). We assessed whether citizens reported having voted in the referendum to support or reject the proposed law. Personal engagement in proenvironmental behaviors was measured with the same scale as in Study 1 (12 items; Tam, 2013), enriched by additional 13 items assessing individual performance on a large variety of sustainable consumption behaviors (M = 4.20, SD = .91, α = .90). The final score is an average of all the 25 items. In addition, we have also enquired about behaviors related to Christmas shopping and gift-giving (only measured in wave 2)—we asked whether participants engage in seven clearly sustainable types of behavior such as "buying gifts from recycled sources", "turning off tree lights and indoor/outdoor house decorative lighting at bedtime" or

"reusing gift packing materials", with response options 0 (does not apply) or 1 (does apply). This measure was self-developed. The final score on this measure was a sum of Christmas-related sustainable behaviors participants reported to engage in during the 2020 Christmas season.

4.3. Results and Discussion

We performed a logistic regression by regressing participants' vote in the referendum on the Responsible Business Initiative (N = 527; in favor = 302, against = 225) assessed in wave 2 on the mean-centered measures of environmental identity strength (using the Extended Inclusion of Nature in Self scale) and salience in models with the two measures as separate predictors (model 1 and model 2) and also entered simultaneously (model 3)—for an overview of the statistical results, see Table 5. The separate analyses revealed statistically significant effects for both environmental identity strength and salience. When both were entered into the model simultaneously, the effect of identity strength became non-significant, and only salience predicted the likelihood of voting in favor of the proenvironmental initiative.

Table 5. Logistic regression models (Study 3)

		Dependent variable	
		Vote in support of proenvironmental policy (0 = against / 1 = in favor)	
Model	Predictors	Coefficients	Model statistics
Model 1	*EI strength*	β = .17, χ^2 (1) = 4.20, p = .040	$\chi^2(1) = 4.24$, p = .04, Nagelkerke R^2 = .01
Model 2	*EI salience*	β = .31, χ^2 (1) = 16.89, p < .001	$\chi^2(1) = 17.72$, p < .001, Nagelkerke R^2 = .04
Model 3	*EI strength*	β = - .04, χ^2 (1) = .186, p = .666	$\chi^2(2) = 17.91$, p < .001, Nagelkerke R^2 = .05
	EI salience	β = .34, χ2 (1) = 13.03, p < .001	

Note. EI = Environmental identity.

The same logistic regression with the measure of Green Consumer Self-Identity instead of the Extended Inclusion of Nature in Self measure for environmental identity strength revealed similar results, see Table 6.

Table 6. Logistic regression models (Study 3)

		Dependent variable	
		Vote in support of proenvironmental policy (0 = against / 1 = in favor)	
Model	Predictors	Coefficients	Model statistics
Model 1	*Green consumer self-identity strength*	$\beta = 28$, $\chi^2(1) = 14.88$, $p < .001$	$\chi^2(1) = 15.40$, $p < .001$, Nagelkerke $R^2 = .04$
Model 2	*EI salience*	$\beta = .31$, $\chi^2(1) = 16.89$, $p < .001$	$\chi^2(1) = 17.72$, $p < .001$, Nagelkerke $R^2 = .04$
Model 3	*Green consumer self-identity strength*	$\beta = .13$, $\chi^2(1) = 1.44$, $p = .231$	$\chi^2(2) = 19.15$, $p < .001$, Nagelkerke $R^2 = .05$
	EI salience	$\beta = .22$, $\chi^2(1) = 3.70$, $p = .054$	

Note. EI = Environmental identity.

We have also performed linear regression analyses, using self-reported engagement in proenvironmental behaviors (measured in wave 2, $N = 794$) and engagement in more sustainable Christmas shopping and gift-giving behaviors (measured in wave 2, $N = 606$) as dependent variables, see Table 7. In both cases, we again found significant effects for environmental identity strength and salience.

Table 7. Linear regression models (Study 3)

		Dependent variable			
		Engagement in proenvironmental behaviors		*Engagement in sustainable Christmas behaviors*	
Model	Predictors	Coefficients	Model statistics	Coefficients	Model statistics
Model 1	*EI strength*	ß = .462, t = 14.66, p < .001	$F(1, 792)$ = 214.99, p < .001, $_{adj}R^2$ = .21	ß = .18, t = 4.38, p < .001	$F(1, 604)$ = 31.49, p < .001, $_{adj}R^2$ = .03
Model 2	*EI salience*	ß = .67, t = 25.20, p < .001	$F(1, 792)$ = 634.78, p < .001, $_{adj}R^2$ = .44	ß = .32, t = 8.27, p < .001	$F(1, 604)$ = 68.41, p < .001, $_{adj}R^2$ = .10
Model 3	*EI strength*[a]	ß = .13, t = 4.17, p < .001	$F(2, 791)$ = 332.68, p < .001, $_{adj}R^2$ = .46	ß = -.003, t = - .06, p = .96	$F(2, 603)$ = 34.15, p < .001, $_{adj}R^2$ = .10
	EI salience	ß = .59, t = 18.83, p < .001		ß = .32, t = 6.90, p < .001	

Note. EI = Environmental identity. The effects are in standardized beta coefficients. [a]VIF = 1.45 / 1.45

Similar results were obtained with the green consumer self-identity as a measure of environmental identity strength (see Table 8).

Table 8. Linear regression models (Study 3)

		Dependent variable			
		Engagement in proenvironmental behaviors		*Engagement in more sustainable Christmas behaviors*	
Model	Predictors	Coefficients	Model statistics	Coefficients	Model statistics
Model 1	*Green consumer self-identity strength*	ß = .67, t = 25.04, p < .001	$F(1, 792)$ = 626.87, p < .001, $_{adj}R^2$ = .44	ß = .28, t = 7.11, p < .001	$F(1, 604)$ = 50.55, p < .001, $_{adj}R^2$ = .08

Model 2	*EI salience*	ß = .67, t = 25.20, p < .001	F(1, 792) = 634.78, p < .001, $_{adj}R^2$ = .44	ß = .32, t = 8.27, p < .001	F(1, 604) = 68.41, p < .001, $_{adj}R^2$ = .10
Model 3	*Green consumer self-identity strength* [a]	ß = .38, t = 10.19, p < .001	F(2, 791) = 410.54, p < .001, $_{adj}R^2$ = .51	ß = .10, t = 1.70, p = .0091	F(2, 603) = 35.75, p < .001, $_{adj}R^2$ = .10
	EI salience	ß = .39, t = 10.43, p < .001		ß = .25, t = 4.41, p < .001	

Note. EI = Environmental identity. The effects are in standardized beta coefficients. [a]VIF = 2.22 / 2.15

Both of the focal environmental identity characteristics, strength and salience, remained quite stable over the two to four week period between waves 1 and 2 of data collection (strength wave 1 with wave 2: r(794) = .71, p < .001: salience wave 1 with wave 2: r(794) = .73, p < .001) and the scores remained quite consistent across time ($M_{salience}$ wave 1 = 5.08, SD = 1.23 ; $M_{salience}$ wave 2 = 5.02, SD = 1.19; $M_{strength}$ wave 1 = 5.14, SD = 1.06 ; $M_{strength}$ wave 2 = 5.06, SD = 1.13). The two constructs were positively correlated at both times (strength_salience wave 1: r(794) = .56, p < .001; strength_salience wave 2: r(794) = .55, p < .001).

The results of this study with a representative sample of Swiss citizens replicated our earlier findings using a longitudinal design and investigating a broad portfolio of proenvironmental behaviors and actions. We found that environmental identity salience positively predicted voting behavior in a referendum on a proenvironmental business initiative. The same pattern of results was found with respect to self-reported engagement in a wide range of daily and Christmas-related sustainable behaviors. In addition, in general, the relationships of environmental identity salience with our behavioral measures were stronger compared to the environmental identity strength – behavior relationships. Results were similar when green consumer self-identity was used as an alternative measure of environmental identity strength.

5. General discussion

In the current research, we introduced the concept and associated concise measure of environmental identity salience and tested its psychometric properties in several studies. Our data suggests that our environmental identity salience measure has good internal consistency. Its four items loaded on one factor and factor analyses indicated that they loaded on a different factor than the items of environmental identity strength measures. Our data therefore supports the theorizing that environmental identity salience and strength are related yet distinct constructs (e.g., Reed, 2004; Reed et al., 2012; Stryker & Serpe, 1994).

Importantly, we found that our new measure of environmental identity salience consistently related to a wide range of self-reported and observed actual proenvironmental behaviors, such as choice between regular and environmentally friendly products, donation to an environmental organization, and voting choices on environmental laws. It also predicted proenvironmental behavior when different extant measures of environmental identity strength were included in the models. Interestingly, effect sizes (i.e., R^2) consistently suggest that environmental identity salience may be more strongly related to proenvironmental behaviors than environmental identity strength. The reported environmental identity strength and salience effects were stable across different types of measures of identity strength (i.e., verbal and pictorial). Lastly, a nationally representative longitudinal study indicated that both environmental identity strength and salience are temporarily stable, at least over the course of a few weeks, and that they predict proenvironmental behavior even several weeks after their measurements took place.

Noteworthy is the point that the measure of environmental identity salience developed herein is an assessment of an identity's salience in a rather chronic and cumulative manner. Often, research has conceptualized identity salience as a contextual construct, that is, "a temporary

state" of activation of a person's identity (Reed, 2004, p. 286). This contextual perspective often implies the situational manipulation of an identity that involves experimental setups and specifically designed stimuli for the focal identity at hand. However, chronic properties have been acknowledged in extant literature as well: "which aspect of identity comes to mind is a dynamic product of that which is chronically accessible and that which is situationally cued" (Oyserman, 2009, p. 250).

5.1. Contribution to Research on Environmental Identity and Behavior

Our research contributes to the literature on environmental identity in several ways. First, we study an identity dimension (i.e., salience) that is established in research on different types of identity, but that appears to be under-researched in relation to environmental identity. Our review of the relevant literature suggested that extant research had focused mostly on the investigation of the strength dimension of environmental identity and how it translates into proenvironmental behavior. We develop a more comprehensive perspective and propose that environmental identity salience can play a meaningful role in proenvironmental behavior in addition to environmental identity strength.

Our findings give a first indication of the merits of such an approach. In particular, our studies consistently indicate that environmental identity salience plays an important role in predicting different types of proenvironmental behavior. However, we do not suggest that environmental identity salience is more important or in any way superior to environmental identity strength. Both concepts play a significant and complementary part in understanding and predicting proenvironmental behavior. Indeed, when predicting proenvironmental behavior in our data, models that included environmental identity salience and strength simultaneously often

outperformed models that included only environmental identity strength or only environmental identity salience.

Another contribution of our research lies in the development and validation of a new measurement tool for the salience of environmental identity. We built our measure on the conceptual grounds of identity theory and relevant research in environmental psychology to ensure content relevance and a comprehensive representation of relevant life domains where environmental identity may be salient (Boateng et al., 2018). The application of this measure in empirical studies allowed us to establish its psychometric properties. That is, our measure showed good internal and temporal consistency, and was related to, yet distinct from, the construct of environmental identity strength as measured with different validated scales commonly used in environmental psychology. Our new measure also increased the predictive power of statistical models using various proenvironmental behavioral dependent variables.

The proposed measure may be useful to scholars who wish to study different questions related to environmental identity salience. Because of its parsimonious nature (i.e., only four items), our environmental identity salience measure can be used either as a stand-alone measurement tool or as a complement with scales meant to primarily assess environmental identity strength. Our measure is broad and general in its setup. However, if researchers are interested in studying a particular type of behavior (e.g., energy saving), it is possible to adapt our measure to a specific behavioral context as well.

5.2. Limitations and Future Research

Despite the above-mentioned contributions, our research is limited in several ways. First, our studies do not allow us to explore the relationship between environmental identity strength and salience in detail. On the one hand, our finding of the consistently strong and positive correlation

between identity salience and identity strength is in line with the theory-derived assumption that identity salience and identity strength are conceptually related although distinct constructs (Stryker & Serpe 1994; Reed et al., 2012; Reed, 2004). On the other hand, we cannot draw conclusions as to whether a stronger environmental identity is more likely to be salient more frequently, or whether environmental identity strength may be a consequence of identity reinforcement processes (Reed & Forehand, 2016). Indeed, environmental identity may be strengthened over time through its repeated activation. Apart from providing evidence for concomitant variation between the relevant measures, our data does not allow us to investigate these possible mechanisms directly. Future research could attempt to better understand the relationship and potential feedback loops between the two environmental identity dimensions. Since both dimensions appear to be relatively stable, at least over several weeks (see our Study 3), a longitudinal design that uses a longer timeframe could be employed in such research.

Environmental identity salience and strength might also be related to yet another identity dimension, referred to as centrality or prominence—the relative standing of a particular identity among other identities within the hierarchy of the self (Kettle, 2019; Reed & Forehand, 2016; Stryker & Serpe, 1994). Identities that are more central to the self are likely to be stronger and more systematically salient and therefore can exert a stronger influence on behaviors across more contexts (Burke, 2006). Our data does again not allow us to investigate this. Future research is needed to shed more light on the structural relationships between environmental identity centrality, salience and strength.

Next, the items of our environmental identity salience measure are derived from theory and are designed so that they broadly cover the major categories of environmentally relevant behaviors (see Schultz & Kaiser 2012). Nonetheless, our new measurement tool may potentially

be limited due to its setup. It may be possible that it does not capture environmental identity salience in general but only in the contexts that are referenced in the individual items. Our data suggests that this is likely not the case. The factor loadings and internal consistency measures indicate that our environmental identity salience measure may tap a broader latent concept. That is, all four items load on one factor highly and items seem to vary together and not independently of one another. Moreover, the measure predicted behaviors that are not within the life domains which the items are based on (e.g., voting behavior). Future research could investigate whether there is benefit in adding additional items to our measure to make it more comprehensive.

Lastly, due to the scope of our research, it was not possible to investigate the wider nomological network around environmental identity salience. Our studies did not focus on individual and situational characteristics that might relate to environmental identity salience. For example, different socio-demographic characteristics (e.g., age, gender, education) may influence environmental identity salience. Similarly, characteristics of an individual's professional (e.g., type of job) or living (e.g., access to green spaces) environment may also cause individuals to experience environmental identity salience more or less frequently. Future research could study the profiles of high vs. low environmental identity salience individuals to gain a better understanding in this regard. Furthermore, it is important to understand which activities might be more or less likely to enhance such environmental identity activation. For example, literature on eudaemonic identity theory (e.g., Waterman, 2004) and recent findings about perceived flow (Bonaiuto, et al., 2016) suggest that enjoyable and optimal flow experiences resulting from self-defining (environmental) activities might be important for the activation of one's (environmental) identity across situations. This would not only help advance our understanding of identity-based conservational behavior but would also represent valuable knowledge for the development of

proenvironmental persuasive messages and a more precise targeting of relevant educational and marketing campaigns.

5.3. Conclusion

Our research suggests that individuals may not only vary in terms of the strength of their relationship with nature, but also in terms of how salient their relationship with nature is to them. Indeed, in our analyses, each environmental identity dimension was associated with unique variation in proenvironmental behavior. A general message of our findings is the need to shift research attention from the study of environment identity strength to a more comprehensive study of different environmental identity dimensions. While environmental identity strength appears to be well researched, much is to be learned about environmental identity salience. Thus, it is not clear when and how individuals develop environmental identity salience, how generalizable it is across proenvironmental behaviors and how variations in salience may be related to individuals' other identities and their dimensions. For example, heightened environmental identity salience may not just encourage more frequent proenvironmental behavior but may also be in conflict with other goals that individuals may have (Hurst et al., 2013).

Research also suggests that disruptive global events, such as a pandemic through spatial confinement, can facilitate the formation of new types of repeated proenvironmental behaviors in people's close surroundings (Ramkissoon, 2020). Such developments arguably present opportunities for identity strength and salience effects to emerge in previously under-represented behavioral domains and this at a potentially global scale. Accordingly, the study of such events deserves further attention in the environmental identity literature.

We are confident that zooming in on the idiosyncrasies of various dimensions of individual environmental identities, their relationship with personal motivations and traits, and their intricate

effects on ensuing behaviors in conservational domains opens up exciting new areas in environmental psychology and we encourage research that advances our knowledge in this regard.

References

Arnocky, S., Stroink, M., & DeCicco, T. (2007). Self-construal predicts environmental concern, cooperation, and conservation. *Journal of Environmental Psychology*, 27, 255-264.

Boateng, G. O., Neilands, T. B., Frongillo, E. A., Melgar-Quiñonez, H. R., & Young, S. L. (2018). Best practices for developing and validating scales for health, social, and behavioral research: a primer. *Frontiers in Public Health*, 6, 149.

Bonaiuto, M., Mao, Y., Roberts, S., Psalti, A., Ariccio, S., Ganucci Cancellieri, U., & Csikszentmihalyi, M. (2016). Optimal experience and personal growth: Flow and the consolidation of place identity. *Frontiers in Psychology*, 7, 1654.

Burke, P.J. (2006). Identity change. *Social Psychology Quarterly*, 69(1), 81-96.

Clayton, S. (2012). Environment and identity. *In Handbook of Environmental and Conservation Psychology, ed S. Clayton* (pp. 164-180). New York, NY: Oxford University Press.

Clayton, S., and Opotow, S. (2003). Introduction: Identity and the natural environment. *In Identity and the Natural Environment: The Psychological Significance of Nature*, ed. S. Clayton and S. Opotow (pp. 45–65). Cambridge, MA: MIT Press.

Clayton, S., Czellar, S., Nartova-Bochaver, S., Skibins, J.C., Salazar, G., Tseng, Y.C et al. (2021). Cross-cultural validation of a revised environmental identity scale. *Sustainability*, 13(4), 2387.

Daryanto, A., & Song, Z. (2021). A meta-analysis of the relationship between place attachment and pro-environmental behaviour. *Journal of Business Research, 123*, 208-219.

Frantz, C.M., & Mayer, F.S. (2014). The importance of connection to nature in assessing environmental education programs. *Studies in Education Evaluation*, 41, 85–89.

Hurst, M., Dittmar, H., Bond, R. & Kasser, T. (2013). The relationship between materialistic values and environmental attitudes and behaviors: A meta-analysis. *Journal of Environmental Psychology*, 36, 257-269.

Kaiser, H.F. (1974). An index of factorial simplicity. *Psychometrika*, 39(1), 31-36.

Kettle, K.L. (2019). Identity salience: understanding when identity affects consumption. *In Handbook of Research on Identity Theory in Marketing*. Cheltenham: Edward Elgar Publishing.

Kleine III, R.E., Kleine, S.S. & Kernan, J.B., 1993. Mundane consumption and the self: A social-identity perspective. *Journal of Consumer Psychology*, 2(3), 209-235.

Lou, X., & Li, L. M. W. (2021). The relationship between identity and environmental concern: A meta-analysis. *Journal of Environmental Psychology*, 76, 101653.

Loy, L. S., & Reese, G. (2019). Hype and hope? Mind-body practice predicts pro-environmental engagement through global identity. *Journal of Environmental Psychology*, 66, 101340.

Mackay, C. M., & Schmitt, M. T. (2019). Do people who feel connected to nature do more to protect it? A meta-analysis. *Journal of Environmental Psychology*, 65, 101323.

Martin, C., &Czellar, S. (2016). The extended Inclusion of Nature in Self scale. *Journal of Environmental Psychology*, 47, 181–194.

Mayer, F.S. & Frantz, C.M. (2004). The connectedness to nature scale: A measure of individuals' feeling in community with nature. *Journal of environmental psychology*, 24(4), 503-515.

Nisbet, E.K., Zelenski, J.M. & Murphy, S.A. (2009). The nature relatedness scale: Linking individuals' connection with nature to environmental concern and behavior. *Environment and behavior*, 41(5), 715-740.

Nisbet, E.K., & Zelenski, J.M. (2013). The NR-6: a new brief measure of nature relatedness. *Frontiers in Psychology*, 4, 813.

Oyserman, D. (2009). Identity-based motivation: Implications for action-readiness, procedural-readiness, and consumer behavior. *Journal of Consumer Psychology*, 19, 250–260.

Pritchard, A., Richardson, M., Sheffield, D., & McEwan, K. (2020). The relationship between nature connectedness and eudaimonic well-being: A meta-analysis. *Journal of Happiness Studies*, 21, 1145-1167.

Ramkissoon, H. (2020). COVID-19 Place confinement, pro-social, pro-environmental behaviors, and residents' wellbeing: A new conceptual framework. *Frontiers in Psychology*, 11, 2248.

Ramkissoon, H., & Mavondo, F. T. (2015). The satisfaction–place attachment relationship: Potential mediators and moderators. *Journal of Business Research*, 68, 2593-2602.

Ramkissoon, H., Smith, L. D. G., & Weiler, B. (2013). Testing the dimensionality of place attachment and its relationships with place satisfaction and pro-environmental behaviours: A structural equation modelling approach. *Tourism Management*, 36, 552-566.

Reed, A. (2004). Activating the self-importance of consumer selves: Exploring identity salience effects on judgments. *Journal of Consumer Research*, 31(2), 286-295.

Reed, A., & Forehand, M.R. (2016). The ebb and flow of consumer identities: The role of memory, emotions and threats. *Current Opinion in Psychology*, 10, 94-100.

Reed, A., Forehand, M.R., Puntoni, S., & Warlop, L. (2012). Identity-based consumer behavior. *International Journal of Research in Marketing*, 29, 310–321.

Richardson, M., Hunt, A., Hinds, J., Bragg, R., Fido, D., Petronzi, D,. et al. (2019). A measure of nature connectedness for children and adults: Validation, performance, and insights. *Sustainability*, 11, 3250.

Sparks, P., and Shepherd, R. (1992). Self-identity and the theory of planned behavior: assessing the role of identification with "green consumerism". *Social Psychology Quarterly*, 55(4), 388–399

Schultz, P. W. (2001). The structure of environmental concern: concern for self, other people, and the biosphere. *Journal of Environmental Psychology*, 21, 327-339.

Schultz, P. W., & Kaiser, F. G. (2012). Promoting pro-environmental behavior. In S. D. Clayton (Ed.), *The Oxford handbook of environmental and conservation psychology* (pp. 556–580). Oxford: Oxford University Press.

Stryker, S. & Serpe, R.T. (1994). Identity salience and psychological centrality: Equivalent, overlapping, or complementary concepts? *Social Psychology Quarterly*, 57, 16-35.

Tam, K.-P. (2013). Concepts and measures related to connection to nature: Similarities and differences. *Journal of Environmental Psychology*, 34, 64–78.

Vesely, S., Masson, T., Chokrai, P., Becker, A.M., Fritsche, I., Klöckner, C.A., Tiberio, L., Carrus, G. & Panno, A. (2021). Climate change action as a project of identity: Eight meta-analyses. *Global Environmental Change*, 70, 102322.

Waterman, A. S. (2004). Finding someone to be: studies on the role of intrinsic motivation in identity formation. *Identity*, 209–228.

Whitburn, J., Linklater, W., & Abrahamse, W. (2020). *Meta-analysis of human connection to nature and proenvironmental behavior*. Conservation Biology, 34, 180–193.

Supplementary Material

Study 1 b

Study 1 b is a replication of Study 1 as described in the manuscript, sharing the design, procedure, and measures with one exception – in Study 1 b environmental identity strength is measured with the Revised Environmental Identity scale (Clayton et al., 2021) instead of the Extended Inclusion of Nature in Self scale (Martin & Czellar, 2016).

Participants

We conducted an online survey on Amazon Mechanical Turk through the CloudResearch platform with 202 participants in exchange for a standard payment. We removed 2 participants (1 % of the initial sample) because they had failed the attention check, which resulted in a final sample of 200 participants for data analysis (M_{age} = 38.96; 0.5 % non-binary, 41.5 % female, 58 % male).

Design and Procedure

The study's design and procedure were identical with Study 1.
We measured the strength of participants' environmental identity with the 14-item seven-point Revised Environmental Identity scale (M = 5.35, SD = 1.16, α = .93; Clayton et al., 2021; for details, see Table B.1 in this document) with response options 1 (Not at all true of me) – 4 (Neither true nor untrue) – 7 (Completely true of me). Environmental identity salience was measured with our newly developed four-item seven-point scale (M = 4.46, SD = 1.52, α = .85; see Table B.1 in this document). Engagement in self-reported proenvironmental behaviors was measured with a 12-item seven-point scale (M = 4.16, SD = 1.29, α = .91; Tam, 2013).

Results & Discussion

The correlation between the measures of environmental identity strength and environmental identity salience in environmentally relevant behaviors was positive (r = .50, p < .001).
We used exploratory factor analysis (EFA) for the set of 18 items composing the two scales. The Kaiser–Meyer–Olkin value was .92, which is above the recommended threshold of .6 (Kaiser, 1974), and Bartlett's Test of Sphericity achieved statistical significance (p < .001), indicating that the correlations were large enough for EFA. Three factors explaining 60.16% of the variance in the data were extracted, first factor explaining 46,7% , second 10,85% and the last 3.6%. We decided on the number of factors from the eigenvalues, cumulative variance, and inspection of the scree plot. To interpret the factor loadings, we then rotated the factors obliquely (assuming the factors are not independent and correlated) using Promax rotation. Items from the two scales loaded on their expected respective factors (for details, see Table A1) – the items of the Revised Environmental Identity scale loaded on factor 1 and 2, while the new environmental identity salience measure loaded on factor 3.

Table A1. Summary of EFA Results – zero-order correlations between the items and the extracted factors (Study 1b)

	Factor loadings		
Item	1	2	3
I like to spend time outdoors in natural settings (such as woods, mountains, rivers, fields, local parks, lake or beach, or a leafy yard or garden). [a]	**.78**	.54	.28
I think of myself as a part of nature, not separate from it. [a]	.61	**.77**	.52
If I had enough resources such as time or money, I would spend some of them to protect the natural environment. [a]	**.64**	.59	.51
When I am upset or stressed, I can feel better by spending some time outdoors surrounded by nature. a	**.81**	.63	.40
I feel that I have a lot in common with wild animals. [a]	.43	**.72**	.40
Behaving responsibly toward nature -- living a sustainable lifestyle -- is important to who I am. [a]	.71	**.73**	.66
Learning about the natural world should be part of everyone's upbringing. [a]	**.72**	.47	.49
If I could choose, I would prefer to live where I can have a view of the natural environment, such as trees or fields. [a]	**.58**	.39	.26
An important part of my life would be missing if I was not able to get outside and enjoy nature from time to time. [a]	**.81**	.47	.42
I think elements of the natural world are more beautiful than any work of art. [a]	**.70**	.46	.34
I feel refreshed when I spend time in nature. [a]	**.87**	.56	.36
I consider myself a steward of our natural resources. [a]	.58	**.78**	.59
I feel comfortable out in nature. [a]	**.77**	.47	.19

I enjoy encountering elements of nature, like trees or grass, even when I am in a city setting. [a]	**.79**	.40	.37
House-related activities[b]	.23	.54	**.69**
Activities related to transportation and traveling[b]	.29	.43	**.73**
Activities related to waste disposal[b]	.39	.37	**.75**
Consumption-related activities[b]	.42	.56	**.90**

Note. Instructions preceding each item: [a]"`Please indicate the extent to which each of the following statements describes you by using the appropriate number from the scale below.[b]"In the following aspects of your daily life, how often do you think about your relationship with the natural environment."

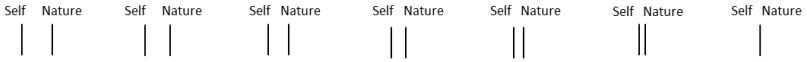
We then regressed engagement in proenvironmental behaviors on the mean-centered environmental identity strength and salience measures in models with the two measures as separate predictors (model 1 and model 2) and also entered simultaneously (model 3) – for overview of the statistical results, see Table A2. We found separate main effects for both, environmental identity strength and salience where salience was a stronger sole predictor. When both were entered into the model simultaneously, the strength main effect became weaker, and salience predicted engagement in proenvironmnetal behaviors more strongly. The explained variance in the data was higher with salience as the single predictor in comparison to strength as a single predictor and highest for a model with both predictors.

Table A2. Regression models (Study 1b)

		Dependent variable	
		Engagement in proenvironmental behaviors	
Model	Predictors	Coefficients	Model statistics
Model 1	*EI strength*	ß = .52, t = 8.66, p < .001	$F(1, 198) = 75.03$, $p < .001$, $_{adj}R^2 = .27$
Model 2	*EI salience*	ß = .71, t = 14.12, p < .001	$F(1, 198) = 199.41$, $p < .001$, $_{adj}R^2 = .50$
Model 3	*EI strength*	ß = .22, t = 4.00, p < .001	$F(2, 197) = 115.28$, $p < .001$, $_{adj}R^2 = .56$
	EI salience[a]	ß = .60, t = 10.63, p < .001	

Note. EI = Environmental Identity. The effects are in standardized beta coefficients. [a]VIF = 1.34.

Table B1. Description of the scales used in studies 1, 1b, 2 & 3

Measure	Items	Response format	Cronbach's alpha
EINS scale (Martin & Czellar, 2016)	1. "Please choose the picture below that best describes your relationship with the natural environment."  2. "Please choose the picture below that best describes nature when you think of your relationship with the natural environment."  3. "Please choose the picture below that best describes your relationship with the natural environment."  4. "Please choose the picture below that best describes your relationship with the natural environment." 	1 (distant) – 7 (close) graphical response options illustrating the relationship of the self with nature.	Study 1: α = .87 Study 2: α = .86 Study 3: α = .86
Revised Environmental Identity scale (Clayton, et al., 2021)	"Please indicate the extent to which each of the following statements describes you by using the appropriate number from the scale below." 1. I like to spend time outdoors in natural settings (such as woods, mountains, rivers, fields, local parks, lake or beach, or a leafy yard or garden). 2. I think of myself as a part of nature, not separate from it. 3. If I had enough resources such as time or money, I would spend some of them to protect the natural environment. 4. When I am upset or stressed, I can feel better by spending some time outdoors surrounded by nature. 5. I feel that I have a lot in common with wild animals. 6. Behaving responsibly toward nature -- living a sustainable lifestyle -- is important to who I am.	1 (Not at all true of me) – 4 (Neither true nor untrue) – 7 (Completely true of me)	Study 1b: α = .93

	7. Learning about the natural world should be part of everyone's upbringing. 8. If I could choose, I would prefer to live where I can have a view of the natural environment, such as trees or fields. 9. An important part of my life would be missing if I was not able to get outside and enjoy nature from time to time. 10. I think elements of the natural world are more beautiful than any work of art. 11. I feel refreshed when I spend time in nature. 12. I consider myself a steward of our natural resources. 13. I feel comfortable out in nature. 14. I enjoy encountering elements of nature, like trees or grass, even when I am in a city setting.		
Green Consumer Self-Identity scale (Sparks & Shepherd, 1992)	1. "I think of myself as a "green consumer." 2. "I think of myself as someone who is very concerned with "green issues."	1 (completely disagree) – 7 (completely agree)	Study 3: α = .83
Environmental identity salience in environmentally relevant domains Self-constructed (based on environmentally relevant behavioral domains from Schultz & Kaiser, 2012)	"In the following aspects of your daily life, how often do you think about your relationship with the natural environment?" 1. House-related activities. 2. Activities related to transportation and traveling. 3. Activities related to waste disposal. 4. Consumption-related activities.	1 (never) – 7 (very often)	Study 1: α = .80 Study 1b: α = .85 Study 2: α = .67 Study 3: α = .84
Engagement in proenvironmental behaviors (Tam, 2013)	"Please evaluate how frequently you perform the following behaviors in daily life." 25. Looking for ways to reuse things. 26. Recycling things (e.g., papers, cans, bottles). 27. Encouraging friends or family to recycle. 28. Purchasing products in reusable containers.	1 (never) – 7 (very often)	Study 1: α = .91 Study 1b: α = .91 Study 3: α = .90

	29. Writing a letter to public authorities to support an environmental issue. 30. Volunteering time to help an environmentalist group. 31. Buying environmentally friendly products even if they may not work as well as competing products. 32. Purchasing something made of recycled materials even though it is more expensive. 33. Buying products only from companies that have a strong record of protecting the environment. 34. Contacting public authorities to complain about environmental problems. 35. Taking a shorter shower to conserve water. 36. Using energy-efficient household devices such as light bulbs. Extended with (in Study 3): 37. Installing an energy-efficient improvement at home, such as solar panel. 38. Traveling by public transport, biking or walking instead of using a car. 39. Living car-free. 40. Reducing your consumption of animal products. 41. Buying local products. 42. Buying goods from Swiss companies. 43. Following a plant based diet. 44. Considering to purchase an electric or a hybrid car. 45. Purchasing second hand products (e.g., clothes). 46. Refusing to buy products with excessive packaging. 47. Boycotting companies with an unecological background. 48. Not buying a product if you know the company which sells it is socially irresponsible. 49. Avoiding to buy products from a company that you know may be harming the environment.		

Donations to pro-environmental organizations	"On average, how much do you donate to support pro-environmental organizations?"	1 – 1000 CH/year slider	
Participation / Vote in a referendum about the Responsible Business Initiative	"Have you participated in the vote?" "How did you vote?"	Yes / No/ / I am not allowed to vote in Switzerland I voted Yes to the Initiative / I voted No to the Initiative	Study 3: $\alpha = .83$
Engagement in proenvironmental Christmas behaviors (self-constructed)	"In which of these behaviors do you engage / will you engage during this year's Christmas season? Please click all those that apply." 9. Buying locally made gifts 10. Buying gifts made from recycled sources 11. Turning off tree lights and indoor/outdoor house decorative lighting at bedtime 12. Buying organic meat for Christmas dinner 13. Using eco-friendly alternatives to conventional wrapping paper 14. Reusing gift packing materials 15. Using handcrafted decorations	0 (does not apply) / 1 (does apply)	

Table B2. Product Choices (Study 2)

Product 1: Organic apple vs. conventionally-grown apple	Product 2: Glass Coke bottle vs. plastic bottle
	

References

Clayton, S., Czellar, S., Nartova-Bochaver, S., Skibins, J. C., Salazar, G., Tseng, Y. C., ... & Monge-Rodriguez, F. S. (2021). Cross-cultural validation of a revised environmental identity scale. *Sustainability, 13*, 2387.

Martin, C., & Czellar, S. (2016). The extended Inclusion of Nature in Self scale. *Journal of Environmental Psychology*, 47, 181–194.

Tam, K. P. (2013). Dispositional empathy with nature. *Journal of Environmental Psychology*, *35*, 92-104.

Schultz, P. W., & Kaiser, F. G. (2012). Promoting pro-environmental behavior. In S. D. Clayton (Ed.), *The Oxford handbook of environmental and conservation psychology* (pp. 556–580). Oxford University.

Sparks, P., & Shepherd, R. (1992). Self-identity and the theory of planned behavior: Assessing the role of identification with "green consumerism". *Social Psychology Quarterly*, 55, 388 - 399.

Conclusion

Global warming poses a significant worldwide challenge for humanity (Intergovernmental Panel on Climate Change, 2023). Human activities have played a substantial role in climate change, emphasizing the need for concerted efforts to mitigate the environmental impacts of individual behaviors (Trudel, 2019). An essential component of this effort is understanding our relationship with the natural environment. Environmental identity refers to the sense of connection to the natural world. It is conceptualized as a dynamic interaction between individuals and their environment, shaping how humans perceive and interact with their surroundings (Clayton, 2003). Humanity is intrinsically intertwined with nature, underscoring the importance of understanding our connection with the natural world for its conservation and protection (Kellert, 1996; Roszak, 1993; Wilson, 1984). In this dissertation, I contribute to the field of consumer behavior through three research papers, specifically delving into identity theory to comprehend the impacts of environmental identity on sustainable consumer behavior. Across the three essays, we demonstrate that three distinct dimensions of environmental identity—namely, strength, salience, and associations—can significantly impact pro-environmental behaviors. In this context, the current research contributes significantly by delving into the nuanced meanings individuals attribute to nature (essay 1). Furthermore, it aims to understand how frequently individuals contemplate their relationship with nature (essay 3) and how we can activate this relational component in their everyday lives (essay 2).

The initial essay investigates the cognitive representations linked to the concept of nature and their correlation with various individual differences. This endeavor holds substantial significance as environmental consumer psychology research has extensively focused on examining the connection between humans and nature. However, our understanding of the precise meaning of

"nature" and how it varies among individuals remains surprisingly limited. Through a series of studies, I construct a typology of associations related to nature and establish a nomological framework that incorporates individual differences. This framework paves the way for further research in diverse realms of environmental psychology and marketing. The essay concludes by proposing several research propositions for future exploration.

In the second essay, my co-authors and I make theoretical and practical contributions by designing efficient and easy-to-implement strategies to enhance the salience of environmental identity. Existing research emphasizes the significance of such interventions while acknowledging a lack of empirical studies in this domain. This article demonstrates, through a series of online and laboratory studies utilizing both scenario-based stimuli and real marketing materials, that strategies based on self-nature connection are more effective than strategies based on Nature alone (i.e., contact with or exposure to nature). Our experimental studies implemented and tested a strategy for activating environmental identity, particularly focusing on the relational aspect of this identity. The findings carry substantial significance for the way these interventions should be framed, offering suggestions for educators, policymakers, and marketers interested in promoting pro-environmental behaviors. The paper has significant implications for both environmental identity research and marketing practice.

The third essay makes three key contributions. The first contribution is that we advance research on environmental identity, which has proposed a series of measures of the construct. Most of these psychometric scales emphasize a dimension of environmental identity that can be qualified as identity strength. Drawing on identity theories, we argue that an additional dimension, environmental identity salience, plays a crucial role in individuals' enactment of their environmental identity. The proposed construct of environmental identity salience refers to the

frequency of activation of environmental identity across relevant pro-environmental behavior domains. Secondly, we introduce a new measurement tool to assess environmental identity salience. To our knowledge, our research is the first to operationalize and measure identity salience with a concise, easy-to-implement scale. Thirdly, our studies highlight the importance of measuring identity salience alongside identity strength. The proposed measurement tool enhances the predictive power of environmental identity assessments concerning various pro-environmental behavioral measures. Thus, we illustrate the applied value of the new measure for predicting both self-reported and actual behaviors.

On a more personal note, undertaking this PhD has been an invaluable learning experience. Completing this dissertation marks the end of a remarkable journey—a period of passion, perseverance, and personal growth. It is not just an academic achievement; it is a transformative chapter in my life story. From the initial spark of inspiration to the final keystrokes, every step has left an enduring mark on my identity as a researcher and, more profoundly, as a human being.

Through countless experiments, setbacks, and late-night data analysis sessions, I honed my technical skills and analytical acumen. Yet, it is the intangible lessons that resonate most deeply within me. The late nights spent wrestling with complex concepts, the camaraderie shared with fellow researchers, and the mentorship received from esteemed faculty have collectively shaped not only my professional trajectory but also my character. I have discovered the profound impact of collaboration, the beauty of intellectual humility, and the importance of resilience in the face of inevitable setbacks.

Moreover, this journey has been punctuated by extraordinary encounters—mentors who became beacons of wisdom, colleagues who evolved into lifelong friends, and participants in my studies whose stories added a poignant human dimension to my research. Through these

connections, I realized that research is not solely about data points and statistical significance; it is a tapestry woven with the threads of human experiences, emotions, and stories.

As I stand on the threshold of a new chapter, gratitude for support, nostalgia for shared moments, and excitement for the future fill me. This dissertation doesn't just end an academic pursuit; it heralds a new era in my life as a researcher. The knowledge, skills, and relationships formed are treasures enriching my journey.

In essence, this doctoral expedition has not been a destination but a transformative voyage, and as I embark on the next phase of my academic career, I carry with me the lessons learned, the connections made, and the passion that ignited this pursuit. The best part, however, is that this is not an end but a beginning—the beginning of what promises to be the most rewarding and fulfilling phase of my life as a researcher.

References

Clayton, S. (2003). Environmental identity: A conceptual and operational definition. In S. Clayton & S. Opotow (Eds.), *Identity and the natural environment* (pp. 45–65). Cambridge, MA: MIT Press.

Intergovernmental Panel on Climate Change. (2023). Climate Change 2023: Synthesis Report. A Report of the Intergovernmental Panel on Climate Change. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC, Geneva, Switzerland, (in press).

Kellert, S.R. (1996a). *The value of life.* Washington, D.C.: Island Press.

Roszak, T. (1993). *The voice of the earth: An exploration of ecopsychology*. New York: Touchstone.

Trudel, R. (2019). Sustainable consumer behavior. *Consumer Psychology Review*, 2(1), 85– 96.

Wilson, E. O. (1984). *Biophilia*. Cambridge: Harvard University Press.