LITERATURE REVIEW ON THE
"CORRELATES OF THE PROENVIRONMENTAL BEHAVIOUR"

A dissertation submitted as a part of the internship program on Environmental Psychology

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JANUARY 2021

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ABSTRACT

Pro-environmental behaviour is a set of behaviours practiced by individuals that seek to take measured actions to promote positive changes in the environment. This type of behaviour can therefore be labelled as goal directed pro-environmental behaviour – behaviour which people adopt with the explicit goal of doing something beneficial for the environment. Pro-environmental behaviour includes recycling, conserving water, saving electricity, reusing, using public transportations or riding bikes or even walking, properly disposing of non-recyclable waste, using less paper when printing, and buying and/or consuming green products. The present study has been carried out with the following objective: to explore the correlates of the pro-environmental behaviour through literature survey. A literature search in different scientific databases was employed to identify studies that examine the link for pro-environmental behaviour, mainly from 2010 to 2021. In the present study different literatures were searched, followed by grouping of the articles of interest and a time scale respective web-analysis was done. The articles were grouped into six categories, and these six groups represent correlates of pro-environmental behaviour, where some of the articles represents more than one clusters. The clusters were: environmental awareness, beliefs, identity, psychological adaptations, personality and values.

ACKNOWLEDMENT

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1 | *INTRODUCTION*

Environmental psychology is an interdisciplinary field that focuses on the interplay between individuals and their surroundings. It examines the way in which the natural environment and our built environments shape us as individuals. The field defines the term environment broadly, encompassing natural environments, social settings, built environments, learning environments, and informational environments.

Environmental psychology was not fully recognized as its own field until the late 1960s when scientists began to question the tie between human behavior and our natural and built environments. Since its conception, the field has been committed to the development of a discipline that is both value oriented and problem oriented, prioritizing research aimed at solving complex environmental problems in the pursuit of individual well-being within a larger society (Proshansky 1987). When solving problems involving human-environment interactions, whether global or local, one must have a model of human nature that predicts the environmental conditions under which humans will respond well. This model can help design, manage, protect and/or restore environments that enhance reasonable behavior, predict the likely outcomes when these conditions are not met, and diagnose problem situations. The field develops such a model of human nature while retaining a broad and inherently multidisciplinary focus. It explores such dissimilar issues as common property resource management, wayfinding in complex settings, the effect of environmental stress on human performance, the characteristics of restorative environments, human information processing, and the promotion of durable conservation behavior. Lately, alongside the increased focus on climate change in society

and the social sciences and the re-emergence of limits-to-growth concerns, there has been increased focus on environmental sustainability issues within the field (DeYoung, 2013).

The earliest noteworthy discoveries in the field of environmental psychology can be dated back to Roger Barker who created the field of ecological psychology. Founding his research station in Oskaloosa, Kansas in 1947, his field observations expanded into the theory that social settings influence behavior. Empirical data gathered in Oskaloosa from 1947 to 1972 helped him develop the concept of the 'behavior setting' to help explain the relationship between the individual and the immediate environment. This was further explored in his work with Paul Gump in the book Big School, Small School: High School Size and Student Behavior. In his book Ecological Psychology (1968) Barker stresses the importance of the town's behavior and environment as the residents' most ordinary instrument of describing their environment.

Human behaviour plays a key role in the rise and severity of environmental problems, and drastic changes in human behaviour are needed to mitigate climate change (Dietz et al., 2009; IPCC, 2018). Unfortunately, pro-environmental behaviours can be more expensive, more time-consuming, and less pleasurable than their environmental-harmful alternatives (Steg et al., 2014). For example, insulating your home or installing solar panels costs time, effort, and money. Hence, acting pro-environmentally tends to (but does not always) oppose one's self-interest; at least in the short run. It is assumed that such collective-action problems in which the actions that benefit the individual harm the collective, should be addressed by authorities from the top down with externally-imposed regulations (e.g. Brennan, 2009; Miller, 2004; Ostrom, 2010). But what does this view entail for the increasingly small-scale pro-environmental initiatives that are emerging from the bottom up in cities, communities, and organizations (Rotmans, 2017).

Bottom-up initiatives have many connotations, sometimes referred to as grass-root or community initiatives (Middlemiss & Parrish, 2010; Seyfang & Haxeltine, 2012). They tend to be defined in contrast to top-down initiatives which are led by (external) authorities such as leaders, governments or (non-)profit organizations. These initiatives do aim to move the larger group towards pro-environmental practices but are typically initiated by a few group members (Middlemiss & Parrish, 2010; Seyfang & Smith, 2007). So, can bottom-up pro-environmental initiatives overcome collective-action problems by

motivating pro-environmental behaviour in the overarching group in which they are embedded.

Individuals do not only act in their personal self-interest, as they derive part of their identity – their social identity – from their knowledge of, and emotional attachment to groups (Tajfel & Turner, 1979), such as their nationality or their community. When people define themselves in terms of a particular social identity, they internalize the content of this identity; it's values, norms, and goals and aim to act in line with these group motivations and advance the interests of the group as a whole (Turner, 1991). Pro-environmental social identities can motivate individual and collective pro-environmental behaviours (Fielding & Hornsey, 2016; Fritsche et al., 2018). The stronger a group's pro-environmental norms (Nolan et al., 2008), and the more a person identifies with this group (Masson & Fritsche, 2014), the more strongly this group membership can promote pro-environmental behaviour.

As the unprecedented scale and cumulative impact of human actions on the natural environment threatens the balance of the world's ecosystem, the accumulated evidence confirming large-scale environmental problems is undeniable. Since these environmental problems can be traced back to human behaviour, scholars have championed the role of psychological science to help understand and address global environmental change (Oskamp, 2000; Schmuck & Schultz, 2002; Swim et al., 2011; Van Lange, Joireman, & Milinski, 2018). Contributing to this call, research in environmental psychology has focused on identifying socio-psychological determinants of pro-environmental attitudes and behaviours (for meta-analytical reviews) (Bamberg & Moser, 2007; Hines, Hungerford, & Tomera, 1986, 1987; Klockner, 2013; Milfont, Wilson, & Diniz, 2012).

Although valuable, most research on the topic emphasizes individual action while disregarding the societal and contextual factors that may motivate or inhibit pro-environmental behaviour. A growing number of studies have employed multilevel designs that allow simultaneous examination of the societal and contextual constraints on people's pro- environmental behaviour (Milfont & Markowitz, 2016). Yet this approach still centres on individual action as the focal driver of environmental protection. Recent calls have thus emphasized the importance of collective action in conjunction with individual action to effectively overcome global environmental change (Bamberg,

Rees, & Seebauer, 2015; Fritsche, Barth, Jugert, Masson, & Reese, 2018). Indeed, the scale and unprecedented nature of global environmental change requires collective efforts that involve people from across national and cultural boundaries.

At present, the global ecological crisis is becoming increasingly serious, and the contradiction between humans and nature is unprecedentedly intensified. Atmospheric warming, rising sea levels, extreme natural disasters, environmental pollution and other environmental problems are devastating human life and affecting economic and social development. Given that almost all environmental issues are caused directly or indirectly by humans, scholars and policymakers urge individuals to take responsibility for environmental protection (Vlek and Steg, 2007; Vilella-Vila and Costa-Font, 2008; Fielding etal., 2008; Urien and Kilbourne, 2011). The Rio Declaration, issued by the United Nations, states that solving environmental problems requires the participation of every member of the public. Therefore, inducing individual pro-environmental behaviors (PEBs) is an important challenge in the path of sustainable development (Williams and Cary, 2002; Gifford, 2011).

Since the 1980s, some scholars have conducted a series of studies on the relationship between media use and environmentally friendly behaviors. Despite the growing interest in the Internet, research on its role in people's pro-environmental behaviors is still limited. In fact, compared with the declining traditional media, the Internet is becoming increasingly prevalent. As of June 2019, the number of Internet users worldwide had reached 4.53 billion, an increase of 1157% since 2000 (Internet world statistics, 2019). Recent studies have shown that the use of Internet social media has significant benefits in enhancing environmental awareness and environmental knowledge (Karahan, 2015). Internet use has a direct and significant positive impact on pro-environmental behaviors (Liua at al., 2021).

Extant research has identified various factors that affect pro- environmental behaviours. One of the factors is place attachment, defined as the cognitive and affective bond that people have with a place (Scannell & Gifford, 2010a; Lewicka, 2011). The rationale is that the attachment to a place fosters a sense of belonging, which promotes engagement in civic activities including pro-environmental behaviour (Uzzell, Pol, & Badenas, 2002; Manzo Lynne and Perkins, 2006; Anton & Lawrence, 2014). However, despite the

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increasing research attention on the link between place attachment and pro-environmental behaviour (Meloni, Fornara, & Carrus, 2019; Song et al., 2019), the variances across individual studies have made it difficult to ascertain the overall impact of place attachment in promoting environmentally friendly behaviours.

One potential behavioural consequence of place attachment is the tendency to exhibit pro-environmental behaviour (Lewicka, 2011), and hence there has been research on pro-environmental behaviour in the place attachment literature. The majority of these studies have used various forms of self-reported behavioural measures for pro- environmental behaviour. Some research relies on a general assessment of people's tendency to engage in pro-environmental behaviour and uses multiple-item scales (Halpenny, 2007; Takahashi & Selfa, 2015). Others distinguish different types of behaviours or focus on a specific type of pro-environmental behaviour, following various criteria for categorization. For instance, Ramkissoon et al. (2013a) and Song and Soopramanien (2019) make a distinction between high-effort and low- effort behaviour according to the different levels of effort or commitment required by the behaviour. Walker, Leviston, Price, and Devine- Wright (2015) categorise pro-environmental behaviour into three types of behaviour: individual behaviour, collective behaviour and policy support behaviour. Halpenny (2007) categorises pro- environmental behaviour into general vs. place specific, depending on whether the behaviour is targeted at a specific place or not.

2 | *OBJECTIVE OF THE STUDY*

The present dissertation work entitled 'Literature Review on the "Correlates of The Proenvironmental Behaviour" has been carried out with the following objective:

> ➢ **To explore the correlates of the pro-environmental behaviour through literature survey.**

3 | *METHOD*

Environmental psychology largely uses the same quantitative and qualitative methods as other psychological disciplines. However, whereas other psychological disciplines often have one dominant research paradigm, environmental psychology is characterized by the use of a wide diversity of methods. Each research method has its strengths and weaknesses. Choosing a method typically involves a trade-off between internal and external validity. Internal validity reflects the extent to which cause–effect relationships can be established. External validity reflects the extent to which the results of a study can be generalized to other populations or settings. The main research methods used in environmental research include questionnaire studies, laboratory experiments, simulation studies, field studies, and case studies.

In the present study the different literatures were searched, followed by grouping of the articles of interest and a time scale respective web-analysis was done.

A. Literature search

A literature search in different scientific databases was employed to identify studies that examine the link for pro-environmental behaviour, mainly from **2010 to 2021**.

Relevant studies in Science Direct, EBSCOhost, google scholar, Web of Science was systematically searched using keywords: pro-environmental behaviour, environmentally responsible behaviour, environmental psychology.

Relevant papers in key journals was also searched such as **Journal of Environmental Psychology, Agriculture and Human Values; Resources, Conservation & Recycling, Journal of Cleaner Production, Science of the Total Environment , Ecological Economics, Tourism Management Perspectives, Journal of Business Research, Journal of Ecological Research** and used the Pro-quest database for searching unpublished dissertations and theses.

The search for papers was considered complete when various databases provided no more new papers on the topic.

In the present study **1035 literature** was searched for understanding the correlates of the pro-environmental behavior.

Study obtained **42 research articles**, published mainly in 2020-2021. The majority of studies were published in environmental psychology journals.

B. Inclusion and exclusion criteria

The following inclusion and exclusion criteria were included in this meta-analysis:
(1)   except for dissertations and theses, these articles had to be published in peer-reviewed international journals,
(2)   the articles were written in English,
(3)   the studies had followed standard statistical analysis (where applicable) of pro-environmental behaviour.

The articles were grouped into six categories, where some of the articles represents more than one groups. The groups were: environmental awareness, beliefs, identity, psychological adaptations, personality and values.

4 | *REVIEW OF LITERATURE*

Pro-environmental behaviour is a set of behaviours practiced by individuals that seek to take measured actions to promote positive changes in the environment and limit the effects of human negligence (Carmi et al., 2015). In promoting pro-environmental behaviour, colleges, universities, and training centres play an essential role, since individual behavioural change can be easily fostered among young generations (Massaro et al., 2018; Ting and Cheng, 2017). Additionally, in the context of education, organizations are interested in having pro-environmental shifts due to their sustainability goals and implications towards student enrolment (Meyer, 2016).

Pro-environmental behaviour includes **recycling** (e.g., reusing paper, plastic, glass, containers), **conserving water** (e.g., limiting the use of water when taking a shower or washing hands), **saving electricity** (e.g., turning off lights when not needed), reusing (e.g., disposable cups), using public **transportations** or riding bikes or even walking, properly **disposing of non-recyclable waste**, using less paper when printing (e.g., double-sided printing), and buying and/or consuming **green products** (Bissing-Olson et al., 2016). Unfortunately, pro-environmental behaviours can be more expensive, more time-consuming, and less pleasurable than their environmental-harmful alternatives (Steg et al., 2014). Hence, acting pro-environmentally tends to (but does not always) oppose one's self-interest; at least in the short run.

Vicente-Molina et al. (2018) opined, pro-environmental behaviour can be changed by public-sphere behaviour (e.g., public policies). Pro-environmental behaviour can be directly affected by the private and public spheres, with examples including consumption of green products, use of public transportation, and recycling. Individuals' intention to practice responsible environmental behaviour is not only influenced by personal beliefs but by others' behaviours and actions. In the university setting, as Vicente-Molina et al. (2018) presumed, pro-environmental behaviour among students can be promoted by university' plans and actions, such as providing disposable containers or offering environmental-related subjects.

In the modern world, the global ecological crisis is becoming increasingly serious, and the contradiction between humans and nature is unprecedentedly intensified. Atmospheric warming, rising sea levels, extreme natural disasters, environmental pollution and other environmental problems are devastating human life and affecting economic and social development. Given that almost all environmental issues are caused directly or indirectly by humans, scholars and policymakers urge individuals to take responsibility for environmental protection (Fielding et al., 2008; Urien and Kilbourne, 2011; Vlek and Steg, 2007; Vilella-Vila and Costa-Font, 2008). The Rio Declaration, issued by the United Nations, states that solving environmental problems requires the participation of every member of the public. Therefore, inducing individual pro-environmental behaviors (PEBs) is an important challenge in the path of sustainable development (Williams and Cary, 2002; Gifford, 2011).

As the unprecedented scale and cumulative impact of human actions on the natural environment threatens the balance of the world's ecosystem, the accumulated evidence confirming large-scale environmental problems is undeniable. Since these environmental problems can be traced back to human behaviour, scholars have championed the role of psychological science to help understand and address global environmental change (Oskamp, 2000; Schmuck and Schultz, 2002; Swim et al., 2011; Van Lange et al., 2018). Contributing to this, research in environmental psychology has focused on identifying socio-psychological determinants of pro-environmental attitudes and behaviours (for meta-analytical reviews) (Bamberg and Moser, 2007; Hines et al., 1986, 1987; Klockner, 2013; Milfont et al., 2012).

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4.1. <u>Parameters of Pro-environmental behaviour</u>

A. <u>Water Saving</u>

Water has been identified as one of the most important natural resources and somewhat different from the rest, because it is viewed as a key to prosperity and wealth (Aprile and Fiorillo, 2016). Water depletion and contamination are among the main environmental problems faced worldwide in the 21st century and water conservation represents important pro-environmental behavior for a sustainable way of life on the planet. Water conservation represents important pro-environmental behavior for a sustainable environment.

Aprile and Fiorillo (2016) investigated the link between water conservation behavior and general environmental concerns using a large dataset from the Multipurpose Household Survey conducted annually by the Italian Central Statistics Office. Univariate probit models show that pollution and resource exhaustion are positively related to individual water conservation behavior while alteration of environmental heritage exhibits a negative relationship with water saving behavior. These findings are robust to the inclusion of environment knowledge and social capital variables. Robustness analysis also indicates that television and radio, participation in environmental initiatives, money for environmental protection and churchgoing are significant determinants of water conservation behavior.

B. <u>Plant Conservation</u>

Pro-environmental behaviors (PEBs) may be associated with a personal relationship with nature. Exposure to nature (specified by the amount of vegetation cover in residents' neighborhoods) and/or past PEB (specified by tree-planting participation) was associated with residents' PEB and key psychological constructs would mediate these relationships. Plant conservation can be included by planting of trees and expanding the greens. This expansion can be done with canopy of mature trees, under grown with shrubs and smaller plants.

Whitburn et al. (2018) conducted a quasi-experiment with 423 residents who had or had not actively participated in a tree-planting scheme and lived in 20 neighborhoods that differ in their greenness level. Structural equation mediation models revealed that the level of neighborhood vegetation and involvement in the planting scheme explained 46% of the variance in PEB, with connection to nature, the use of nature for psychological restoration, and environmental attitudes mediating the relationships. Connection to nature was more strongly associated with engagement in PEB than the use of nature for psychological restoration and environmental attitudes.

C. <u>Energy Conservation</u>

Pro-environmental behaviour and energy savings in households are interlinked (Bissing-Olson et al., 2016). It is one means of modifying behaviour in households in order to promote energy conservation. Energy conservation is a part of the concept of Eco-sufficiency. Energy conservation measures (ECMs) in buildings reduce the need for energy services and can result in increased environmental quality, national security, personal financial security and higher savings. It is at the top of the sustainable energy hierarchy. It also lowers energy costs by preventing future resource depletion.

There are many different ways to reduce your household's energy use, ranging from simple behavioral adjustments to extensive home improvements. The two major motives for conserving energy are to save on utility bills and protect the environment. Energy conservation can be as simple as turning off lights or appliances when you do not need them. You can also use energy-intensive appliances less by performing household tasks

manually, such as hang-drying your clothes instead of putting them in the dryer, or washing dishes by hand. The behavior adjustments that have the highest potential for utility savings are turning down the heat on your thermostat in the winter and using your air conditioner less in the summer. Heating and cooling costs constitute nearly half of an average home's utility bills, so these reductions in the intensity and frequency of heating and cooling offer the greatest savings.

D. Green Transport

Green transportation is that kind of a transportation system which does not affects the environment negatively. The field of green transportation has expanded a lot in the past few years, owing to the rising petrol and gas prices across the world. Some examples of green transportation are walking, cycles, car sharing, electric bikes and scooters, green vehicles which run on wind, hydrogen, solar energy or biofuels and public transportation such as buses, metros and subways. Green transportation is very important in today's scenario where environment is depleting with every passing day and dependence of gas and petrol is increasing day by day, thus posing a threat to earth.

Green transportation is extremely important because it takes off the burden from the earth's natural resources of fossil fuels such as oil, natural gas and petroleum. These fuels take millions of years to replenish and are soon running out. Another reason why green transportation is so important is because using fossil fuels poses a great threat to the environment. The fumes which are generated from running vehicles are harmful for the air, the water and the trees. When humans inhale the polluted air or drink the contaminated water, they are at an increased risk of diseases like asthma. Thus to stop pollution from spreading, we all need to switch to green transportation. Green transportation like cycling, walking and using car sharing is not only good for the environment but also helps to save a lot of money that we otherwise spend on petrol or gas.

The promotion of sustainable transport is usually targeted at transportation system users in urban areas. Many research has been done is association with proenvironmental behaviour and green transport. However, the end result of any such initiative depends largely on the recipients. Investigating people's behaviour and identifying user profiles

to reveal the degree of their environmental awareness and sensitivity, as well as their attitudes towards active travelling, could shed light on the critical aspects of behaviour relevant to everyday mobility practices. This information could be used to enhance appropriate sustainable policies that presently seem to be inadequate (Mikiki and Papaioannou, 2012).

E. Green Buying

Environmentally Preferable Purchasing (EPP) or Green Purchasing refers to the procurement of products and services that have a lesser or reduced effect on human health and the environment when compared with competing products or services that serve the same purpose. Environmentally responsible purchasing is vital as unplanned purchasing of goods can severely damage the environment. Environmental considerations play a minor role in consumer purchasing decisions and people generally overlook environmental impacts of their purchases.

The study by Joshi and Rahman (2015) reviewed 53 empirical articles on green purchase behavior from 2000 to 2014. This is one of the first study that reviewed articles related to attitude - behaviour inconsistencies in the context of green purchasing. This review identified various prevalent motives, facilitators and barriers affecting purchase decision-making towards green products and provides possible explanations for inconsistencies reported in green purchase behavior. All These factors are divided into those unique to the individual decision maker and those considered situational in nature. Consumer's environmental concern and products functional attributes emerged as the two major determinants of consumer green purchase behavior. The paper informs about the main predictors of consumer's green purchase behavior. In this way, it will help policy makers and managers in formulating and implementing strategies to encourage green purchasing.

F. Waste management

Waste management (or waste disposal) includes the activities and actions required to manage waste from its inception to its final disposal. This includes the collection, transport, treatment and disposal of waste, together with monitoring and regulation of the

waste management process. Waste management is intended to reduce adverse effects of waste on human health, the environment or aesthetics. Waste management practices are not uniform among countries (developed and developing nations); regions (urban and rural areas), and residential and industrial sectors can all take different approaches.

Pro environmental behavior (PEB) is defined as actions that cause no harm to natural systems, and/or benefit the environment (Steg and Vlek, 2009). It is expected that both conservation behaviors and waste management behaviors contribute to sustainable ecological conservation in rural communities. Many researches proved that waste disposal through the encouragement of waste reduction, reuse and recycling result in a positive direction.

4.2. <u>Environmental psychology</u>

Environmental psychology is the discipline that studies the interplay between individuals and the built and natural environment. Environmental psychology examines the influence of the environment on human experiences, behaviour, and well-being, as well as the influence of individuals on the environment, that is, factors influencing environmental behaviour, and ways to encourage pro-environmental behaviour (Steg and Groot, 2019).

Environmental psychology has been recognized as a field of psychology since the late 1960s and is therefore a relatively 'new' field in psychology (Altman, 1975; Proshansky et al. 1976; Stokols, 1977, 1978). Hellpach was one of the first scholars who introduced the term 'environmental psychology' in the first half of the twentieth century (Pol, 2006). Hellpach (1911) studied the impact of different environmental stimuli, such as colour and form, the sun and the moon, and extreme environments, on human activities. In his later work, he also studied urban phenomena, such as crowding and overstimulation, and distinguished different types of environments in his work, including natural, social, and historical-cultural environments (Pol 2006). Although the topics of Hellpach are typical of the field of environmental psychology as it has been practised from the 1960s onwards, it was still too early to speak of an independent field of systematic research into human–

environment interactions. Brunswik (1903–1955) and Lewin (1890–1947) are generally regarded as the 'founding fathers' of environmental psychology (Gifford 2007).

Environmental psychology is primarily interested in the interaction between humans and the built and natural environment; it also explicitly considers how the environment influences behaviour as well as which factors affect behaviour that can help improve environmental quality.

Environmental psychology largely uses the same quantitative and qualitative methods as other psychological disciplines. However, whereas other psychological disciplines often have one dominant research paradigm, environmental psychology is characterized by the use of a wide diversity of methods. Each research method has its strengths and weaknesses. Choosing a method typically involves a trade-off between internal and external validity. Internal validity reflects the extent to which cause–effect relationships can be established. External validity reflects the extent to which the results of a study can be generalized to other populations or settings. Low external validity of a finding may be problematic if the goal is designing an intervention to solve a specific applied problem. However, it may be less relevant if the purpose of the research is testing theory because in this case the main concern is to achieve a high internal validity. Ideally, environmental psychologists try to replicate the findings of the same phenomenon using different research designs. In this way, weaknesses of one research design may be compensated by the strengths of another, thereby optimizing internal and external validity.

4.3. 'Architectural' Psychology

Around the late 1940s and 1950s, systematic research in everyday physical settings and psychological processes slowly increased with some pioneering studies on, for example, human factors in work performance (Mayo, 1933), the lighting of homes (Chapman and Thomas 1944), and child behaviours in natural settings (Barker and Wright, 1955).

In this early period of the field of environmental psychology, much attention was given to the built physical environment (i.e. architecture, technology, and engineering) and how it affected human behaviour and well-being (Bonnes and Bonaiuto, 2002). This focus on

the built environment was largely guided by the political and social context of the time. Modern architecture tried to respond to post-war challenges (Pol 2006), such as decent housing. Questions like how homes, offices, or hospitals could best be built for their potential users and how environmental stressors (e.g. extreme temperatures, humidity, crowding) would affect human performance and well-being were the focus of many environmental psychological studies (Wohlwill, 1970). Environmental psychology as a study to design buildings that would facilitate behavioural functions was officially born.

4.4. <u>Green Psychology</u>

The second period of rapid growth in environmental psychology started during the late 1960s when people increasingly became aware of environmental problems. This resulted in studies on sustainability issues, that is, studies on explaining and changing environmental behaviour to create a healthy and sustainable environment. The first studies in this area focused on air pollution (De Groot, 1967; Lindvall, 1970), urban noise (Griffiths and Langdon, 1968), and the appraisal of environmental quality (Appleyard and Craik, 1974; Craik and Mckechnie, 1974). From the 1970s onwards the topics further widened to include issues of energy supply and demand (Zube et al. 1975) and risk perceptions and risk assessment associated with (energy) technologies (Fischhoff et al. 1978). In the 1980s the first studies were conducted that focused on efforts promoting conservation behaviour, such as relationships between consumer attitudes and behaviour (Cone and Hayes, 1980; Stern and Gardner, 1981).

4.5. <u>People's behaviour to reverse environmental problems</u>

From the beginning of the twenty-first century, it has become evident that environmental problems such as climate change, pollution, and deforestation are major challenges threatening the health, economic prospects, and food and water supply of people across the world (IPCC 2013). It is also generally recognized that human behaviour is one of the main causes of these environmental problems. A continuing and growing concern of environmental psychology is to find ways to change people's behaviour to reverse environmental problems, while at the same time preserving human well-being and

quality-of-life. To this end, a broad concept of sustainability, which encompasses environmental as well as social and economic aspects, has been widely adopted (World Commission on Environment and Development 1987). This broad concept of sustainability has increasingly become a central guiding and unifying principle for research in environmental psychology (Giuliani and Scopelliti 2009). Indeed, it has been suggested that, over the past decades, the field of environmental psychology has gradually evolved into a 'psychology of sustainability' (Gifford 2007).

4.6. <u>Environmental behaviour and Pro-environmental behaviour</u>

The goal of much environmental psychology research is to help understand and change environmental behaviour. Most research in environmental psychology focuses on studying pro-environmental behaviour, also referred to as environmentally friendly behaviour (Dolnicar and Grün 2009), ecological behaviour, or conservation behaviour (Scherbaum et al. 2008; Schultz et al. 2008). Pro-environmental behaviour has been defined as 'behaviour that consciously seeks to minimize the negative impact of one's actions on the natural and built world' (Kollmuss and Agyeman 2002). This type of behaviour can therefore be labelled as goaldirected pro-environmental behaviour – behaviour which people adopt with the explicit goal of doing something beneficial for the environment. Some scholars suggest that environmental psychology can and should only be concerned with studying this type of goal-directed behaviour (Kaiser and Wilson 2004). Alternatively, pro-environmental behaviour has been defined as 'behaviour that harms the environment as little as possible, or even benefits the environment' (Steg and Vlek 2009). This is behaviour that is beneficial for the environment but is not necessarily (or exclusively) motivated by environmental goals. According to this definition people can act pro-environmentally without any intention to do so, for instance, because the behaviour is habitual (e.g. you always turn the tap off when brushing your teeth) or because the behaviour is motivated by other goals (e.g. not driving to work because cycling is cheaper and healthier).

Pro-environmental behaviour (whether goal-directed or not) differs from the broader term environmental behaviour. Environmental behaviour has been defined as 'all types of behaviour that change the availability of materials or energy from the environment or

alter the structure and dynamics of ecosystems or the biosphere' (Steg and Vlek 2009). This includes behaviours which are environmentally damaging as well as behaviours which are beneficial for the environment. Arguably this includes almost all kinds of behaviour as almost everything we do has some sort of impact on the environment. Measures of actual impact necessarily include both behaviours which are environmentally damaging and behaviours which are environmentally friendly.

Decisions on what to measure need to be informed by the theoretical and practical aims of a study. Goal-directed pro-environmental behaviour is by definition motivated by environmental goals, but may not necessarily reflect actual impact. A measure of goal-directed pro-environmental behaviour is likely to be suitable for a study that aims to understand the link between pro-environmental intentions and behaviour.

4.7. <u>Measures of environmental behaviour</u>

Whether developing measures of environmental behaviour or of actual impact, there are further considerations that affect the validity and reliability of findings, particularly when relying on self-reports. Self-reported behaviours, such as recycling frequency, and self-reported outcomes, such as car mileage or energy use, are the most common type of data used in psychology research. Typical items of pro-environmental behaviour measures tend to ask for some sort of judgement on how often individuals (or households) perform a behaviour.

The main advantage of this type of measure is that it is easy to administer and allows easy comparisons across behaviours and the use of conventional statistical techniques, such as factor analyses, in order to explore underlying clusters of behaviour. Unfortunately, however, such self-reports are also subject to response bias (such as social desirability or self-serving biases) and measurement error. A meta-analysis examining the relationship between objective measures of pro-environmental behaviour and self-reports in 15 studies found a positive but moderate correlation between these two types of measures (Kormos and Gifford 2014).

The most accurate form of measurement may be the observation of actual behaviour (e.g. observing littering or recycling) or its immediate outcomes (e.g. weighing bins, reading meters). This, however, can be labour intensive and therefore require extra financial resources. Information technologies such as smart meters or smart plugs may reduce these problems, but these can raise issues around ethics due to potential privacy infringement (Bolderdijk et al. 2011). Observations are much less common in environmental psychology than self-reports, although there are exceptions (Bolderdijk et al. 2011; Nigbur et al. 2010; Schultz et al. 2007, 2008).

4.7.1. <u>Multidimensional Measures of Environmental Behaviour</u>

Environmental behaviour is often conceptualized as multidimensional. Several studies have suggested that different behaviours are not necessarily correlated, and behavioural antecedents may vary between behaviours. Measures of environmental behaviour usually either focus on one type of behaviour, such as recycling (Carrus et al. 2008), transportation mode choice (Carrus et al. 2008; Matthies et al. 2002), or political activism (e.g. signing petitions, donating money; Berenguer 2007), or they include a range of different (types of) behaviours (Lee et al. 2013). When respondents are questioned about a range of behaviours, their responses are often subjected to some form of statistical exploration to examine whether different categories of behaviour can be distinguished empirically, for example, waste avoidance, recycling, consumerism, or political activism (Dolnicar and Grün 2009; Corraliza and Berenguer 2000; Milfont et al. 2006; Oreg and Katz-Gerro 2006). Based on statistical analyses of the bivariate correlations of various behaviours, most of this research suggests that pro-environmental behaviour is multidimensional. The precise number and type of dimensions that are distinguished varies between studies and depends on the number and types of questions that are included in the questionnaires (Lee et al. 2013).

These finding suggest that people do not appear to behave consistently pro-environmentally across different domains (i.e. some behaviours are not or weakly correlated) and that different behaviours are likely to be motivated by different factors. Moreover, the same motivational goal (doing something beneficial for the environment) may motivate one person to donate to charity, another to buy organic, and yet another to use a bicycle rather than a car. There is plenty of evidence to suggest that pro-

environmental behaviours do not correlate reliably – sometimes even within but certainly not across – different domains, and that engagement in one pro-environmental behaviour does not necessarily spill over to another one (Truelove et al. 2014).

4.7.2. <u>Unidimensional Measure of Environmental Behaviour</u>

A unidimensional measure of goal-directed pro-environmental behaviour was developed by Kaiser and Wilson (2004) based on what is called the Campbell paradigm (Kaiser et al. 2010). According to this paradigm, all behaviours regarding a specific goal (e.g. environmental conservation) can be ordered on one single dimension from easy to difficult with regards to reaching that goal. The idea is that someone with a strong motivation to achieve the goal will adopt all the easy behaviours as well as the more difficult ones, whereas those who are less committed to reaching the goal will only adopt the easier ones.

The Rasch model (Bond and Fox 2001) can be used as a construct validity tool to test this unidimensional model. It is commonly used to estimate performance or ability on a test. Conceptualizing goal-directed pro-environmental behaviour of individuals in this manner implies that seemingly diverse behaviours, such as donating money to environmental organizations, recycling, and using public transport, form a uniform set of behaviours. These different behaviours are linked by one underlying goal (i.e. environmental conservation) and can be mapped onto one dimension from easy to difficult. Studies found that energy conservation, waste avoidance, recycling, vicarious acts toward conservation (e.g. political activism), and ecological transportation and consumer behaviour can indeed be mapped on one dimension (Kaiser et al. 2007; Kaiser and Wilson 2004).

This unidimensional measure has the advantage that it allows one to make a relatively simple distinction between more and less pro-environmental individuals and to include a wide variety of behaviours. However, it fundamentally rests on the assumption that behaviours are psychologically linked by one single underlying goal (doing something good for the environment). As such it assumes a shared understanding of what is pro-environmental or not. It also assumes that people behave relatively consistently and that difficulty of behaviour is the key factor that differentiates those with strong and weak

environmental goals. Finally, this perspective departs from common views of attitude–behaviour relationships which perceive attitudes and behaviours as distinct psychological concepts because a higher score on the measure reflects not only the difficulty of a behaviour but also a person's commitment to achieving a goal – their attitude (Kaiser et al. 2007).

4.8. <u>Values and Pro-Environmental Behaviour</u>

Values are desirable trans-situational goals that vary in importance and serve as guiding principles in the life of a person or other social entities (Schwartz 1992). This definition includes three key features of values. First, values include beliefs about the desirability or undesirability of certain end-states. Second, values are rather abstract constructs and therefore transcend specific situations. This is the main difference from 'goals'. A goal refers to a target that an individual strives hard to reach in his or her life. It is thus understood that goals remain a target until they are reached or achieved while values are there to be adhered to on a longer term. Third, values serve as guiding principles for the evaluation of people and events and for behaviours (Steg and Judith, 2019).

Values are ordered in a system of value priorities (i.e. they vary in importance), which implies that when competing values are activated in a situation, choices are based on the value that is considered most important. There are important advantages to using values in environmental behaviour research. First, the total number of values is relatively small compared to the countless behaviour-specific beliefs, attitudes, and norms. Consequently, values provide an economically efficient instrument for describing and explaining similarities and differences between persons, groups, nations, and cultures. Second, the abstractness of values allows for predictions in almost all contexts. Values influence various specific attitudes and behaviours (Seligman and Katz 1996).

4.9. <u>Value Theories</u>

Two common value theories: the theory on social value orientations (Messick and McClintock 1968) and Schwartz's value theory (Schwartz 1992).

A. <u>Social Value Orientations</u>

Social value orientations (SVO), originating from social dilemma research, reflect the extent to which individuals care about own and others' payoffs in a social dilemma situation (Messick and McClintock 1968). Most studies only distinguish between a pro-self value orientation, in which case people are particularly concerned with their own outcomes, and a prosocial value orientation, in which people particularly care about the outcomes for other people or the community. A person's SVO is usually assessed by means of the decomposed game technique (Liebrand 1984) in which participants choose between options that offer points to themselves and another person.

B. <u>Schwartz's Value Theory</u>

In Schwartz 's value theory (1992, 1994), a general and comprehensive taxonomy of 56 values is proposed. Respondents taking Schwartz's value survey rate each value item on a 9-point scale measuring their importance as 'a guiding principle in their life'. Based on survey data from 44 countries, Schwartz identifies 10 motivational types of values. These 'types' of values include a variety of values closely related to each other. The closer value types or individual values are to each other in this structure, the more compatible they are; the further away, the more incompatible they are. In Schwartz's theory, scores on the importance of values have little meaning on their own, particularly the relative priorities of values compared with other values is important.

4.10. <u>Four Key Values for Pro-Environmental Behaviour</u>

In the environmental domain, two types of self-transcendence (altruistic and biospheric) and two types of self-enhancement (egoistic and hedonic) values appear to be particularly relevant in relation to attitudes, norms, and behaviour. It appears to be important to make a distinction between biospheric and altruistic values within Schwartz' self-transcendent value dimension (Stern, 200; De Groot and Steg 2008). Biospheric values reflect a concern for the quality of nature and the environment for its own sake, while altruistic values reflect a concern with the welfare of other human beings.

Biospheric and altruistic values are positively correlated, which is in line with Schwartz's value theory, as both reflect self-transcendence values. Yet, biospheric and altruistic values can be distinguished empirically (De Groot and Steg 2008). Moreover, when pro-environmental choices reflect both values differently, they may contribute to the prediction of pro-environmental behaviours in a unique way, and sometimes even in an opposite direction. In most cases, biospheric values are more predictive of pro-environmental attitudes, norms, and behaviours than are altruistic values (De Groot et al. 2016; Schuitema and De Groot 2015; Van Doorn and Verhoef 2015).

4.11. <u>Values Affecting Environmental Behaviour</u>

As a consequence, behaviour-specific attitudes and norms are generally better predictors of behaviour than are values (Eagly and Chaiken 1993). Indeed, various studies showed that values mostly influence behaviour indirectly, via behaviourspecific beliefs, attitudes, and norms (De Groot et al. 2016; Thøgersen et al. 2016). The value that is prioritized in a specific situation will be most influential for beliefs, attitudes, and norms (hence, behaviour).

Values are abstract, overarching goals that vary in importance and serve as guiding principles in someone's life. Values provide a useful tool in research on the psychological determinants of environmental behaviour, because they are stable and widely applicable. The self-transcendent values (including biospheric and altruistic values) and self-enhancement values (including egoistic and hedonic values) are especially relevant in relation to pro-environmental beliefs, attitudes, norms, and behaviours. Self-transcendent values tend to be positively related to these concepts, whereas self-enhancement values tend to be negatively related to them. In general, people will be more inclined to act upon biospheric and altruistic values when these values are prioritized and made salient in a specific context, for exampling making biospheric values more salient by linking them to one's self-concept, or by supporting them with cognitive reasons. Values differ from related concepts such as environmental concern, worldviews, and myths of nature, and values may be used in applied settings to design value-tailored interventions.

4.12. <u>Social Norms and Pro-Environmental Behaviour</u>

Social norms are 'rules and standards that are understood by members of a group, and that guide and/or constrain human behaviour without the force of laws' (Cialdini and Trost 1998). In a general sense, social norms are what is commonly done or (dis)approved. They refer to what other people think or do. This sets them apart from personal norms, which are rules or standards for one's own behaviour (Kallgren et al. 2000). It is useful to distinguish between two types of social norms: injunctive norms which refer to the behaviour commonly approved or disapproved, and descriptive norms which refer to the behaviour shown by most group members.

Injunctive social norms tell us which behaviour is approved or disapproved. Conforming to such norms is often associated with social acceptance or rewards, whereas violating them often entails disapproval and social sanctions. People conform to injunctive norms to gain social approval or to avoid social sanctions. In essence, we want people to like us. Deutsch and Gerard (1955) termed this type of motivation normative social influence. Conforming to descriptive norms typically has a different motivation, namely the desire to be correct. In many instances, following the group will lead to a correct outcome. For example, following the crowd after arriving by train to an unfamiliar station will likely lead you to the exit. Deutsch and Gerard (1955) termed this type of motivation informational social influence.

Social norms can exert a powerful influence on our behaviour. But subsequent studies have shown a number of important moderator variables. Moderators are variables that increase or decrease the strength of an effect. Social norms can exert a powerful influence on (pro-environmental) behaviour through normative and informational influence. This influence is moderated by the salience of the norm, the size of the reference group, the extent to which this group is considered an in-group, one's personal norms, and the extent to which injunctive and descriptive norms are aligned. When designing messages to promote pro-environmental behaviour, it is essential that information regarding corresponding descriptive norms is in line with the targeted behaviour.

4.13. <u>Emotions and Pro-Environmental Behaviour</u>

Emotions are elicited by something, are reactions to something, and are generally about something – namely a specific object or behaviour (Ekkekakis 2012). This distinguishes emotions from core affect and mood. Core affect is defined as the most elementary consciously accessible feeling, like feeling pleasure or displeasure (Russell and Feldman Barrett 1999). Core affect itself is not consciously directed at anything. When it becomes directed at something, core affect becomes part of an emotion. Similarly, moods are defined as 'affective states that are about nothing specific or about everything – about the world in general' (Frijda 2009). Moods could thus be seen as a longer-lasting version of core affect. In this chapter, we focus on core affect in relation to environmental behaviour; in other words, the emotions that environmentally friendly behaviour elicits.

Research shows that the extent to which people believe engaging in behaviour will elicit positive or negative emotions, so-called, anticipated emotions, can be an important predictor of whether they will act accordingly. This can lead people to engage in environmentally harmful behaviour, such as commuting by car more often because they associate car use with bringing pleasure (Steg 2005). People can thus be motivated to engage in a particular behaviour because they believe it will make them feel good (i.e. experience positive emotions), or because they believe it will help them to avoid feeling bad (i.e. experience negative emotions). The emotions that an object or behaviour is expected to elicit can thereby serve as a motive for (further) engagement in that behaviour. These reasons to engage in behaviour are referred to as emotional motives.

4.13.1. <u>Hedonic and Eudaimonic View on Emotions</u>

Two different views have been provided to explain why pro-environmental behaviour elicits positive or negative emotions. Emotions having their roots in a pleasurable (or unpleasurable) experience are part of the **hedonic view** on which emotions are elicited by pro-environmental behaviour (Venhoeven et al. 2013). Some environmentally friendly behaviours can be inherently pleasurable, and from a hedonic viewpoint lead to positive emotions.

Emotions having their roots in a meaningful (or meaningless) experience are part of the **eudaimonic view** on which emotions are elicited by pro-environmental behaviour. Pro-environmental behaviour is often regarded as moral behaviour, as acting pro-environmentally can benefit the quality of nature and the well-being of other people (Van der Werff et al. 2013a). Specific moral emotions have also been connected to the likelihood that people will act pro-environmentally. For instance, the more guilt people anticipate as a result of not buying pro-environmental products, the higher their intention to buy these products (Onwezen et al. 2013). Also, the more pride people anticipate as a result of buying pro-environmental products, the higher their intention to buy environmentally friendly products (Onwezen et al. 2013).

4.13.2. Pro-Environmental Behaviour in Eudaimonic View

Engaging in pro-environmental behaviour sends a positive **self-signal**. People's self-image can be seen as a collection of different components that together form a person's view of who they are. One of the pillars on which people base their self-image is the behaviour they show (Bem 1972). Moreover, when they engage in pro-environmental behaviour, people conclude they must be a good person (Venhoeven et al. 2016). How positively people think of themselves is an important determinant of how good they feel (Baumeister 1993). When perceiving one's actions to be environmentally friendly leads to a positive self-image, this in turn elicits positive emotions (Venhoeven et al. 2016). Such a positive feeling as a result of helping others or benefiting the environment is also referred to as a **warm glow** (Taufik et al. 2015).

4.13.3. Warm Glow Feelings of Pro-Environmental Actions

Anticipated positive affect might explain why people choose to make decisions that benefit the environment. As discussed, pro-environmental behaviour may be seen as meaningful behaviour, and thereby feel good to engage in. It has been proposed that engaging in meaningful actions elicits a warm glow feeling (Andreoni 1990), a positive feeling as a result of helping others. Interestingly, this warm glow feeling may be interpreted quite literally (Taufik et al. 2015).

4.14. <u>Identity</u>

Self-identity refers to the labels people use to describe themselves (Cook et al. 2002). People hold many different (sometimes even conflicting) identities that become salient at different points in time depending on the context (Stryker and Burke 2000). These include social identities, consumer identities and many others. One particular identity that has important implications for environmental behaviour and has received significant attention in the environmental psychology literature is **environmental self-identity** – the extent to which people see themselves as an environmentally friendly person.

A different conceptualization of identity is **identity similarity**, that is, the correspondence between the perceived characteristics (such as fashionable, socially accepted, easy-going) a person attributes to him or herself and to a particular stereotype such as the typical recycler or the typical owner of a sports car (Manetti et al. 2002, 2004).

4.14.1. <u>Environmental Self-Identity and Behaviour</u>

People's desire to maintain a positive and consistent sense of self can help explain the link between environmental self-identity and environmental behaviour. **Self-discrepancy** theory (Higgins 1989) suggests that people strive for **self-consistency**, that is, consistency between their actual self (what they do), the valued self (their values and aspirations), and theought self (perceived norms). People will try to resolve any discrepancy they experience between these different aspects of the self, for instance by changing their behaviour. Similarly **self-perception** theory (Bem 1972) suggests that people know who they are by looking at what they do. When people perceive a discrepancy between what they do and what (they say) is important to them, they will experience psychological discomfort: **cognitive dissonance** (Festinger 1957), which is a powerful motivator for behaviour or attitude change.

A study tested under which circumstances initial pro-environmental actions can strengthen environmental self-identity and spill-over to other pro-environmental behaviours (Van der Werff et al. 2014a). Environmental self-identity was in turn related to pro-environmental product choices. The stronger one's environmental self-identity, the more pro-environmental products participants preferred. Also, environmental self-

identity mediated the relationship between the manipulation of past behaviour (comparing the group reminded of eight different environmental behaviours to the control group). These results show that reminding people of eight different environmental behaviours can strengthen environmental self-identity, which in turn increases pro-environmental product choices. However, reminding people of eight similar environmental behaviours or of one environmental behaviour is not enough to strengthen environmental self-identity and thereby promote subsequent pro-environmental behaviour.

4.15. Theories of Planned Behaviour

A. Theory of Planned Behaviour

The theory of planned behaviour (TPB; Ajzen 1985; Figure 22.1) assumes that behaviour results from the intention to engage in specific behaviour (i.e. whether people plan to do so). The stronger your intention, the more likely it is that you engage in the behaviour. The intention depends on attitudes towards the behaviour, subjective norms related to the behaviour, and perceived behavioural control. The TPB assumes that all other factors, such as socio-demographics and values, influence behaviour indirectly, via attitudes, subjective norms, and perceived behavioural control.
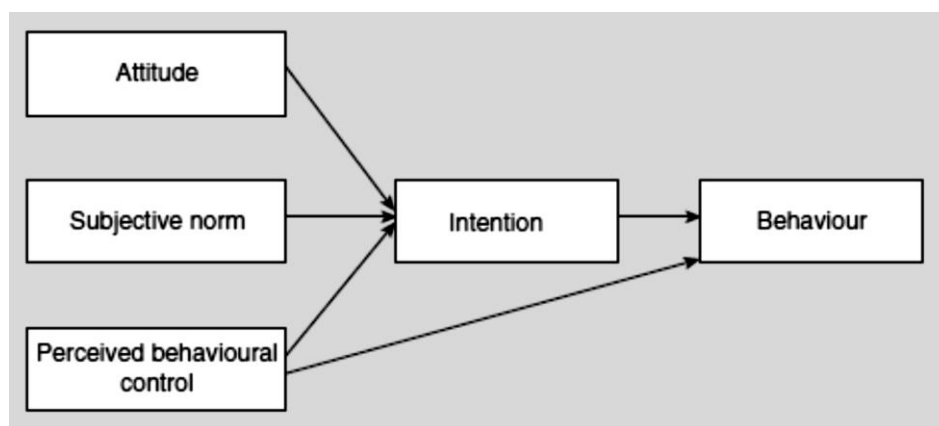
Fig. 1: A schematic representation of the TPB.

B. **Protection Motivation Theory**

The protection motivation theory (PMT; Rogers 1983) assumes that people consider costs and benefits of pro-environmental and environmentally harmful behaviour when making choices. PMT proposes that people are more likely to act pro-environmentally when both threat appraisal and coping appraisal are high (Rogers 1983). Threat appraisal involves evaluating the perceived benefits of environmentally harmful actions, the perceived severity of risks caused by such actions, and one's perceived vulnerability to these risks. Coping appraisal reflects the extent to which people think they can engage in pro-environmental actions that will reduce the threat, which is based on perceived self-efficacy (similar to perceived behavioural control in the TPB), perceived outcome efficacy (the extent to which people think their pro-environmental actions will reduce environmental problems), and the perceived costs of pro-environmental behaviour (Bockarjova and Steg 2014).
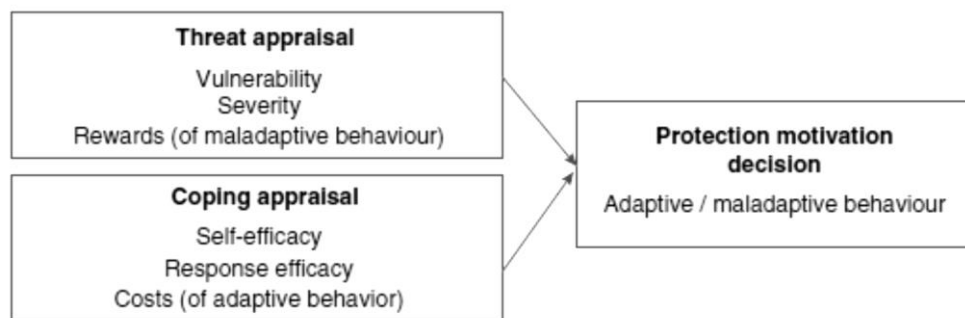
Fig. 2: Protection-motivation theory.

C. **The Norm Activation Model**

The norm activation model (NAM; Schwartz 1977; Schwartz and Howard 1981) proposes that pro- environmental actions follow from the activation of personal norms, reflecting feelings of moral obligation to perform or refrain from actions. Personal norms are activated by four factors: problem awareness (or awareness of need), ascription of responsibility, outcome efficacy, and self-efficacy. Notably, personal norms are stronger when people are aware of the environmental problems caused by their behaviour, and when they feel personally responsible for these problems and do not attribute these

problems to the actions of others, industry, or the government. Moreover, personal norms are stronger when people believe that their actions will help to reduce the relevant problems (outcome efficacy).

D. The Value-Belief-norm Theory of Environmentalism

The value-belief-norm theory of environmentalism (VBN theory; Stern 2000) is an extension of the NAM. The VBN theory proposes that problem awareness depends on values (i.e. general goals that serve as guiding principles in your life) and ecological worldviews (i.e. beliefs on relationships between humans and the environment). The VBN theory proposes that egoistic values are negatively related, and altruistic and biospheric values are positively related to ecological worldviews. In turn, ecological worldviews predict problem awareness, which next influences one's beliefs on whether one can act to reduce the environmental threat, personal norms, and subsequently behaviour.
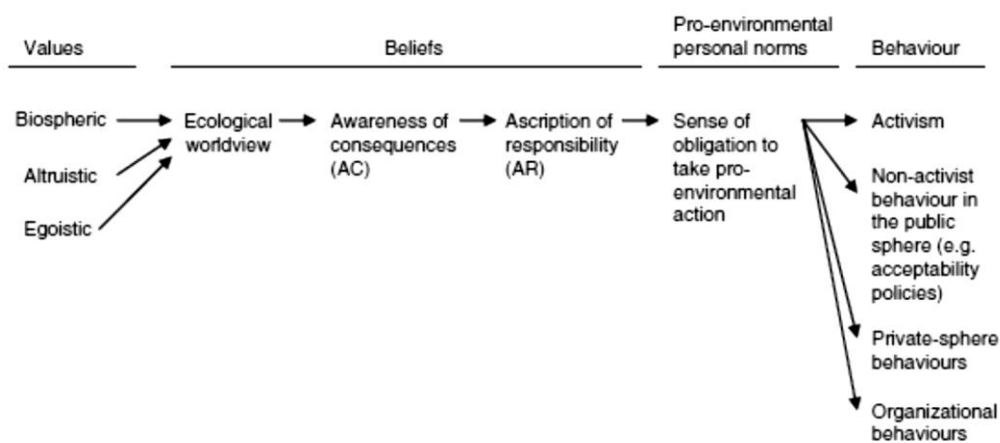
Fig. 3: A schematic representation of the VBN theory of environmentalism.

E. Goal-Framing Theory

Goal-framing theory (Lindenberg and Steg 2007) proposes that three general goals govern or 'frame' the way people process information and act upon it: the hedonic goal 'to feel better right now', the gain goal 'to guard and improve one's resources', and the normative goal 'to act appropriately'. The strength of different goals influences what

people think of at the moment, what information they are sensitive to, what alternatives they perceive, and how they will act. According to goal-framing theory, one goal is focal (i.e. the goal-frame) and influences information processing the most, while other goals are in the background and increase or decrease the strength of the focal goal. Normative goals provide the most stable basis for pro-environmental actions, as acting pro-environmentally is the appropriate way to act. If people act pro- environmentally based on gain or hedonic goals, they will only do so as long as doing so is profitable and comfortable.

4.16. <u>Social Identity Guided Environmental Attitudes and Behaviours</u>

The second theoretical perspective incorporated into the social identity approach is self-categorisation theory (SCT; Turner et al. 1987) which is an extension of SIT. SCT proposes that individuals can either define themselves in terms of personal identity or in terms of social identity. When personal identity becomes salient, individuals distinguish themselves from others on the basis of distinctive attributes; behaviour is driven by individual motives, and social identities become less salient. In contrast, when a social identity becomes salient, group members are defined by their shared group membership and they behave in line with internalized group norms and motives. Hence, individuals' self-perceptions become 'depersonalized' and personal identity is pushed to the background and thus becomes less salient. This process of depersonalization is what, according to SCT, promotes group behaviour, group influence, and cooperation.

4.17. <u>Group Norms Guide Environmental Attitudes and Behaviours</u>

Whether or not a specific group membership is associated with more or less pro-environmental attitudes and behaviours depends on the content of social identity (**social identity content**) as expressed through group norms. Group norms are social norms associated with a particular group identity. When a particular group membership is salient, group members internalize the norms of the group, which then guide their environmental attitudes and behaviours. The social identity approach suggests that

identity content is fluid, and can change depending on the particular outgroup with which group members are comparing their group.

4.18. Group Members Influence Environmental Attitudes and Behaviours

Another key outcome of thinking of oneself in terms of a particular social identity is that people are more likely to be influenced by people they see as belonging to their group. Environmental attitudes and behaviours are more likely to be changed by someone who is considered an in group member.

4.19. Group Identification Influences Environmental Attitudes and Behaviours

The more salient a particular group membership is, the more it will influence people's environmental attitudes and behaviours. SCT proposes that if a particular group membership is relatively more accessible to a person, this social identity is more likely to be salient in a particular situation (Oakes et al. 1994). Social identity salience depends on the level of group identification, that is, the extent to which an individual evaluates and emotionally experiences the relationship to the group as positive. The higher the identification with the group, the more salient group membership is, and the more likely a person is to act in accordance with the group's norms (Turner 1991). Indeed, research has shown that people who strongly identify with pro-environmental groups are more likely to recycle (White et al. 2009), to engage in sustainable agricultural practices (Fielding et al. 2008), and to reduce carbon emissions (Masson and Fritsche 2014).

4.20. Informational Strategies to Promote Pro-Environmental Behaviour

Interventions to promote behaviour change can be divided into two categories (Steg and Vlek 2009). **Informational strategies** are aimed at changing knowledge, awareness, norms, and attitudes (such as information campaigns to raise awareness about recycling). **Structural strategies** are aimed at changing the circumstances in which behavioural

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decisions are made (such as the provision of recycling facilities). Informational strategies include: information provision, goal setting, commitment, prompting, and feedback.

A. <u>Provision of Information</u>

Information provision is probably the most widely used intervention to promote behaviour change. Generally, two types of information are distinguished: information about environmental problems and information that helps people to take action to alleviate these problems. Information provision has its roots in the so-called **knowledge-deficit model**, the assumption being that people do not know about a specific environmental problem, or they do not know in detail what to do about it (Schultz 2002). Information provision aims to overcome this knowledge deficit.

B. <u>Goal Setting</u>

This intervention technique is based on goal setting theory, which states that individual behaviour is goal-directed and that the anticipation of reaching an attractive goal motivates respective behaviour. Goal setting is most effective when goals are high but, at the same time, realistic (Locke and Latham 1990). Moreover, goals should be clearly formulated and achievable within a short period of time.

C. <u>Commitment</u>

In a commitment intervention, individuals, or groups are asked to sign a pledge (commitment) to change their behaviour. It can be assumed that a commitment affects behaviour change via reduction of cognitive dissonance (Festinger 1957), i.e. the tension that arises when one's beliefs or attitudes do not align with one's behaviour. Commitment techniques are regularly combined with other informational strategies (e.g. goal setting) as well as incentives (Bachmann and Katzev 1982; Matthies et al. 2006).

D. <u>Prompting</u>

The technique of prompting has been used to encourage pro-environmental behaviour since the early years of intervention research. It entails a short written message or sign,

which draws attention to a specific behaviour in a given situation. Prompts are simple reminders that can encourage people to behave in an appropriate way, e.g. to avoid littering or to switch off the lights when leaving a room (Sussman and Gifford 2012). By using prompts one assumes that the target group already has a positive attitude or has the intention to carry out the behaviour in question, but lacks a cue in the situation where the behaviour is required. Thus, prompts can be assumed to overrule the automatic elicitation of a problematic behaviour. Depending on the content of a prompt, they can be assumed to directly convey sanctions or incentives, which can be linked to behaviourist approaches (Bell et al. 2001).

E. Feedback

Feedback consists of giving people information about their performance, for instance, energy savings, or amount of recycled materials. According to feedback intervention theory (Kluger and DeNisi 1996), feedback influences behaviour because it gives insight into the links between certain outcomes (e.g. saving energy) and the behaviour changes necessary to reach that outcome (e.g. switching off lights). The more frequently feedback is given, the more effective it tends to be (Abrahamse et al. 2005).

4.21. Persuasive Technology and Environmental Behaviour

Persuasion can be argued to be a typical human activity. In particular, humans are capable of applying persuasive mechanisms like argumentation, praise, reciprocity, norm activation, or authority. Research on persuasion has almost exclusively focused on human–human persuasive interactions (Petty and Wegener 1998). This research has identified many persuasion factors that are related to source features (e.g. trustworthiness), message factors (e.g. argument strength), and receiver factors (e.g. involvement). One may wonder whether similar processes would occur if the persuader were technological in nature instead of human. Persuasive technology can have various functions: it can work as a social actor capable of establishing a social relationship that forms the basis of social influence, it can it can be a medium that allows for persuasive experiences, and it can provide tools that guide or support behaviour (Fogg 2003).

As a tool, persuasive technology can help in various ways to promote change. First, it can make new behaviours easier and thereby more attractive and controllable for a person. Second, persuasive technology can help to tailor information, making the message more personal and contextspecific and therefore more persuasive. Third, persuasive systems may be used to implement learning schemes that systematically reinforce desired behaviours. Fourth, persuasive technology can help people to monitor the consequences of their behaviours by providing feedback about those consequences. Fifth, persuasive technology can activate social norms, for example by providing performance information in a group.

4.22. <u>Persuasive Technology as a Tool to Promote Behaviour Change</u>

A. <u>Ambient Persuasion</u>

Most types of persuasive communication are only effective if the user pays attention to them. However, in many situations people might not be motivated or lack the cognitive capacity to consciously process relatively complex information like factual feedback. One possibility is ambient intelligence: the pervasion of everyday life with information technology (Riva et al. 2004). This allows new forms of influencing through subtle cues in the environment or prompting reflecting changes in form, movement, sound, colour, smell, or light.

A crucial advantage of ambient persuasive technology is that it can continue influencing people, even in daily situations in which cognitive resources are taxed and where interventions that need cognitive attention would not be influential (Ham and Midden 2010).

B. <u>Group Interventions</u>

Most interventions encouraging energy savings (and pro-environmental behaviour in general) treat individuals as the decision-making unit. However, energy conservation usually happens in social systems and is the result of actions by group members. The social dynamics that occur within these groups may influence energy consumption

behaviours to a large extent. So, technological interventions should also address the group level. Interventions at the group level, like group and individual comparison feedback, are promising for the reduction of energy consumption. The type of intervention, the combination of interventions, and the cultural context are important factors to consider in the design of persuasive technology.

LITERATURE SURVEY

Lautenschlager, L., Smith C. (2007). Beliefs, knowledge, and values held by inner-city youth about gardening, nutrition, and cooking. Agriculture and Human Values, 24, 245–258.

Author: Lauren Lautenschlager and Chery Smith

Year: 2007

Objectives:

Changes in the US food system and an interest in changing dietary habits among youth have impelled numerous schools and communities to develop programs such as community gardens. Youth community gardens have the potential to positively influence dietary behaviors and enhance environmental awareness and appreciation. However, actual data supporting youth gardening and its influence are limited. The purpose of the study was to explore the effects of community gardens on youth dietary behaviors, values and beliefs, and cooking and gardening behaviors.

Sample:

The Youth Farm Market Project (YFMP) began in 1994 and is a multicultural gardening enterprise that educates youth about environmental responsibility, empowerment, and cultural expression, while fighting racism and poverty. Inner-city youth (ages 8–13) are actively involved in planting and harvesting at three YFMP garden locations in Minneapolis/St. Paul. Throughout the year, they also participate in cooking groups, community markets, classroom based activities focusing on science, health, nutrition, and literature, and field trips to grocery stores, restaurants, nature centers, and cultural events. During the ten-week garden project, YFMP participants are involved in an array

of activities that focus on various aspects of the food system (gardening, harvesting, cooking, eating) and nutrition education.

Method:

Focus groups were conducted with inner-city youth living in Minneapolis/St. Paul, Minnesota and compared those involved in a youth garden program with those uninvolved in order to investigate whether the gardening program influenced their habits, beliefs, and values.

Instruments:

Qualitative data were collected using focus group methodology. Both YFMP and non-YFMP participants were included to determine if belief, knowledge, and value differences existed between the two populations with regard to dietary habits, ethnic tolerance, cooking, and gardening. Data collection took place between February and April 2005. Focus groups were conducted according to standard protocol, and questions were developed based on the Theory of Planned Behavior (TPB), a review of the literature, and discussions with YFMP staff. The TPB is an expectancy-value model that provides a framework for the determination and analysis of behavioral, normative, and control beliefs that impact health behaviors (Ajzen, 1991). The TPB has been used previously to study health-related decision making behavior (Ajzen, 1991; Armitage and Conner, 1999; Robinson and Smith, 2002, 2003).

Result:

Findings indicate that youth garden program participants were more willing to eat nutritious food and try ethnic and unfamiliar food than those not in the program. Additionally, it was apparent that garden participants had a stronger appreciation for other individuals and cultures and were more likely to cook and garden on their own than youth not involved in a garden program. The findings suggest that garden programs positively impact youth garden habits, food choice, social skills, nutrition knowledge, and cooking skills.

All youth were inner-city residents and 85% were self-reported to be other than White. In all, six ethnic groups were represented. Additionally, 70% of the participants reported having a garden at home with vegetables being the most common product grown. The Minneapolis/St. Paul area is known for garden utilization, so it is not surprising that 70% of the participating youth reported having a homegarden.

Data analysis identified five main themes and several sub-themes from the focus group discussions. Themes included (1) gardening, (2) dietary habits, (3) social influences, (4) nutrition knowledge, and (5) cooking. The theme, ''dietary habits,'' was further divided into subthemes. These included nutritious food, ethnic food, unfamiliar food, and sensory characteristics.

This study identified several differences between youth involved in a garden program and those not exposed to one. Besides having a better understanding of the food system, garden program participants demonstrated heightened values for other individuals and other cultures. Although the immediate benefits of gardening were evident, we were unable to determine the long-term effects of garden programs. Future research will need to examine whether and to what extent the aforementioned benefits are sustainable over time.

This study demonstrates that a youth gardening program has the potential to develop future citizens who are environmentally responsible and ethnically tolerant. Furthermore, the gardening program itself was an important social influence for these youth. Future gardening program directors can use the results of this study to develop a curriculum that facilitates a solid belief system and healthful nutrition and gardening habits. A better understanding of the food system, in turn, may ultimately help youth to navigate their way through the numerous food choices available to them so that they select foods that optimize their health outcomes.

Jans, L. (2021). Changing environmental behaviour from the bottom up: The formation of pro-environmental social identities. Journal of Environmental Psychology, 73, 101531.

Author: Lise Jans

Year: 2021

Objectives:

In the present paper, it was tested whether initiative members' perceptions of bottom-up formation are positively related to perceived pro-environmental initiative norms (H1a) and initiative identification (H1b), and in turn, to pro-environmental intentions. Additionally, whether these relations uphold after six months and a year was examined. In Study 2, whether higher perceived bottom-up formation is also associated with higher perceived pro-environmental norms in the overarching group (H3a), and identification with this group (H3b), and in turn, to increased pro-environmental behaviour (H4a & H4b) was tested. The aim of Study 3 was to experimentally test whether making this bottom-up initiative salient (vs. not salient) enables pro-environmental social identity formation among Estonians in terms of norms (H3a), and identification (H3b), and in turn, fosters pro- environmental intentions (H4a & H4b).

Sample:

This study was conducted in a division of a large international organization (Philips) in the Netherlands. A small group of employees had set up an initiative to encourage pro-environmental behaviour among their colleagues. Yet, the initiative was supported by the management, and initiative takers were mostly from the middle ranks of the organization. Increasingly initiatives are formed from the bottom-up, by for example community

members themselves, to stimulate pro-environmental behaviour in their overarching group. Specifically, perceiving bottom-up formation of pro-environmental initiatives allows for the formation of pro- environmental social identities, motivating behaviour in line with this identity. The hypotheses were tested in three field studies around different pro- environmental initiatives. All studies were reviewed and approved by the Ethical Committee of Psychology of the University of Groningen. In Study 1, data from a large dataset from a project on community energy initiatives was used.

Method:

An online survey link was distributed by email to approximately 2000 employees, working at a 'Research and Development' site of Philips (a Dutch multinational technology company) in The Netherlands. Employees (N = 277; Mage = 45.26; SDage = 10.69) from various departments (e.g. Floor Care, Coffee, and Male Grooming) voluntarily completed the survey. Of these, 216 were male (78.0%), 46 were female (16.6%), 7 identified as other (2.5%), and 8 did not specify their gender. On average, participants had been working at the organization for 15.54 years (SD =11.30). Seventeen participants filled in the questionnaire in English (the default was Dutch).

All items started with the question "To what extent do you (dis)agree with the following statements" and could be answered on a scale from 1 (strongly agree) to 7 (strongly disagree), unless otherwise specified. All scales were recoded so that the highest number was always the most positive, (7 = strongly agree).

Instruments:

Perceived pro-environmental norms of both employees and the management were assessed, with 5 items each (Masson & Fritsche, 2014).

Organizational identification was assessed with a single item shown to have good reliability and validity (Postmes, Haslam, & Jans, 2013).

Fourteen items assessed self-reported pro-environmental behaviour (adapted from Ruepert et al., 2016).

In order to test the hypotheses, Hayes (2012) PROCESS macro, model 4 was used.

Result:

Overall, the pro-environmental initiative was, in line with its actual formation, perceived as more bottom, than top-down formed, $\Delta M = 0.88$, t (276) = 9.95, p < .001. There was no difference between perceived pro-environmental norms of employees and the management, $\Delta M = - 0.02$, t (276) = $-$ 0.40, p =.690. Perceived bottom-up formation was specified as predictor and top-down formation as covariate. Pro-environmental employee and management norms and organizational identification were indicated as mediators, and self-reported pro-environmental behaviour was indicated as dependent variable. The mediation path was also specified with perceived top-down formation as predictor and bottom-up formation as covariate.

These initiatives varied in size and were spread across the Netherlands. All initiatives were part of an overarching network called Buurkracht. Although these initiatives could be perceived as bottom-up as they were set up by community members themselves, they could also be perceived as top-down as they were part of this overarching network supported by a large grid operator in the Netherlands (Enexis). Previous research on this dataset shows that membership to, and identification with, these community energy initiatives is positively related to various self-reported energy-specific pro-environmental behaviours and intentions, and more general pro-environmental and communal intentions (Sloot et al., 2018). The initiative could thus again be perceived as both bottom up and top down. In both studies, the effect of perceived top-down formation is also explored. The final study was conducted in Estonia, in which in 2008, a bottom-up initiative – was set up by a group of Estonians who wanted to clean up littered areas and change the littering habits of Estonians.

This paper supports the potential of bottom-up pro-environmental initiatives. This finding does not only shed light on the formation of pro- environmental social identities but might also encourage those trying to mitigate environmental problems from the bottom up. But can such bottom-up initiatives motivate pro-environmental behaviour. Perceiving a pro-environmental initiative as formed by regular group members

themselves (i.e. from the bottom up) enables pro-environmental social identity formation, motivating behaviour accordingly.

Three field studies around different initiatives supported this. Perceived bottom-up formation is positively associated with pro-environmental social identity (in content and strength), for members of the initiative (Study 1) and the overarching group (Study 2), and bottom-up pro-environmental initiative salience strengthens pro-environmental social identity in the overarching group (Study 3). Perceived bottom-up formation partly relates to self-reported pro-environmental behaviour (Study 2) and intentions (Studies 1 and 3) via pro-environmental social identity. Bottom-up pro-environmental initiatives may thus accelerate the transition towards pro-environmental practices; theoretical and practical implications are discussed.

Milfont, T.L., Osborne, D., Yogeeswaran, K., Sibley, C.G. (2020). The role of national identity in collective pro-environmental action. Journal of Environmental Psychology, 72, 101522.

Author:

Taciano L. Milfonta, Danny Osborneb, Kumar Yogeeswaranc, Chris G. Sibleyb

Year: 2020

Objectives:

The current research examined representations of national identity and, in particular, the extent to which believing that being "clean and green" contributes to a distinct national identity relative to other qualities of being a 'true' New Zealander. Most importantly, whether this "clean and green" identity correlates with pro- environmental attitudes and intentions to act on behalf of the environment was investigated.

Sample:

The New Zealand Attitudes and Values Survey (NZAVS) is a national panel study that has been assessing people's socio-political attitudes annually since 2009. The first phases of the longitudinal study were approved on 09-September-2009 for 3 years (reference number: 2009/ 336). The NZAVS is reviewed every three years by the University of Auckland Human Participants Ethics Committee. The current study used data primarily from Time 7 (2015) of the NZAVS because the multi-item national character measure was only included in this wave of the survey.

The Time 7 wave of the NZAVS contained responses from 13,942 participants (13,941 retained from one or more previous wave, and 1 unmatched participant or unsolicited

opt-in). Of these participants, 13,854 (i.e., 99.4% of the full Time 7 sample) provided partial or complete responses to our variables of interest and were included in the current study. This final sample had a mean age of 50.84 years (SD = 13.88), with 8660 (62.5%) participants identified as women. In terms of ethnicity, participants identified as New Zealand European (N = 10,946), Maori (N = 1951), Pacific Islander (N = 354) and Asian (N = 542).

Method:

Both individual and collective actions are needed to address global environmental changes. Contributing to a growing literature on the collective dimension of pro-environmental actions, the role of national identity in mobilizing environmental norms and pro-environmental tendencies was examined.

To achieve these related goals, broader profiles of national identity from a representative sample of New Zealanders first identified. Then the characteristics of participants within each profile, and use profile membership to predict environmental appraisals, climate change beliefs, pro-environmental intentions, self-reports of pro- environmental behaviours, and support for pro-environmental collective actions both cross-sectionally and longitudinally was investigated.

In terms of assessing the extent to which national identity is comprised of pro-environmental representations, respondents were asked to rate the importance of eight qualities for being a 'true' New Zealander, including to have a "clean and green" attitude. Then used an LPA to identify national identity profiles (i.e., distinct subgroups) based on the importance given to each of the eight national qualities. LPA provides a model-based approach towards identifying unique response patterns within a sample population (Osborne & Sibley, 2017). Thus, with this first analytic step, we can assess how many people (if any) believe that having a clean-and-green attitude relates to other aspects of national identity.

Instruments:

National character: Eight items were used to assess participants' view of key attributes of New Zealand national identity. This measure was informed by previous international research (Citrin, Reingold, & Green, 1990; Devos & Banaji, 2005), as well as local scholarship exploring New Zealand national identity (Liu, McCreanor, McIntosh, & Teaiwa, 2005).

Social dominance orientation (SDO): The survey included six items from the SDO6 scale (Pratto, Sidanius, Stallworth, & Malle, 1994).

Right-wing authoritarianism (RWA): The survey included six items from the RWA scale (Altemeyer, 1996).

Patriotism and Nationalism: The survey included four items from the two measures developed by Kosterman and Feshbach (1989) to assess participants' levels of Patriotism and Nationalism.

Personality dimensions: The Mini-IPIP6 (Sibley, Hoverd, & Liu, 2011) was used to assess the six personality traits of Extraversion, Agreeableness, Conscientiousness, Neuroticism, Openness to Experience, and Honesty-Humility with four items each.

Values: The shortened values measure developed by Stern, Diez, and Guagnano (1998) to assess Schwartz's (1992) higher-order value dimensions of Self-Enhancement vs. Self-Transcendence, and Openness to Change vs. Conservation was used.

Private-sphere environmentalism: Two items from Liu and Sibley (2012) to assess behavioural intention to make sacrifices for the environment and self-reports of having actually made sacrifices for the environment was used.

Public-sphere environmentalism: Two items developed by the NZAVS team to assess changes in non-activist behaviour in the public sphere involving acceptance of environmental policies (Stern, 2000) was used, thus measuring support for collective pro-environmental actions.

Result:

Latent profile analysis with a large national dataset (N = 13,942) revealed five profiles underlying participants' views of attributes necessary for being a 'true' New Zealander. Four profiles containing over 89% of participants placed high importance on having a clean-and-green attitude as a core component of national identity, confirming that environmentalism is part of New Zealand's zeitgeist. Importantly, believing that New Zealand has a superordinate environmental identity was associated with both individual pro-environmental tendencies and collective pro-environmental actions (i.e., support for government regulation of carbon emissions and subsidisation of public transport), both cross-sectionally and longitudinally. Forging national environmental identities and norms are thus important, yet vastly underutilised, pathways to mobilise pro-environmental collective action.

Collective action is imperative for addressing global environmental change. To these ends, existing research within the social identity perspective suggests that identification with a pro-environment group is one important pathway to facilitating collective environmental action (Bamberg et al., 2015; Fielding & Hornsey, 2016; Fritsche et al., 2018). Accordingly, previous research has examined the role of national identity in influencing the appraisal of environmental issues and collective environmental actions (Bonaiuto et al., 1996; Schlicht-Schmalzle et al., 2018). Although being "clean and green" is a core component of New Zealand's national imagery for many, previous research had yet to examine the extent to which viewing environmental protection as central to national identity coincides with other characteristics of the nation and, more importantly, whether this view fosters individual and collective pro-environmental tendencies and actions.

Liua, P., Hana, C., Teng, M. (2021). The influence of Internet use on pro-environmental behaviors: An integrated theoretical framework. Resources, Conservation & Recycling, 164, 105162.

Author: Pihui Liua, Chuanfeng Hana, Minmin Teng

Year: 2021

Objectives:

This paper develops an integrated theoretical analytical framework for explaining the question of how Internet use shapes pro-environmental behaviors. Structural equation modeling with bootstrapping estimation was conducted to assess a causal chain from Internet use to pro-environmental behaviors with a nationally representative sample of 9,473 respondents from China.

Sample:

The data are taken from the 2013 Chinese General Social Survey (CGSS2013), which was associated collected by the Renmin University of Chinaand Hong Kong University of Science and Technology in 2013.

Method:

Using the method of multistage stratified sampling, more than 10,000 individual respondents covering 30 provinces in China (excluding Xinjiang and Hainan) were interviewed in person. Respondents were between 18 and 95 years of age. The questionnaires elicited information about social demographics, living styles, social networks, personal cognitive ability, social security, and environmental behaviors.

Instruments:

Pro-environmental behaviors (PEBs): PEBs were assessed using five items adapted from the studies of Zhao (2019).

Internet use (IU): This study uses a 5-point Likert scale to ask respondent show often they used the Internet in the past year (1 = never; 5 = always). Internet use is a continuous variable, ranging from 1 to 5.

Structural equation modelling (SEM) with AMOS25.03 was used to test for significant relationships between variables.

Result:

The results show that Internet use has a strong positive impact on environmental knowledge (EK) and perceived environmental pollution threats (PEPTs) and a negative effect on satisfaction with governmental environmental protection (SGEP). It was concluded that Internet use not only directly affects pro-environmental behaviors (although the effect is low) but also indirectly influences pro-environmental behaviors through the mediating effects of EK, PEPTs, and SGEP. Among them, the mediating effects of EK and PEPTs are positive, while the mediating effect of SGEP is negative. In fact, Internet use does not always have a positive mobilizing effect, which is undoubtedly one of the interesting results of this study. Finally, there are marked differences between the Internet and traditional media, such as newspapers, television, and magazines, in their influence on pro-environmental behaviors under this comprehensive framework.

Daryantoa, A., Songb, Z. (2021). A meta-analysis of the relationship between place attachment and pro-environmental behaviour. Journal of Business Research, 123, 208-219.

Author: Ahmad Daryantoa, Zening Songb

Year: 2021

Objectives:

Place attachment has been identified as a key construct that can explain pro-environmental behaviour. However, the precise strength of its effect remains undocumented. The aim of this article was to quantify the effects of place attachment on pro-environmental behaviour by means of a meta-analysis and to examine the contextual factors that may explain the variations in the effect sizes reported in previous research.

In this research, a meta-analysis study of past literature on the effect of place attachment on pro-environmental behaviour was conducted. A meta-analysis study is needed to clarify the nature of the relationship between place attachment and pro-environmental behaviour. Common to any meta-analysis studies, the main goal was to examine the size and the direction of the focal relationship being studied and the potential contextual factors that affect the relationship.

Sample:

A literature search in different scientific databases to identify studies that examine the link between place attachment and pro-environmental behaviour employed. Systematically searched relevant studies in EBSCOhost, google scholar, Web of Science

using keywords: place attachment, sense of place, place identity, pro-environmental behaviour, environmentally responsible behaviour.

Method:

Meta-analysis followed standard meta-analysis procedures for correlation coefficient (i.e., Pearson's r) as a measure of effect size. However, some studies did not report correlation coefficients but provided standardised regression coefficients. These standardised regression coefficients converted into correlation coefficients using the approximation formula suggested by Peterson and Brown (2005), which was $r = 0.98\beta + 0.05\lambda$, where λ equals 1 when β was non-negative and 0 when β was negative.

Among the studies on the association between place attachment and pro-environmental behaviour, the two focal constructs have been measured as either global or specific. Global vs. specific measurement of constructs may have a different effect on attitudes and behaviours.

Instruments:

Some samples regarding the measurement scales used in prior studies for place attachment and for pro-environmental behaviour was used. First, using the escalc() function in the R metafor package, applied Fisher's Z transformations, which was the effect size used in the subsequent analysis. Second, calculated correlation effect sizes and sample variances adjusted for measurement error following the procedure suggested by Hunter and Schmidt (2004). Next, performed the statistical test for homogeneity among the effect sizes—also called the heterogeneity analysis. The restricted maximum-likelihood estimation used when estimating the amount of heterogeneity in effect sizes. Fourth, conducted a multilevel meta-regression analysis to assess the influence of moderator variables on the variation in the effect sizes.

In modelling the stochastic dependency among the effect sizes, the multilevel model meta-analysis applied a three-level structure, which considers three different sources of variance in calculating effect size heterogeneity that occurs at three various levels of a meta-analytic model.

Result:

Study obtained 130 effect sizes from 38 research articles, published between 2002 and 2019. The majority of studies were published in tourism and environmental psychology journals. Before proceeding with meta-analysis, checked for extreme effect sizes to detect the presence of outliers in the data using the boxplot.

The results show that, first, the overall effect of place attachment on pro-environmental behaviour is positive, and the strength of the effect is moderate. Second, the effect is larger in collectivist vs. individualist cultures. Third, the effect also depends on the type of place user and is larger for tourists vs. local residents. Fourth, the general measure of place attachment produces a larger effect size than measures focusing on one of its dimensions. Finally, place-specific measures of pro-environmental behaviour produce a larger effect size than non-place-specific ones.

Donmez-Turan, A., Kılıçlar, İ.E. (2020). The analysis of pro-environmental behaviour based on ecological worldviews, environmental training/ knowledge and goal frames, Journal of Cleaner Production, 279, 123518.

Author: Aygul Donmez-Turan, İbrahim Erdem Kılıçlar

Year: 2020

Objectives:

The analysis of pro-environmental behaviour based on ecological worldviews, environmental training/ knowledge and goal frames. The environmental dimension of the concept of sustainability has become a topic that has been frequently researched in the fields of psychology, sociology and organisational behaviour. Designed on the basis of previous studies, this study aims at explaining pro-environmental behaviour based on ecological worldviews of individuals and goals that the individuals desire to achieve with their environmental knowledge.

Sample:

Present study has two separate studies were conducted on two separate samples. The first study was carried out to determine the pro-environmental behaviours of 109 high school students in a public high school (garbage disposal in the recycling bin) and the second study was undertaken to observe whether 236 university students from a public university would participate in an environmental activity (a sustainable day event)

Method:

Explaining the pro-environmental behaviour of individuals with environmental knowledge, their ecological worldviews and goal frames was aimed, in this study. The

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effect of the independent variable on the dependent variable in experimental design is provided by the perception of the relevant independent variable as real by subjects (manipulation/ intervention) (Neuman, 2013).

Accordingly, two separate experimental studies, consisting of 109 high school students and 236 college students, were designed. Participants' level of knowledge was manipulated through environmental training, while their personal goals were manipulated so as to create certain conditions in order to lead individuals to achieve specific goals.

Instruments:

In this study, pro-environmental behaviour and environmental training/ knowledge were measured with dichotomous variables as in the way of, 'exhibiting/ not exhibiting proenvironmental behaviour' and 'attending/ not attending training session', respectively. Goal frames (gain, normative) were also measured by categorical variables with the manipulation of reward promises and each goal-frame has two response categories (yes/no) according to the adaptation to the related intervention.

The ecological worldviews of students were obtained by means of the new ecological paradigm scale. The validity of this scale was tested in two samples with multi-group confirmatory factor analysis. Multivariate logistic regression models were used to explain pro-environmental behaviour which was determined as 'dropping litter in to a recycle bin' in the first study and 'participating in an environmental event' in the second study.

Result:

As a result of the first study, it was observed that one-unit change in the post-training views of the individual increases the probability by 11.1 times in exhibiting pro-environmental behaviour. Furthermore, the results showed that 'gain-goals' oriented individuals would exhibit pro-environmental behaviour 7.3 times more than those in the control group and 'normative-goals' oriented individuals would exhibit pro-environmental behaviour 3.5 times greater than those in the control group. It was

estimated that the students who had environmental training would exhibit pro-environmental behaviour 2 times more than those who without. It was determined that environmental training had a significant effect only on voluntary behaviour when pro-environmental behaviour was classified as voluntary, gain or normative goal oriented behaviours.

Accordingly, it was also estimated that the individuals who had environmental training would exhibit voluntary pro-environmental behaviour 4.7 times more than those who did not have any training. Training and goal-frames were treated to the subjects, so real responses of the subjects could be examined to the environmental training and goal-frame stimulation. So the main contribution of this research to the literature is enabling observation real pro-environmental behaviour of individuals in terms of interventions.

Tianyu, J., Meng, L. (2020). Does Education Increase Pro-Environmental Willingness to Pay? Evidence from Chinese Household Survey, Journal of Cleaner Production, 275, 122713.

Author: Jin Tianyu, Li Meng

Year: 2020

Objectives:

In the paper aims to offer an integrated research between WTP for environmental improvements and personal educational attainment, and to determine whether there is a causal relationship between them.

Sample:

The study was carried out in Chinese populations driving force behind this rapid development lies in the enforcement of relevant education policies, including the promulgation in 1986 of the Compulsory Schooling Law (CSL), which requires mandatory nine-year basic education for school-age children, and the expansion of higher education opportunities in 1998.

Method:

The methods used in our study contains two parts. Firstly, given that considerable respondents report China Yuan (CNY) in the survey, there may be severe selected bias in the estimation. To address this problem, the Heckman two-stage regression to adjust the self-selection applied. On the other hand, the association between WTP and educational attainment may be endogenous, therefore used IV estimation to identify the casual relationship between educational attainment and WTP.

To conduct both two-stage selection model and IV regression as empirical analysis to provide evidence consistent with the hypotheses performed. Hypothesis I: Higher educational attainment leads to higher willingness to pay for environmental improvements. HypothesisII: There is a causal effect between higher educational attainment and pro-environmental higher willingness to pay.

Instruments:

In order to reduce the potential self-selection bias, by employing the two-stage model proposed by Heckman (1979), which explains the self selection process within the sample itself employed.

Result:

There has been very little research conducted to identify the causal relationship between individual's educational attainment and pro-environmental WTP. First of all, endogeneity of education and omitted characteristics have made it difficult to identify causality, potentially biased the estimation results and caused inconsistency between existing studies (Ek and Soderholm, 2008). Therefore, it is necessary to introduce instrumental variables, for instance external policy shocks that enhance educational attainment, in order to provide reliable results on the causal effect between educational attainment and WTP (Meyer, 2015).

China, as the most populated country with severe ecological deterioration, has put much effort on environmental protection. The success of environmental protection relies not only on administrative regulations but also largely on public supports, especially how much the public is willing to pay for relevant environmental improvements. It is widely accepted that higher educational attainment promotes pro-environmental behavior. However, the increase of pro-environmental willingness to pay associated with higher education attainment and the identification of their causality has been missing.

In this study, investigate into how higher level of educational attainment contributes to willingness to pay based on household survey data. OLS regression conducted as baseline

results, apply Heckman two-stage regression to adjust for selection bias, and identify the causal relationship between higher educational attainment and higher willingness to pay by using the promulgation of the Compulsory Schooling Law as an instrumental variable. Study find that higher education would significantly increase both the incentive and the amount of willingness to pay for environmental improvements. It is clear that governmental efforts on public education can contribute to environmental protection by promoting public supports. Increasing the fiscal expenditure on education may have a long-term positive effect on environmental protection.

Fuhrmann-Riebela, H., D'Exelle, B., Verschoor, A. (2021). The role of preferences for pro-environmental behaviour among urban middle class households in Peru. Ecological Economics, 180, 106850.

Author: Hanna Fuhrmann-Riebela,, Ben D'Exelle, Arjan Verschoor

Year: 2021

Objectives:

To elicit information on the variables of interest for analysis, a household survey was conducted among 900 middle class households in Lima, Peru, in November and December 2018.

Sample:

Using a survey module from the Global Preference Survey (GPS), we investigate the role of a large range of preferences for PEB in a sample of 900 middle class households in Lima, Peru.

Method:

The data collection was conducted by a local survey firm. The PEBs considered are habitually saving energy, avoiding the use of plastics, and limiting expenditures on electricity.

Instruments:

Data on risk, time and social preferences was collected using questions from the Global Preference Survey (GPS) of Falk et al. (2016, 2018), which has been implemented

worldwide, in at least 76 countries. A key advantage of the GPS is that it is experimentally validated, meaning that the survey items included in the GPS were the best predictors for preferences in incentivised choice experiments.

Result:

Pro-environmental behaviour (PEB) is known to reflect people's social preferences, time preferences and risk preferences. Previous research has tended to consider these in isolation, which means they may proxy for omitted ones, leading to biased estimates. Moreover, it has not considered ambiguity preferences, which for some PEBs is conceptually more relevant than risk preferences.

Result find that social preferences matter mainly for saving-energy behaviour; time, risk and ambiguity preferences matter mainly for the consumption of plastics; and time and ambiguity preferences matter for expenditures on electricity. The insight that particular preferences matter for particular PEBs has important policy implications.

Zhang Y., X. Xiao, R. Cao, et al. (2020). How important is community participation to eco-environmental conservation in protected areas? From the perspective of predicting locals' pro-environmental behaviours, Science of The Total Environment, 739, 139889.

Author: Yuling Zhang, Xiao Xiao, Ruibing Cao, Chunhui Zheng, Yongrui Guo, Weixia Gong, Zongcai Wei

Year: 2020

Objectives:

This study focuses on the relationship among community participation, perception changes in livelihood capitals and place attachment, which are related to residents' production, livelihoods, and pro-environmental behaviours.

Sample:

The Nanling National Nature Reserve has a long history of biological development; it is a refuge for ancient tropical flora and fauna and the birthplace of temperate and subtropical plants in modern East Asia. It is one of 14 biodiversity hotspots in China and has been acknowledged as a Treasury of Species in subtropical areas. A interviews and surveys, were conducted with 340 respondents in and around Nanling National Reserve.

Method:

The study uses a convenience sampling method in the Nanling National Nature Reserve, China. A mixed-methods approach, including interviews and surveys, was chosen to examine residents' PEB as well as community participation, place attachment and perception of livelihood capital changes. In-depth interviews were conducted with

community elites, poor households, managers, and vendors, for a total of 15 participants. Surveys were completed by 340 respondents in and around Nanling National Reserve.

Instruments:

The survey questionnaire separated into sections A and B. Section ―A‖ contained the socio-demographic profile of the respondents. Section ―B‖ contained the residents' self-reported PEB, community participation, perception of livelihood capital changes and place attachment. PEB were measured with six items referring to Zhang et al.'s (2014a) scale.

Result:

Community participation is considered an effective measure to protect the eco-environment and to improve people's livelihoods in protected areas. However, it has not received enough attention at the practical level in most developing countries, and it is unclear how important it is in stimulating locals' pro-environmental behaviours to achieve eco-environmental protection goals.

Regression analysis results show that community participation is the most powerful predictor of pro-environmental behaviours. Furthermore, community participation moderates the relationship between place attachment and pro-environmental behaviours. In addition, perception changes in livelihood capitals positively affect pro-environmental behaviours in the high-level community participation group while having negative or positive results in the low-level community participation group. The findings, which emphasize the importance of community participation in conservation, provide a better understanding of the differences in pro-environmental behaviours between high and low community participation groups and will aid future development and conservation planning of these initiatives.

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, 101471.

Author: Allen R. McConnell, Tyler P. Jacobs

Year: 2020

Objectives:

The current work first sought to establish that nature-self size could be distinguished from overlap (Study 1) and could be manipulated independently of overlap (Study 2) before turning to the question of how different components of size (e.g., self size, nature size, relative difference) might predict pro-environmental outcomes (Study 3).

Sample:

202 undergraduates (Male=18.83, SD=1.11; 132 females, 70 males) participated in individual lab rooms each equipped with a computer. Sample size was determined using an a prior sample size analysis (α=.05, desired power=.80) conducted in G Power (Faul, Erdfelder, Lang, & Buchler, 2007), assuming small-to-medium correlations (r=.20) observed in pilot data.

Method:

To assess environmental concerns, Schultz's (2001) measure of environmental concern was used, which examines the extent to which people are motivated to protect the environment for biospheric (e.g., plants, animals), altruistic (e.g., other people, future generations), and egoistic (e.g., my health, my lifestyle) reasons.

Instruments:

Study included a measure of self-transcendent values, modeled after Schwartz (1992). Prticipants complete the New Ecological Paradigm scale (NEP; Dunlap, Van Liere, Mertig, & Jones, 2000), a widely-used measure that predicts self-reported pro-environmental behavior and support for conservation policies (Hawcroft & Milfont, 2010).

Result:

In three studies, investigated the consequences of self-nature representations for pro-environmental action, focusing on the role of viewing nature as relatively larger than the self (i.e., nature-self size; NSS). Drawing on theories from the self, prosocial behavior, and emotions literatures, anticipated that NSS would make unique contributions above and beyond inclusion of nature in self (INS) in predicting behaviors, beliefs, and emotions associated with conservation outcomes.

In Study 1, greater INS and greater NSS uniquely predicted greater biospheric concern, performing more conservation behaviors, and holding more pro-environmental beliefs. However, only seeing nature as relatively larger than the self (NSS) uniquely predicted greater self-transcendence, stronger beliefs in anthropogenic climate change, and holding more liberal ideologies. Study 2 manipulated NSS without altering INS, consistent with a distinction between these two self-nature representations, and it found that increasing NSS inspired stronger prosocial emotions. Finally, Study 3 explored whether these size effects might be driven by views of nature size, self size, or their relative differences, and nature size provided the best account. In addition to suggesting a unique role for nature-self size and discussing how particular facets of nature-self size might matter in different contexts, the current work builds conceptual bridges with several psychological literatures and suggests new avenues for pro environmental interventions.

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Liping, F., Zhaohui, S., Zha, L., Liu, F., He, L., Sun, X., Jing, X. (2019). Environmental Awareness and Pro-environmental Behavior within China's Road Freight Transportation Industry: Moderating Role of Perceived Policy Effectiveness, Journal of Cleaner Production, 252, 11979.

Author:

Liping Fu, Zhaohui Sun, Lajia Zha, Feng Liu, Lanping He, Xuesong Sun, Xiaoli Jing

Year: 2019

Objectives:

To reduce the negative effects of the accelerating use of RFT, China has recently been committed to promote green RFT. Efforts made in this direction have mainly focused on supply-side policy and technical measures, while neglecting the importance of demand-side psychological and behavioral strategies.

Sample:

The empirical study was conducted in the Beijing-Tianjin-Hebei (BTH) region, which is one of the most heavily polluted regions in China. Pollutant emissions from RFT have long been a cause for concern in this region. Hypotheses are examined using a sample of 243 truck drivers with structural equation modeling and hierarchical regression analysis.

Method:

In this study, the current levels of environmental awareness and pro-environmental behavior among China's RFT drivers, and explore the role of environmental awareness as defined by four main components—environmental concern, environmental attitude, environmental knowledge, and behavioral intention—in motivating pro-environmental

RFT behavior was investigated. We also test the moderating effect of perceived policy effectiveness on the awareness–behavior relationship.

Instruments:

Structural equation modeling (SEM), a powerful multivariate statistical modeling technique, is used to test the proposed theoretical model and hypotheses (Kline, 2011).

Hierarchical regression analysis (HRA) is an appropriate technique for examining the moderating effects. The advantages of HRA lie in its ability to isolate different variables into separate blocks, thus allowing researchers to identify any significant change in variance following the addition of new variables (Osazuwa and Che-Ahmad, 2016).

Result:

Road freight transportation (RFT) has received significant attention from the government, industry, and academia because of its high energy consumption and carbon emissions. Recent research suggests that drivers play a fundamental role in generating environmental impacts during transport. Thus, the success of green RFT should also be based on a thorough understanding of the drivers' environmental awareness and pro-environmental behavior.

The results indicate the existence of an environmental awareness–behavior gap. We determine that the awareness score (3.2) is higher than the behavior score (3.1) because barriers to proenvironmental behavior are stronger than motivators. We also find that environmental concern, attitude, and knowledge indirectly affect pro-environmental behavior via behavioral intention.

Moreover, a high level of perceived policy effectiveness facilitates the transformation of awareness into behavior, bridging the awareness–behavior gap. Study confirms the importance of environmental awareness and effective incentive policies in encouraging pro-environmental RFT behavior. The conclusions will aid researchers' understanding of drivers' environmental awareness and pro-environmental behavior in China's RFT,

and compel transport policy makers and managers to implement more effective measures that promote environmentally sustainable RFT.

Hamzah MI, Tanwir NS, Do pro-environmental factors lead to purchase intention of hybrid vehicles? The moderating effects of environmental knowledge, Journal of Cleaner Production, 279, 123643.

Author: Muhammad Iskandar Hamzah, Nurul Syafiqah Tanwir

Year: 2020

Objectives:

This research aimed to investigate the antecedents of Malaysians purchase intention of hybrid vehicles through the integration of the Norm Activation Model (NAM) and the Theory of Planned Behavior (TPB).

Sample:

The study was conducted with 256 vehicle owners across suburban areas of the Greater Kuala Lumpur, Malaysia.

Method:

Data was collected from vehicle owners (n = 256) across suburban areas of the Greater Kuala Lumpur and was analyzed using Partial-Least Squares Structural Equation Modelling (PLS-SEM).

Instruments:

Three constructs of TPB were identified based on previously described studies on proenvironmental attitudes and behaviors, especially drawing on Ajzen's (1991) philosophy and measurement of TPB constructs. Meanwhile, the NAM is represented by

three variables, namely perceived green value, environmental concern, and environmental responsibility.

Result:

Specific pro-environmental factors, namely perceived green value, perceived behavioral control, and subjective norm, were found to exert a positive influence over green purchase intention. Additionally, the results show that environmental knowledge has positive moderating effects on the link between perceived green value and green purchase intention. Perceived behavioral control was shown to mediate the effects of environmental concern and responsibility on green purchase intention. The findings reinforce the current view that pro-environmental factors overcome self-interest in buyers' decision making process. Given the limited literature integrating TPB and NAM within the hybrid vehicle market context, especially in the developing economies, the findings provide a novel perspective for future research to build on.

Tkaczynski, A., Rundle-Thiele, S., Truong, D.V. (2020). Influencing tourists' pro-environmental behaviours: A social marketing application. Tourism Management Perspectives, 36, 100740.

Author: Aaron Tkaczynski, Sharyn Rundle-Thiele, V. Dao Truong

Year: 2020

Objectives:

This paper demonstrates how social marketing can be applied to gain insights that can be used by the tourism industry to promote pro-environmental behaviours of targeted tourists to contribute positively to the environment.

Sample:

The sample included tourists aged 18 or over that participated in a guided commercial whale watching trip in either Hervey Bay or Fremantle during 2017.

Method:

This research applies a two-phase approach –

Phase one: self-administered survey: This study first employs TPB items to identify the significance of these items in segment classification and validation, distinguishing this research from prior studies which aim to examine the significance of one variable (i.e. attitudes) on another (behavioural intentions or behaviour).

Phase two: semi-structured interviews: This study's second phase seeks to provide further insight into a PEB tourist segment which can be used to maximise the efficiency and effectiveness of future social marketing interventions.

Instruments:

A self-administered survey was employed. Attitudinal items were designed as bipolar, while interest, norms and perceived behavioural control used seven-point Likert scales to maximise response variation.

Result:

Tourism, whilst delivering economic benefits, can deliver environmental harm. Although several measures to mitigate tourism's environmental effects have been documented, a shared responsibility that encompasses the tourism industry and tourists themselves is needed to limit environmental damage. Social benchmarks that were applied resulted in the identification of two segments, one of which was examined in more detail using a follow-up interview format to gain insights for intervention planning, design and implementation. Implications for the role that tourism may play in delivering changes that benefit our planet are outlined and opportunities for future research are provided.

Bradley, G.L., Babutsidze, Z., Chai, A., Reser, J.P. (2020). The role of climate change risk perception, response efficacy, and psychological adaptation in pro-environmental behavior: A two nation study, Journal of Environmental Psychology, 68, 101410

Author: Graham L. Bradley, Zakaria Babutsidze, Andreas Chai, Joseph P. Reser

Year: 2020

Objectives:

The current research aimed to develop and test a model of the antecedents of pro-environment behaviors and its (psychological) precursors, validate this model in a second independent sample, identify and seek to understand aspects of the model that apply more and less well in the two samples, and use the information and insights thereby gained to recommend structural, psychological, and behavioral intervention strategies aimed at promoting pro-environmental behavior change.

Sample:

The study was conducted with 3,096 respondents in the Australian sample and 3,480 respondents in the French sample.

Method:

Institutional ethical approval was obtained for both surveys. The Australian survey was conducted in June and July, 2010, whereas the French survey was conducted in June and July, 2017. Both were anonymous online surveys managed by the same company (Qualtrics) using its panels of nationally representative respondents. Participants were randomly selected to fill quotas based on geographic region and gender in the Australian

survey, and based on gender, age, education, residence type, and region, in France. In both nations, checks were in place to ensure data quality and exclude questionnaires that did not meet screening filters before the data sets were forwarded from the provider to the researchers. This left usable questionnaires from 3,096 respondents in the Australian sample and 3,480 respondents in the French sample.

Instruments:

Belief certainty: The certainty with which respondents believe in climate change was measured by a single item. In the Australian survey, respondents were asked to indicate their level of agreement on a 5-point Likert scale with the statement "I am certain that climate change is really happening." In France, the question was "How sure are you that climate change is happening?". Response options ranged from 1 = not at all sure to 6 = extremely sure. For comparison purposes, responses to the Australian item were re-scaled to cover the range 1 to 6. Similar questions have been used to assess belief certainty in past studies (Krosnick, 2008; Krosnick & MacInnis, 2011; Leiserowitz et al., 2018; Spence et al., 2010).

Knowledge: In Australia, 10 questions, and in France six questions, tapped respondents' factual knowledge of the impact of climate change. The items were adapted from those used in past studies (Sundblad et al., 2007).

Perceived residential exposure: In both national surveys, perceived exposure of one's place of residence to extreme weather events, natural disasters, and other manifestations of climate change was measured by three items.

Pro-environmental behavior: Respondents were asked to endorse all behaviors from a list of pro-environmental behaviors that they were currently undertaking to reduce their carbon footprint. The list comprised 15 behaviors in the Australian survey and 14 behaviors in the French survey. Although the behaviors were similar to those included in past studies (Howell, 2014; Spence et al., 2010; Whitmarsh, 2008), only four were common to both of the current surveys.

Result:

As the actions of individuals contribute substantially to climate change, identifying factors that underpin environmentally-relevant behaviors represents an important step towards modifying behavior and mitigating climate change impacts. This paper introduces a sequential model in which antecedent psychological and socio-demographic variables predict climate change risk perceptions, which lead to enhanced levels of response efficacy and psychological adaptation in relation to climate change, and ultimately to environmentally relevant behaviors.

The model is tested and refined using data from large national surveys of Australian and French residents. As hypothesized, in both samples, risk perception (indirectly), response efficacy (both indirectly and directly), and psychological adaptation (directly) predicted behavior. However, these effects were stronger in the Australian than in the French sample, and other unexpectedly strong direct effects were also observed. In particular, subscribing to a "green" self-identity directly predicted all endogenous variables, especially in the French sample. The study provides valuable insights into the processes underlying environmentally-relevant behaviors, while serving as a reminder that effects on behavior may be nation-specific. Strategies are recommended for promoting pro-environmental behavior through the enhancement of a green identity, response efficacy, and psychological adaptation.

Author: Tobias Krettenauera, Wan Wanga, Fanli Jiab, Ying Yao

Year: 2019

Objectives:

The present research investigated whether age-related differences in connectedness with nature in adolescence are associated with pro-environmental behavior across two cultures, Canada (N=325) and China (N=363).

Sample:

The final sample included 688 participants (325 Canadian and 363 Chinese) covering the age range from late childhood/early adolescence (9 years) to late adolescence/early adulthood (21 years). Female/male gender ratio in each country was approximately equal, 174 female participants (53.7%) in Canada and 173 female participants (47.92%) in China. Five participants did not report gender.

Method:

In the present study, three steps followed to investigate measurement equivalence of the scale connectedness with nature. First, run separate Rasch analyses for the two cultural groups investigating whether items are uni-dimensional in both countries. Second, investigated differential item functioning (DIF) for the two cultural groups, thus,

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checking whether item parameters differ across countries. Third, calibrated the measure by using those items with invariant item curve characteristics across countries as anchors.

Instruments:

All survey measures were based on previously developed instruments that had been tested and validated with Canadian teenagers (Krettenauer, 2017; Krettenauer & Jia, 2013).

For measuring connectedness with nature the scale as described in Krettenauer (2017) was used.

Result:

While older adolescents demonstrated lower connectedness with nature in both countries, pro-environmental behavior was inversely associated with age only in Canada but not in China. To investigate this cultural difference, conducted a moderated mediation analysis.

Positive self-evaluative emotion expectancies (pride/ satisfaction) for engaging in pro-environmental behavior were found to mediate the interaction effect of culture and age when predicting pro-environmental behavior for Chinese but not for Canadian adolescents. The present research suggests that the development of pro-environmental behavior is contextually bounded and multi-directional. Effective promotion of pro-environmental behavior in adolescence should target culturally specific mechanisms, may it be connectedness with nature or moral emotions.

5 | *RESULT & DISCUSSION*

For the literature survey, a time scale analysis of the published articles on environmental psychology from Science direct was done from the year 2010-2021. The search revealed 373 published articles in 2010, 348 articles in 2011, 494 articles in 2012, 551 in 2013, 670 in 2014, 800 in 2015, 815 in 2016, 850 in 2017, 1075 in 2018, 1174 in 2019, 1300 in the year 2020, and 300 in the month of January 2021 (Fig. 4).
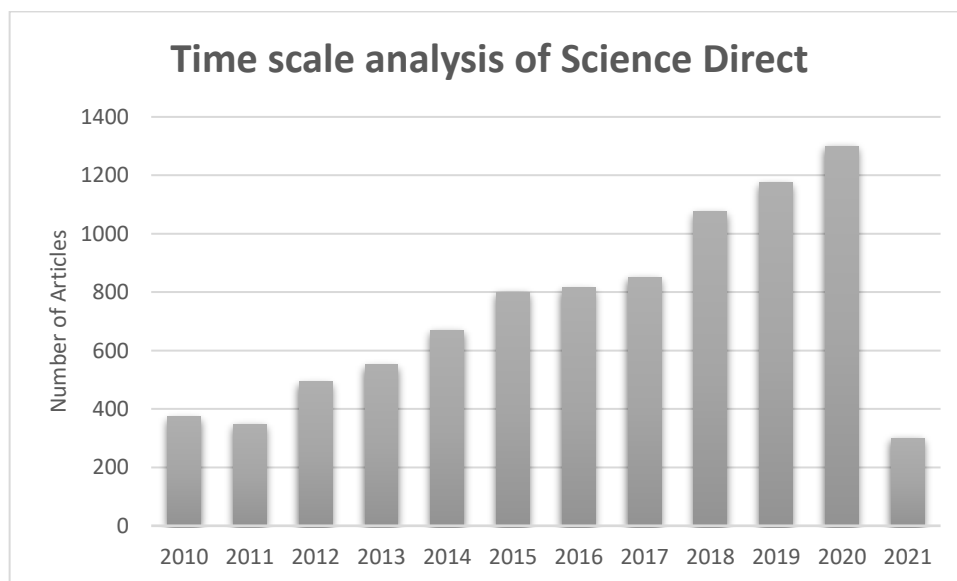
Fig. 4: Time scale analysis of Science Direct Articles from 2010-2021.

Among all the articles, only 1035 literature was found relevant for the objectives of the present study for understanding the correlates of the pro-environmental behaviour. Further, only 42 research articles (article of interest) matched all the criteria of exclusion and inclusion of the study design.

The articles were published mainly in 2020-2021 and majority of studies were published in environmental psychology journals. A time scale analysis of the article of interest was also done from 2010 to 2021 (Fig. 5).
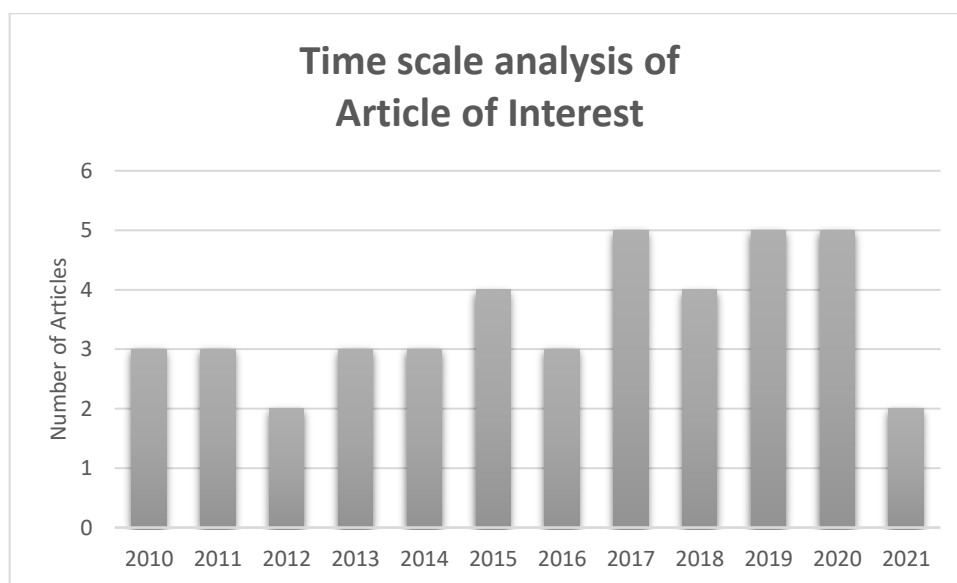
Fig. 5: Time scale analysis of Article of Interest from 2010-2021.

The correlated variables are broadly grouped under six categories namely:

- Environmental awareness
- Beliefs
- Identity
- Psychological adaptations
- Personality
- Values

Among the all 42 articles of interest, some of the article includes more the one groups. The number of articles that met the criteria of these groups were: 15 for environmental awareness, 18 for beliefs, 12 for identity, 5 for psychological adaptations, 4 for

personality and 3 for values (Fig. 6). The percentage distribution of the articles of interest in the following groups were also analysed and graphical representation were shown (Fig. 7).
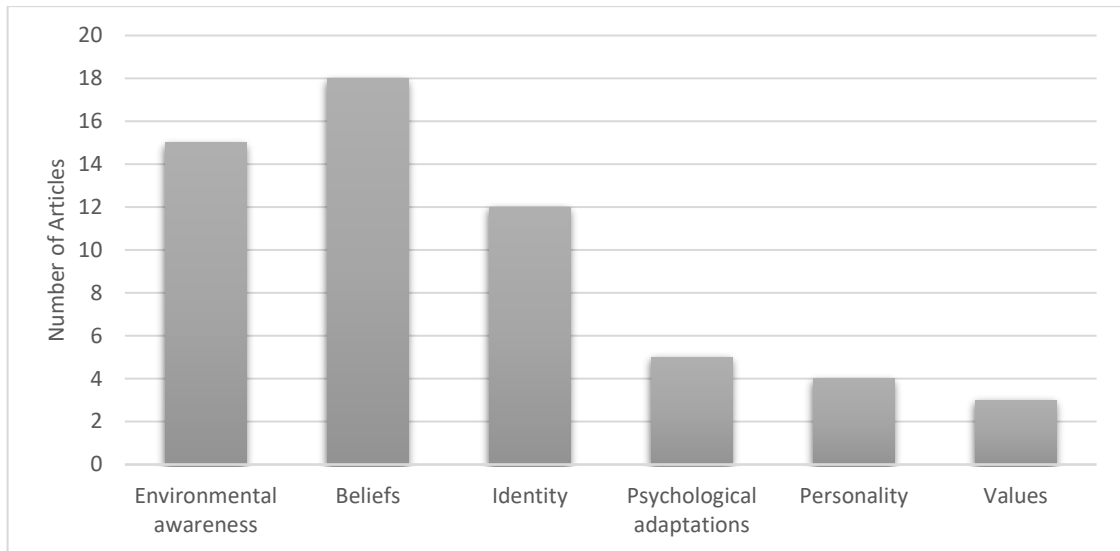
Fig. 6: Graphical representations of the six groups.

The distribution of the articles are as follows:

Group	Number of article	Percentage
Environmental awareness	15	26
Beliefs	18	32
Identity	12	21
Psychological adaptations	5	9
Personality	4	7
Values	3	5
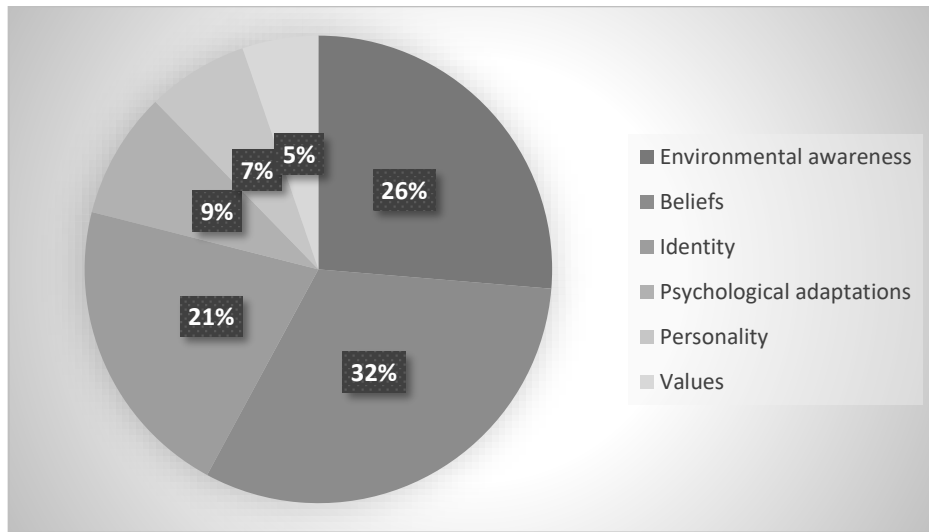
Fig. 7: Percentage distributions of the six groups.

A. <u>Environmental awareness:</u>

Environmental awareness can be defined as to aware of the natural environment and to make choices that benefit the earth and natural environment, rather than harm it. The ways to practice environmental awareness include using safe and non-toxic building supplies, conserving energy and water, recycling, activism, and others. Pro-environmental behaviour is a set of behaviours practiced by individuals that seek to take measured actions to promote positive changes in the environment and limit the effects of human negligence (Carmi et al., 2015). These behaviour include: water saving, plant conservation, energy conservation, green transport, green buying and waste management.

Among these six groups, 15 articles (26%) out of all studied reflects environmental awareness studies.

The study by Donmez-Turan and Kılıçlar (2020) was aimed at explaining pro-environmental behaviour based on ecological worldviews of individuals and goals that the individuals desire to achieve with their environmental knowledge. It was also estimated that the individuals who had environmental training would exhibit voluntary pro-environmental behaviour 4.7 times more than those who did not have any training.

Another study by Tianyu and Meng (2020) was aimed to offer an integrated research between environmental improvements and personal educational attainment. The study was carried out in Chinese populations driving force behind the rapid development lies in the enforcement of relevant education policies. Result clearly revealed that that governmental efforts on public education can contribute to environmental protection by promoting public supports. Increasing the fiscal expenditure on education may have a long-term positive effect on environmental protection (Tianyu and Meng, 2020).

Another empirical study was conducted in the Beijing-Tianjin-Hebei (BTH) region in China by Liping et al. (2019) to reduce the negative effects of the accelerating use of RFT (Road Freight Transportation Industry). Results revealed a high level of perceived policy effectiveness facilitates the transformation of awareness into behavior, bridging the awareness–behavior gap. Study confirmed the importance of environmental awareness and effective incentive policies in encouraging pro-environmental RFT behavior. The conclusions of the study also aid researchers' understanding of environmental awareness and pro-environmental behavior in China's RFT, and compel transport policy makers and managers to implement more effective measures that promote environmentally sustainable RFT.

The study of Yusliza et al. (2020) aimed to answer the research question of whether environmental commitment, environmental consciousness, green lifestyle, and green self-efficacy significantly affects the practice of pro-environmental behaviour. This study examined the direct influence of environmental commitment, environmental consciousness, green lifestyle, and green self-efficacy on pro-environmental behaviour (Yusliza et al, 2020).

B. **Beliefs:**

A belief is an attitude that something is the case, or that some proposition about the world is true (Primmer, 2018). It is an acceptance that something exists or is true, especially one without proof. Mainstream psychology and related disciplines have traditionally treated belief as if it were the simplest form of mental representation and therefore one of the building blocks of conscious thought. Individual's behaviour and attitude towards nature majorly influenced by their beliefs (Khare, 2015; Vicente-Molina et al., 2018).

Many times without proper knowledge and awareness people do good/bad things towards the environment depending on their beliefs. These type of beliefs can be individual or may be societal or religion dependent, for example food-related environmental beliefs and behaviours.

The major group was studies on Beliefs comprising 18 articles (30%).

Individuals' intention to being ecologically friendly may be influenced by their beliefs, motives, and commitment to the environment (Khare, 2015). Pro-environmental behaviour may be influenced by various aspects (Vicente-Molina et al., 2018), such as socio-demographics such as gender, age or residence, political perspective, values, and beliefs about life (Panno et al., 2018). The results lend support to the arguments of the TPB model in that students' environmental beliefs and values shape their attitudes that subsequently lead to intended environmental behaviours that further drive them to practice pro-environmental behaviour.

Efficacy beliefs are important drivers of human behavior (Hamann and Reese, 2020). In the sustainability domain, self-, collective, and participatory efficacy tend to predict pro-environmental behavior (PEB). Few studies consider efficacy actors and goals simultaneously, and it is uncertain whether specific efficacy beliefs are more or less predictive of specific PEB types (i.e., private, public, or activist). In the study of Hamann and Reese (2020) the manipulations did not affected goal efficacy beliefs or PEB intentions, goal efficacy beliefs and positive affect predicted PEB intentions, and specific efficacy behavior patterns occurred. Study highlighted the importance of differentiating actors and goals in efficacy research and behavior types in general.

Within this context, several studies have explored students' pro-environmental behaviour, including food-related environmental beliefs and behaviours (Arvai, 2015). The purpose of the study of Arvai (2015) was to document the food-related environmental beliefs and behaviours of undergraduate university students. More specifically, this research was focussed on determining if environmental sustainability is a consideration in students' food choices, identifying the specific choices and behaviours adopted to reduce their food-related environmental footprint, and documenting the role of gender and pro-environmental values in these food-related environmental beliefs and

behaviours. Results from focus group discussions revealed a broad array of beliefs and behaviours related to the connection between food, food production and the environment. The survey confirmed these results, but indicated a preference for such actions as recycling and reducing food waste in contrast to such alternatives as reducing meat consumption or avoiding processed foods. These results suggested that educational campaigns could focus on strengthening beliefs about the food-environment connection, as well as help to empower students to take a greater variety of actions to reduce their food-related environmental footprint (Arvai, 2015).

The research of Panno et al. (2018) was aimed at consolidating and expanding previous knowledge by proposing that mindfulness is related to both pro-environmental behavior and belief in global climate change through social dominance orientation (SDO). Moreover, in the study, a measure of belief in global climate change was adopted as a further outcome. Again, trait mindfulness was related to both pro-environmental outcomes through SDO.

In a study of Sharma and Gupta (2020) the understanding of pro-environmental behaviour (PEB) of tourists visiting protected areas was imperative to mitigate the negative effects of tourism on environment. This study provided empirical support for value-belief-norm (VBN) theory in context of nature based tourists visiting national park in India. The findings indicated that biospheric value has the highest impact on new environmental paradigm, whereas egoistic value negatively influenced new environmental paradigm. Awareness of consequences and ascription of responsibility significantly predict pro-environmental personal norms which statistically predict pro-environmental behaviour of nature based tourists. Specific recommendations for policy makers were suggested to encourage pro-environmental behaviour among tourists (Sharma and Gupta, 2020).

In a previous study of the same author Value Belief Norm theory was tested (Gupta and Sharma, 2019). The aim of the study was to investigate the factors which influence the adventure tourists' intentions to behave pro-environmentally. The results of the study confirmed that value belief norm model predicts adventure tourists' pro-environmental intention. Result found that the biospheric and altruistic value has direct positive relation with new environmental paradigm and indirect positive relation with awareness of

consequences, ascription of responsibility, personal norms and pro-environmental behavioural intentions. Further, the result of the study showed that personal norm is the largest predictor of pro-environmental behaviour of adventure tourists (Gupta and Sharma, 2019).

This study of Blok et al. (2015) aimed to identify factors that predict pro-environmental behaviour and it was one of the first studies focussing on pro-environmental behaviour in the workplace. The study revealed that leadership support has a significant positive relation with employee's behaviour and employee's intention to act. In order to enhance more sustainable behaviour in households, a model was tested among employees of a green university in the Netherlands. Based on the results of this study, it was concluded that the theory of planned behaviour can explain pro-environmental behaviour in the workplace. At the same time, the results showed that leadership support and exemplary pro-environmental behaviour are associated with value-belief-norm theory on employee's intention to act pro-environmentally. The findings of this study have various managerial implications for green companies and organizations in general and green universities in particular.

The goal of the study of Bamberg and Möser (2007) was to determinate pro-environmental behavioural intention and the impact of all other psycho-social variables. Results also confirmed that besides attitude and behavioural control personal moral norm is a third predictor of pro-environmental behavioural intention. It also indicated that problem awareness is an important but indirect determinant of pro-environmental intention. Its impact seems to be mediated by moral and social norms, guilt and attribution processes.

C. **Identity:**

Identity can be considered as the set of qualities and beliefs that make one person or group different from others. It can be the distinguishing character or personality of an individual, the relation established by psychological identification, the condition of being the same with something described or asserted, or sameness of essential or generic character in different instances, sameness in all that constitutes the objective reality of a thing. In mother nature each and every organism poses its own identity by their specific

activity towards a particular goal. It can be self-identity or group identity. In environmental behaviour activities, cleanliness, plantation and go-green activities are associated with a persons' identity, and sometimes it is also related with nation identity in wide scale (Milfonta et al., 2020).

Further, 12 articles (22%) out of all studied reflects studies on Identity.

The finding by Jans (2021) did not only shed light on the formation of pro- environmental social identities, but also revealed that perceiving a pro-environmental initiative as formed by regular group members themselves enables pro-environmental social identity formation, motivating behaviour accordingly.

The research of Milfonta et al. (2020) examined representations of national identity and, in particular, the extent to which believing that being "clean and green" contributes to a distinct national identity relative to other qualities of being a 'true' New Zealander. Most importantly, whether this "clean and green" identity correlates with pro- environmental attitudes and intentions to act on behalf of the environment was investigated by Milfonta et al. (2020). Although being "clean and green" is a core component of New Zealand's national imagery for many previous research had yet to examine the extent to which viewing environmental protection as central to national identity coincides with other characteristics of the nation and, more importantly, whether this view fosters individual and collective pro-environmental tendencies and actions. Accordingly, previous research has examined the role of national identity in influencing the appraisal of environmental issues and collective environmental actions (Bonaiuto et al., 1996; Schlicht-Schmalzle et al., 2018).

Individuals do not only act in their personal self-interest, as they derive part of their identity – their social identity – from their knowledge of, and emotional attachment to groups (Tajfel and Turner, 1979), such as their nationality or their community. When people define themselves in terms of a particular social identity, they internalize the content of this identity; it's values, norms, and goals and aim to act in line with these group motivations and advance the interests of the group as a whole (Turner, 1991). Pro-environmental social identities can motivate individual and collective pro-environmental behaviours (Fielding and Hornsey, 2016; Fritsche et al., 2018). The stronger a group's

pro-environmental norms (Nolan et al., 2008), and the more a person identifies with this group (Masson and Fritsche, 2014), the more strongly this group membership can promote pro-environmental behaviour.

People's desire to maintain a positive and consistent sense of self can help explain the link between environmental self-identity and environmental behaviour. Self-discrepancy theory (Higgins, 1989) suggests that people strive for self-consistency, that is, consistency between their actual self (what they do), the valued self (their values and aspirations), and theought self (perceived norms). People will try to resolve any discrepancy they experience between these different aspects of the self, for instance by changing their behaviour. Similarly self-perception theory (Bem, 1972) suggests that people know who they are by looking at what they do. When people perceive a discrepancy between what they do and what (they say) is important to them, they will experience psychological discomfort: cognitive dissonance (Festinger, 1957), which is a powerful motivator for behaviour or attitude change.

A study tested under which circumstances initial pro-environmental actions can strengthen environmental self-identity and spill-over to other pro-environmental behaviours (Van der Werff et al., 2014). Environmental self-identity was in turn related to pro-environmental product choices. The stronger one's environmental self-identity, the more pro-environmental products participants preferred. Environmental self-identity mediated the relationship between the manipulation of past behaviour (comparing the group reminded of eight different environmental behaviours to the control group). These results show that reminding people of different environmental behaviours can strengthen environmental self-identity, which in turn increases pro-environmental product choices.

D. **Psychological adaptations:**

A psychological adaptation is a functional, cognitive or behavioral trait that benefits an organism in its environment. Psychological adaptations fall under the scope of evolved psychological mechanisms (EPMs). Psychological adaptations include only the functional traits that increase the fitness of an organism, while EPMs refer to any psychological mechanism that developed through the processes of evolution. For example, xenophobic attitudes and behaviors, appear to have certain EPM influences

relating to disease aversion, in many environments these behaviors will have a detrimental effect on a person's fitness. The principles of psychological adaptation rely on Darwin's theory of evolution and are important to the fields of evolutionary psychology, biology, and cognitive science. Psychological adaptation is highly influential in pro-environmental behaviour studies as it is the adjusting behavior to changing environmental demands, for example, climate change and psychological adaptation (Bradley et al., 2020). Evolution has shaped the brain to successfully deal with the physical and changes in the environment and the actual adaptation of behavior.

For the studies on psychological adaptations, the number of articles were 5 (11%).

The research of Bradley et al. (2020) was aimed to develop and test a model of the antecedents of pro-environment behaviors and its (psychological) precursors, and use the information and insights thereby gained to recommend structural, psychological, and behavioral intervention strategies aimed at promoting pro-environmental behavior change. The study provided valuable insights into the processes underlying environmentally-relevant behaviors, strategies were recommended for promoting pro-environmental behavior through the enhancement of a green identity, response efficacy, and psychological adaptation.

E. <u>Personality:</u>

Personality is defined as the characteristic sets of behaviors, cognitions, and emotional patterns that evolve from biological and environmental factors (Corr and Matthews, 2009). Personality refers to individual differences in characteristic patterns of thinking, feeling and behaving. The study of personality focuses on two broad areas: one is understanding individual differences in particular personality characteristics, such as sociability or irritability. Trait-based personality theories, such as those defined by Raymond Cattell, define personality as the traits that predict a person's behavior. On the other hand, more behaviourally-based approaches define personality through learning and habits. Most theories view personality as relatively stable (Corr and Matthews, 2009). The definition of personality, in most theories, focus on motivation and psychological interactions with one's environment (Sadock et al, 2017).

Among these six groups, 4 articles (9%) out of all studied reflects studies on Personality.

Pro-environmental behaviour (PEB) is known to reflect people's social preferences, time preferences and risk preferences, and also personality. In a study by Fuhrmann-Riebela et al. (2021) found that social preferences matter mainly for saving-energy behaviour; time, risk and ambiguity preferences matter mainly for the consumption of plastics; and time and ambiguity preferences matter for expenditures on electricity. The insight that particular preferences matter for particular PEBs has important policy implications.

Pro-environmental behaviour may be seen as meaningful behaviour, and thereby feel good to engage in. It has been proposed that engaging in meaningful actions elicits a warm glow feeling (Andreoni, 1990), a positive feeling as a result of helping others. Interestingly, this warm glow feeling may be interpreted quite literally (Taufik et al., 2015).

F. Values:

Values can be defined as broad preferences concerning appropriate courses of actions or outcomes. Values are the motive behind purposeful action. They are the ends to which individual act and come in many forms. Personal values are personal beliefs about right and wrong and may or may not be considered moral. Cultural values are values accepted by religions or societies and reflect what is important in each context. In ethics, value denotes the degree of importance of some thing or action, with the aim of determining what actions are best to do or what way is best to live (normative ethics). Values tend to influence attitudes and behavior and these types include ethical/moral values, doctrinal/ideological (religious, political) values, social values, and aesthetic values. Further, values influence various specific attitudes and behaviours (Seligman and Katz, 1996), and values provide an economically efficient instrument for describing and explaining similarities and differences between persons, groups, nations, and cultures. According to Steg and Judith (2019), values can be used in environmental behaviour research in a positive direction towards the goal of healthy environment.

For the studies on Values 3 articles (7%) out of all studied were categorised.

Values are ordered in a system of value priorities (i.e. they vary in importance), which implies that when competing values are activated in a situation, choices are based on the value that is considered most important. There are important advantages to using values in environmental behaviour research (Steg and Judith, 2019). First, the total number of values is relatively small compared to the countless behaviour-specific beliefs, attitudes, and norms. Consequently, values provide an economically efficient instrument for describing and explaining similarities and differences between persons, groups, nations, and cultures. Second, the abstractness of values allows for predictions in almost all contexts. Values influence various specific attitudes and behaviours (Seligman and Katz, 1996).

As a consequence, behaviour-specific attitudes and norms are generally better predictors of behaviour than are values (Eagly and Chaiken, 1993). Indeed, various studies showed that values mostly influence behaviour indirectly, via behaviour specific beliefs, attitudes, and norms (De Groot et al., 2016; Thøgersen et al., 2016). The value that is prioritized in a specific situation will be most influential for beliefs, attitudes, and norms (hence, behaviour).

Values are desirable trans-situational goals that vary in importance and serve as guiding principles in the life of a person or other social entities (Schwartz, 1992). This definition includes three key features of values. First, values include beliefs about the desirability or undesirability of certain end-states. Second, values are rather abstract constructs and therefore transcend specific situations. This is the main difference from 'goals'. A goal refers to a target that an individual strives hard to reach in his or her life. It is thus understood that goals remain a target until they are reached or achieved while values are there to be adhered to on a longer term. Third, values serve as guiding principles for the evaluation of people and events and for behaviours (Steg and Judith, 2019).

Environmental psychology is the discipline that studies the interplay between individuals and the built and natural environment. Human behaviour plays a key role in the rise and severity of environmental problems. Pro-environmental behaviour (whether goal-directed or not) differs from the broader term environmental behaviour. Most research in

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environmental psychology focuses on studying pro-environmental behaviour, also referred to as environmentally friendly behaviour, ecological behaviour, or conservation behaviour. Pro-environmental behaviour has been defined as 'behaviour that consciously seeks to minimize the negative impact of one's actions on the natural and built world'.

Environmental behaviour is often conceptualized as multidimensional. According to unidimensional measure of goal-directed pro-environmental behaviour, all behaviours regarding a specific goal (e.g. environmental conservation) can be ordered on one single dimension from easy to difficult with regards to reaching that goal. Values are desirable trans-situational goals that vary in importance and serve as guiding principles in the life of a person or other social entities. Social norms are 'rules and standards that are understood by members of a group, and that guide and/or constrain human behaviour without the force of laws'. Research shows that the extent to which people believe engaging in behaviour will elicit positive or negative emotions, so-called, anticipated emotions, can be an important predictor of whether they will act accordingly.

Extant research has identified various factors that affect pro-environmental behaviours. One of the factors is place attachment, defined as the cognitive and affective bond that people have with a place (Lewicka, 2011; Scannell and Gifford, 2010). The rationale is that the attachment to a place fosters a sense of belonging, which promotes engagement in civic activities including pro-environmental behaviour (Anton and Lawrence, 2014; Manzo et al., 2006; Uzzell et al., 2002). However, despite the increasing research attention on the link between place attachment and pro-environmental behaviour (Meloni et al., 2019; Song et al., 2019), the variances across individual studies have made it difficult to ascertain the overall impact of place attachment in promoting environmentally friendly behaviours.

TABULAR REPRESENTATION OF THE FINDINGS:

Group	Reference	Objective	Studied populations	Methodologies	Results
Environmental awareness					
	Carmi et al., 2015	The present study was aims on the premise that environmental knowledge can drive environmental behavior only if it arouses environmental emotions.	The study was conducted with the college students from the International Social Survey Program.	Using a structural equations modeling approach, tested the direct, as well as the indirect (mediated) effects of knowledge on behavior and assessed the mediating role of environmental emotions.	Pro-environmental behaviour is a set of behaviours practiced by individuals that seek to take measured actions to promote positive changes in the environment and limit the effects of human negligence.
	Donmez-Turan and Kiliçlar (2020)	Aimed at explaining pro-environmental behaviour based on ecological worldviews of individuals and goals that the individuals desire to achieve with their environmental knowledge.	Two separate experimental studies, consisting of 109 high school students and 236 college students, were designed.	he validity of this scale was tested in two samples with multi-group confirmatory factor analysis. Multivariate logistic regression models were used to explain pro-environmental behaviour which was determined as 'dropping litter in to a recycle bin' in the first study and 'participating in an environmental event'	It was estimated that the individuals who had environmental training would exhibit voluntary pro-environmental behaviour 4.7 times more than those who did not have any training. As a result of the first study, it was observed that one-unit change in the post-training views of the individual increases the probability by 11.1 times in exhibiting pro-environmental behaviour. Furthermore, the results showed that 'gain-goals' oriented individuals would exhibit pro-environmental behaviour 7.3 times more than those in the control group and 'normative-goals' oriented individuals would exhibit pro-environmental

				in the second study.	behaviour 3.5 times greater than those in the control group.
	Tianyu and Meng (2020)	Aimed to offer an integrated research between environmental improvements and personal educational attainment.	The study was carried out in Chinese populations driving force behind the rapid development lies in the enforcement of relevant education policies.	In this study, the authors investigate into how higher level of educational attainment contributes to WTP based on household survey data, using the enactment of the Compulsory Schooling Law as an instrumental variable	Result clearly revealed that that governmental efforts on public education can contribute to environmental protection by promoting public supports. Increasing the fiscal expenditure on education may have a long-term positive effect on environmental protection
	Liping et al. (2019)	The study aimed to reduce the negative effects of the accelerating use of RFT (Road Freight Transportation Industry).	Beijing-Tianjin-Hebei (BTH) region in China	Based on the CA-Markov model, this study predicts the spatial patterns of land use in 2025 and 2036 based on the dynamic changes in land use patterns using remote sensing and geographic information system.	Results revealed a high level of perceived policy effectiveness facilitates the transformation of awareness into behavior, bridging the awareness–behavior gap. Study confirmed the importance of environmental awareness and effective incentive policies in encouraging pro-environmental RFT behavior. The conclusions of the study also aid researchers' understanding of environmental awareness and pro-environmental behavior in China's RFT, and compel transport policy makers and managers to implement more effective measures that promote environmentally sustainable RFT.
	Stikvoort et al., 2020	This article presents a comparison between Swedish consumers and prosumers, concerning whether	Swedish consumers (N = 460) and prosumers	Questionnaire based study design was used in this study.	The data show that both consumers and prosumers engaged in pro-environmental behaviours for the same reasons: convictions that behaviours contribute to the environment and one's life-quality.

		consumers and prosumers engage in pro-environmental behaviours for different reasons.			Both groups were also motivated by a perceived moral responsibility and by a high self-assessed awareness of one's electricity consumption and saving possibilities.
	Yusliza et al. (2020)	Aimed to answer the research question of whether environmental commitment, environmental consciousness, green lifestyle, and green self-efficacy significantly affects the practice of pro-environmental behaviour.	Through the mediation of environmental knowledge of lecturers in public research universities in Malaysia.	This cross-sectional study examines the mechanism in which green HRM affects the EGB of lecturers through environmental knowledge in Malaysian public research universities. Smart PLS was used to analyse the relationships from 425 valid responses.	This study examined the direct influence of environmental commitment, environmental consciousness, green lifestyle, and green self-efficacy on pro-environmental behaviour. The findings of the study show that green HRM affects EGB through the full mediation of environmental knowledge. This finding gives a theoretical implication in terms of ability, motivation and opportunity theory.
	Lange F, 2019	Aimed at cognitive flexibility has been hypothesized to relate to adaptive, long-term-oriented behaviour, empirical support for such a relationship.	Individuals attending European Association of Personality Psychology	In the study (N = 143), explored potential associations between multiple self-report scales and performance-based measures of cognitive flexibility and pro-environmental behaviour.	In the present article, examined the role of cognitive flexibility as a correlate of long-term-oriented behaviour in the domain of environmental conservation.
	Chen et al., 2011	This study addresses this need by modelling the sociodemographic and attitudinal factors	Urban China populations who were employed, holding leadership positions, living in	Pro-environmental behaviour was modelled as a function of environmental attitude (measured	These results accord with previous studies suggesting being female, younger, highly educated and having environmentally oriented attitudes increased the odds of participating in proenvironmental behaviour.

		predicting pro-environmental behaviour in urban China.	larger cities and single.	using the new environmental paradigm) and various sociodemographic characteristics.	The rapid urbanization and economic development in China may significantly influence pro-environmental behaviour in the future. The education leads to environmental awareness.

<u>Beliefs</u>

	Sharma and Gupta (2020)	In the study of the understanding of pro-environmental behaviour (PEB) of tourists, visiting protected areas was imperative to mitigate the negative effects of tourism on environment.	Tourists visiting national park in India.	Value-belief-norm (VBN) theory	This study provided empirical support for value-belief-norm (VBN) theory in context of nature-based tourists visiting national park in India. The findings indicated that biospheric value has the highest impact on new environmental paradigm, whereas egoistic value negatively influenced new environmental paradigm. Awareness of consequences and ascription of responsibility significantly predict pro-environmental personal norms, which statistically predict pro-environmental behaviour of nature based tourists. Specific recommendations for policy makers were suggested to encourage pro-environmental behaviour among tourists.
	Gupta and Sharma, 2019	The aim of the study was to investigate the factors, which influence the adventure tourists' intentions to behave pro-environmentally.	Adventure tourists of India.	Value Belief Norm theory was tested.	The results of the study confirmed that value belief norm model predicts adventure tourists' pro-environmental intention. Result found that the biospheric and altruistic value has direct positive relation with new environmental paradigm and indirect positive relation with awareness of consequences,

				ascription of responsibility, personal norms and pro-environmental behavioural intentions.
				Further, the result of the study showed that personal norm is the largest predictor of pro-environmental behaviour of adventure tourists.
	Blok et al. (2015)	This study aimed to identify factors that predict pro-environmental behaviour and it was one of the first studies focussing on pro-environmental behaviour in the workplace.	Among employees of a green university in the Netherlands.	In order to enhance more sustainable behaviour in households, a model was tested based on the theory of planned behaviour.	The study revealed that leadership support has a significant positive relation with employee's behaviour and employee's intention to act. Based on the results of this study, it was concluded that the theory of planned behaviour could explain pro-environmental behaviour in the workplace. At the same time, the results showed that leadership support and exemplary pro-environmental behaviour are associated with value-belief-norm theory on employee's intention to act pro-environmentally. The findings of this study have various managerial implications for green companies and organizations in general and green universities in particular.
	Bamberg and Möser (2007)	The goal of the study of was to determinate pro-environmental behavioural intention and the impact of all other psycho-social variables.	Meta-analysis on psycho-social determinants of pro-environmental behaviour based on information from a total of 57	The matrix of pooled correlations is used for a structural equation modelling (SEM) test of theoretically postulated structural relations between eight determinants of pro-	Results also confirmed that besides attitude and behavioural control personal moral norm is a third predictor of pro-environmental behavioural intention. It also indicated that problem awareness is an important but indirect determinant of pro-environmental intention. Its impact seems to

				samples.	environmental behaviour (so-called Meta-analytic SEM (MASEM)).	be mediated by moral and social norms, guilt and attribution processes.
	Chen et al., 2011	This study addresses this need by modelling the sociodemographic and attitudinal factors predicting pro-environmental behaviour in urban China.	Urban China populations who were employed, holding leadership positions, living in larger cities and single.	Pro-environmental behaviour was modelled as a function of environmental attitude (measured using the new environmental paradigm) and various sociodemographic characteristics.	These results accord with previous studies suggesting being female, younger, highly educated and having environmentally oriented attitudes increased the odds of participating in pro-environmental behaviour. The rapid urbanization and economic development in China may significantly influence pro-environmental behaviour in the future. The leadership positions, living in larger cities influence their belief to environmental conservations.
	Arvai, 2015	The purpose of the study was focussed on determining if environmental sustainability is a consideration in students' food choices, identifying the specific choices and behaviours adopted to reduce their food-related environmental footprint, and documenting the role of gender and pro-environmental values in these food-related environmental beliefs	The study was conducted on the campus of a large undergraduate university students of University of the Midwestern United States (n=26).	Study participants were provided with writing descriptions, interview, based on the PANAS (Positive and Negative Affect Schedule).	Results from focus group discussions revealed a broad array of beliefs and behaviours related to the connection between food, food production and the environment. The survey confirmed these results, but indicated a preference for such actions as recycling and reducing food waste in contrast to such alternatives as reducing meat consumption or avoiding processed foods. These results suggested that educational campaigns could focus on strengthening beliefs about the food-environment connection, as well as help to empower students to take a greater variety of actions to reduce their food-related environmental footprint.

		and behaviours.			
	Hamann and Reese, 2020	Study highlighted the importance of differentiating actors and goals in efficacy research and behavior types in general.	Sample consisted of 259 German university students (188 females, age M = 21.66 years, SD = 2.58), (N = 259).	A 2 × 2 plus baseline design. Goal efficacy beliefs and PEB intentions, goal efficacy beliefs and positive affect predicted PEB intentions, and specific efficacy behavior patterns.	Efficacy beliefs are important drivers of human behavior. In the sustainability domain, self-, collective, and participatory efficacy tend to predict pro-environmental behavior (PEB). It is uncertain whether specific efficacy beliefs are more or less predictive of specific PEB types (i.e., private, public, or activist).

It was presenting participants with success stories and imagination tasks that highlighted either self- or collective efficacy (I vs. we) and either a direct or indirect goal (act environmentally friendly vs. encourage others to act). |
| | Panno et al. (2018) | The research of was aimed at consolidating and expanding previous knowledge by proposing that mindfulness is related to both pro-environmental behavior and belief in global climate change through social dominance orientation (SDO). | A first study was conducted on undergraduate students (n = 279) and found, as expected, that trait mindfulness was related to pro-environmental behavior through SDO. A second study using a known groups approach compared practitioners (n = 44) and non-practitioners (n = | In the study, a measure of belief in global climate change was adopted as a further outcome. Again, trait mindfulness was related to both pro-environmental outcomes through SDO. | The results lend support to the arguments of the TPB model in that student' environmental beliefs and values shape their attitudes that subsequently lead to intended environmental behaviours that further drive them to practice pro-environmental behaviour. |

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			53) of Buddhist meditation, which is known to develop a mindful stance.		
	Khare, 2015	The purpose of this paper was to examine influence of past environmental attitudes, social and personal environmental norms, social influence, and green self-identity on Indian consumers' green buying behaviour.	The study was carried out by contacting respondents through mall intercept technique in six cities across India.	Data were collected through self-administered survey method.	Individuals' intention to being ecologically friendly may be influenced by their beliefs, motives, and commitment to the environment. The findings suggest that green self-identity, peer influence, and past green buying behaviour influence the decision to purchase green product.
	Vicente-Molina et al., 2018	This paper analyses the influence of environmental knowledge on pro-environmental behaviour	The study was done among university students from countries with different levels of economic development (USA, Spain, Mexico and Brazil).	The explanatory variables include formal and informal education sources, gender, motivations, attitudes and perceived effectiveness of pro-environmental behaviour.	Pro-environmental behaviour may be influenced by various aspects, such as socio-demographics such as gender, age or residence, political perspective, values, and beliefs about life.

Identity

	Jans L (2021)	Aimed at formation of pro- environmental	Community members of Groningen, the	Three field studies around different initiatives supported	The finding did not only shed light on the formation of pro- environmental social identities, but also revealed that perceiving a

		social identities.	Netherlands.	this bottom-up initiatives motivate pro-environmental behaviour.	pro-environmental initiative as formed by regular group members themselves enables pro-environmental social identity formation, motivating behaviour accordingly.
	Milfont et al. (2020)	The research examined representations of national identity and, in particular, the extent to which believing that being "clean and green" contributes to a distinct national identity relative to other qualities of being a 'true' New Zealander.	Populations of New Zealand.	Identity correlates with pro- environmental attitudes and intentions to act on behalf of the environment.	Although being "clean and green" is a core component of New Zealand's national imagery for many previous research had yet to examine the extent to which viewing environmental protection as central to national identity coincides with other characteristics of the nation and, more importantly, whether this view fosters individual and collective pro-environmental tendencies and actions.
	Bonaiuto et al., 1996	Examined the role of national identity in influencing the appraisal of environmental issues.	Populations of New Zealand	Identity correlates with pro- environmental behavious.	Results revealed that national identity influence the major appraisal of environmental issues.
	Schlicht-Schmalzle et al., 2018)	National identity in influencing collective environmental actions	Populations of New Zealand	Identity correlates with pro- environmental behavious.	national identity coincides with other characteristics of the nation and is a core component of New Zealand's national imagery.
	Tajfel and Turner, 1979	To examine whether individuals act on self-identity with their nationality.	This is a review based study.	The theory of planned behavior and value-belief-norm theory was used.	Individuals do not only act in their personal self-interest, as they derive part of their identity – their social identity – from their knowledge of, and emotional attachment to groups, such as their nationality or their

				community.
	Turner, 1991	Aimed to act in line with the group motivations and advance the interests of the group as a whole.	By reproducing a number of key articles that were published in the British Journal of Social Psychology and the European Journal of Social Psychology	Systematizing social identity theory was used in the study.	When people define themselves in terms of a particular social identity, they internalize the content of this identity; it's values, norms, and goals and
	Fielding and Hornsey, 2016	In this paper social identity theory was aimed to help describe and explain the processes.	The similarities and differences between the social identity approach was discussed to these phenomena and related review articles.	Theories such as cultural cognition theory, the theory of planned behavior and value-belief-norm theory was used.	Importantly, we also advance social-identity based strategies to foster more sustainable environmental attitudes and behaviors. Although this theoretical approach can provide important insights and potential solutions, more research is needed to build the empirical base, especially in relation to testing social identity solutions.
	Fritsche et al., 2018	The article aimed at the social identity processes of in-group social identification, group norms, and collective efficacy interact to generate appraisals of environmental events and responses to address environmental crises.	A review work based study.	The social identity model of pro-environmental action (SIMPEA).	Pro-environmental social identities can motivate individual and collective pro-environmental behaviours.

Pro-environmental action has been primarily investigated as a personal decision-making process.

A Social Identity Model of Pro-Environmental Action (SIMPEA) was proposed of how social identity processes affect both appraisal of and behavioral responses to large-scale environmental crises. |
| | Nolan et al., 2008 | To investigate the persuasive impact and | The first study surveyed 810 | In this study a survey based work was done. | Result found that descriptive normative beliefs were more predictive of behavior than |

| | | detectability of normative social influence. | Californians about energy conservation. | | were other relevant beliefs, even though respondents rated such norms as least important in their conservation and decisions.

Results showed that normative messages can be a powerful lever of persuasion but that their influence is under-detected. |
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| | Masson and Fritsche, 2014 | To evidence that group norms influence intentions to engage in pro-climate behaviour and that identification with the group moderates the norm effects. | The present studies investigated group-level self-investment (i.e. the importance of and satisfaction with the group) and self-definition (i.e. perceived similarities among group members) as possible moderators of group norm effects. | Two experimental studies to test assumption that self-investment but not self-definition would moderate the norm-intention relation. | The stronger a group's pro-environmental norms, and the more a person identifies with this group, the more strongly this group membership can promote pro-environmental behaviour.

The results support our assumption and show that group members who were highly self-invested in the group (but did not necessarily perceive themselves as similar to other group members) adhered more strongly to climate-related ingroup norms than less self-invested group members. |
| | Van der Werff et al., 2014 | This article aimed to demonstrate that hedonic values are important for understanding environmentally relevant beliefs, preferences, and actions, next to egoistic, altruistic, and biospheric values. | The study was carried out with the populations of Groningen, Netherlands. | The authors used the methods for their hypothesis that hedonic, egoistic, altruistic, and biospheric values. | Environmental self-identity was in turn related to pro-environmental product choices. The stronger one's environmental self-identity, the more pro-environmental products participants preferred.

Environmental self-identity mediated the relationship between the manipulation of past behaviour. These results show that reminding people of different environmental behaviours can strengthen environmental self-identity, which in turn increases pro-environmental |

					product choices.
					The study tested under which circumstances initial pro-environmental actions can strengthen environmental self-identity and spill-over to other pro-environmental behaviours.
	Hüseyin Ates, 2020	To understand factors influencing pro-environmental behaviors.	A total of 340 science teachers in several cities in central Anatolia region in Turkey.	Theory of Planned Behavior (TPB) and Value Identity Personal norm model (VIP) by proposing a new model.	Considering VIP constructs, biospheric values and environmental self-identity had a direct influence on personal norm which in turn affected pro-environmental behaviors.
	Mendeley, 2019	Examination of the relationship of environmental activism, pro-environmental behaviour and social identity	131 students from an Australian University (M = 25.04 years old, SD = 8.17)	An anonymous questionnaire containing an environmental activism scale, a pro-environmental behaviour scale and a social identity scale.	The results revealed that while there was a significant relationship between social identity and environmental behaviour, only the citizenship component of environmental behaviour significantly predicted environmental activism. In other words, the relationship between social identity and environmental activism was indirect. This research presents the opportunity for further exploration of these relationships and to further investigate their relationship to inter-group processes.
Psychological adaptations					
	Bradley et al. (2020)	The research was aimed to develop and test a model, and use the information and	A review work based study.	A model of the antecedents of pro-environment behaviors and its (psychological)	The study provided valuable insights into the processes underlying environmentally-relevant behaviors, strategies were recommended for promoting pro-

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		insights thereby gained to recommend structural, psychological, and behavioral intervention strategies aimed at promoting pro-environmental behavior change.		precursors was developed and tested. Causal loop diagrams (CLDs) were tools to depict the data.	environmental behavior through the enhancement of a green identity, response efficacy, and psychological adaptation. Risk communication influences people's capability and motivationto perform protective behaviours.
	Stikvoort et al., 2020	This article presents a comparison between Swedish consumers and prosumers, concerning whether consumers and prosumers engage in pro-environmental behaviours for different reasons.	Swedish consumers (N = 460) and prosumers	Questionnaire based study design	Both prosumers and consumers were more inclined to engage in pro-environmental behaviour when they saw less economic gain in those behaviours. The data show that both consumers and prosumers engaged in pro-environmental behaviours for the same reasons: convictions that behaviours contribute to the environment and one's life-quality.
	Hüseyin Ates, 2020	To understand factors influencing pro-environmental behaviors.	A total of 340 science teachers in several cities in central Anatolia region in Turkey.	Theory of Planned Behavior (TPB) and Value Identity Personal norm model (VIP) by proposing a new model.	Attitude and perceived behavioural control had a direct influence on pro-environmental behavioural intentions, which encourage active engagement in pro-environmental behaviors, while subjective norm had no direct effect on pro-environmental behavioural intentions.
Personality					
	Fuhrmann-Riebela et al. (2021)	Aimed to study the pro-environmental behaviour (PEB) reflect people's social	The role of a large range of preferences was investigated for	Using a survey module from the Global Preference Survey	In the study it was found that social preferences matter mainly for saving-energy behaviour; time, risk and ambiguity preferences matter mainly for the

		preferences, time preferences and risk preferences, and also personality.	PEB in a sample of 900 middle class households in Lima, Peru.	(GPS) was used.	consumption of plastics; and time and ambiguity preferences matter for expenditures on electricity. The insight that particular preferences matter for particular PEBs has important policy implications.
	Andreoni, 1990	The study aimed to know if engaging in meaningful actions elicits a positive feeling	A review work based study.	Impure Altruism based model was used in this study.	Pro-environmental behaviour may be seen as meaningful behaviour, and thereby feel good to engage in. It has been proposed that engaging in meaningful actions elicits a warm glow feeling, a positive feeling as a result of helping others. Interestingly, this warm glow feeling may be interpreted quite literally (Taufik et al., 2015).

Values

	Seligman and Katz, 1996	The study was aimed to differentiate more incisively between similarly regarded values.	The review study was done with 42 values, 30 controversial issues, and 74 behaviors.	This hypothesis was examined by comparing the predictive validity of value rankings with value ratings on a within-subject basis.	Values provide an economically efficient instrument for describing and explaining similarities and differences between persons, groups, nations, and cultures. Second, the abstractness of values allows for predictions in almost all contexts. Values influence various specific attitudes and behaviours.
	Steg and Judith, 2019	Aims to study that values serve as guiding principles for the evaluation of people and events and for behaviours.	In this study a review was done with over 1000 published articles.	A detailed review work was done with TPB theory.	Values are ordered in a system of value priorities (i.e. they vary in importance), which implies that when competing values are activated in a situation, choices are based on the value that is considered most important. There are important advantages to using values in environmental behaviour research. First, the total number of values is

				relatively small compared to the countless behaviour-specific beliefs, attitudes, and norms.
	Schwartz, 1992	The study aimed to address the universals in the content and structure of values, concentrating on the theoretical advances and empirical tests.	The study covers 20 countries, and its four basic issues: substantive contents of human values, identification of comprehensive set of values; extent to which the meaning of particular values.	Set of value types that was relatively comprehensive, encompassing virtually all the types of values to which individuals attribute at least moderate importance as criteria of evaluation was demonstrated.	Values are desirable trans-situational goals that vary in importance and serve as guiding principles in the life of a person or other social entities. Values include beliefs about the desirability or undesirability of certain end-states. Second, values are rather abstract constructs and therefore transcend specific situations. Two basic dimensions that organize value systems into an integrated motivational structure with consistent value conflicts and compatibilities were discovered.

6 | CONCLUSION

Environmental psychology is the discipline that studies the interplay between individuals and the built and natural environment. Human behaviour plays a key role in the rise and severity of environmental problems. Pro-environmental behaviour (whether goal-directed or not) differs from the broader term environmental behaviour. Most research in environmental psychology focuses on studying pro-environmental behaviour, also referred to as environmentally friendly behaviour, ecological behaviour, or conservation behaviour. Pro-environmental behaviour has been defined as 'behaviour that consciously seeks to minimize the negative impact of one's actions on the natural and built world'. Environmental behaviour is often conceptualized as multidimensional. According to unidimensional measure of goal-directed pro-environmental behaviour, all behaviours regarding a specific goal (e.g. environmental conservation) can be ordered on one single dimension from easy to difficult with regards to reaching that goal. Values are desirable trans-situational goals that vary in importance and serve as guiding principles in the life of a person or other social entities. Social norms are 'rules and standards that are understood by members of a group, and that guide and/or constrain human behaviour without the force of laws'. Research shows that the extent to which people believe engaging in behaviour will elicit positive or negative emotions, so-called, anticipated emotions, can be an important predictor of whether they will act accordingly.

The present dissertation work entitled 'Literature Review on the "Correlates of The Pro-Environmental Behaviour" has been carried out with the following objective: to explore the correlates of the pro-environmental behaviour through literature survey. In the present study, the literature search in different scientific databases was employed to identify studies that examine the link for pro-environmental behaviour.

In the present study, different literatures were searched, followed by grouping of the articles of interest and a time scale respective web-analysis was done. The articles were grouped into six categories, and these six groups represent correlates of pro-environmental behaviour, where some of the articles represents more than one groups. The groups were environmental awareness, beliefs, identity, psychological adaptations, personality and values. Among the all articles of interest, some of the article includes more the one groups. Further, the major group is focused on beliefs, followed by environmental awareness and identity. The psychological adaptations, personality and values form minor groups. This literature search in different scientific databases was employed to identify studies that examine the link for pro-environmental behaviour, mainly from 2010 to 2021.

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