Mind the Gap: Exploring the influence of environmental awareness dissonance on ecological behaviours

Dharma Gopalakrishnan

A thesis submitted to Auckland University of Technology in partial fulfilment of the requirements for the degree of Master of Arts (MA)

2025

School of Social Sciences and Public Policy

Abstract

This thesis investigates the psychological, social, and contextual factors influencing pro-environmental decision-making, focusing on the interrelatedness of environmental attitudes, social norms, and decision outcomes. Two hypotheses were proposed: (1) environmental attitudes are positively correlated with pro-environmental decision-making, and (2) participants receiving feedback indicating a higher environmental impact (compared to the “average person") (i.e., more harm to the environment) would exhibit more pro-environmental behaviour than those in low- or average-impact conditions.

The sample comprised 253 adults who participated in an online survey measuring environmental attitudes, carbon footprint, and choice tasks regarding transportation, investment, and donations. Participants were randomly assigned to one of three conditions: high-impact, average-impact, or low-impact feedback, informing them of their environmental impact relative to the “average person.” Environmental attitudes were measured using 23 Likert-scale statements, while an adapted tool calculated the carbon footprint. Delay discounting tasks assessed participants’ willingness to shift to sustainable transportation (e.g., public transit, electric vehicles), while climate-friendly decisions were measured through investment and charitable donations.

The results provided partial support for Hypothesis 1, showing weak correlations between environmental attitudes and financial decisions, with positive associations to climate-friendly investments and donations However, there was no support for Hypothesis 2, as ANCOVAs revealed no significant differences across conditions ($p > 0.05$). High-impact feedback was associated with a less rapid decline in the likelihood of waiting for electric vehicles (EVs) or paying a premium, with average-impact participants choosing more public transport. Participants preferred

investments with higher returns, often neglecting environmental consequences, indicating that financial motivation influenced decision-making.

The findings illustrate that, in addition to donations, other symbolic, low-cost behaviours align well with attitudes, like investment decisions. More costly behaviours like changing transportation modes feel complicated as they conflict between hedonic and biospheric values. This suggests that past behaviours create social habits that resist change, rendering social norms theory less effective without contextual change. The study argues for a supportive context to convert attitudes into action, aligning with Attitude-Behaviour-Context theory.

Theoretical implications challenge rational choice theories, proposing a hybrid framework engaging VBN theory and goal-framing approaches. Policy recommendations should combine normative messaging with structural reforms (e.g., subsidies, reliable public transit) and interventions addressing cultural specifics. Future research should examine dynamic norms, disrupt life-transition habits, and explore technology-driven personalised nudges.

This research contributes to environmental psychology by highlighting the intricate role of awareness, norms, and contextual forces in sustainable decision-making. It calls for systemic change to bridge the gap between concern and action in addressing global environmental challenges.

Contents

List of Figures

List of Tables

Attestation of Authorship

I hereby declare that this submission is my work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements) nor material which, to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.

Dharma G.

Acknowledgements

I want to express my heartfelt gratitude to those who supported and guided me in completing my Master's thesis at Auckland University of Technology.

First and foremost, I extend my deepest thanks to my supervisor, Dr. Stef Gomes-Ng, for their unwavering support, insightful guidance, and valuable feedback throughout this research. I also want to thank my secondary supervisor, Dr. Jay Wood, for their continuous support and critical insights that significantly contributed to this work.

Secondly, I am sincerely grateful to all the participants who generously offered their time to participate in this study; this research would not have been possible without their contributions.

Additionally, I would like to thank AUT University for providing valuable resources and logistical support that significantly facilitated the completion of this thesis.

I also want to sincerely thank my family and friends, both near and far, for their moral support and unwavering encouragement throughout this journey.

Finally, I would like to acknowledge everyone, both known and unknown, who contributed to the successful completion of this thesis. Your help has been truly invaluable.

The Auckland University of Technology Ethics Committee granted ethics approval on June 24, 2024, with approval number 24/146.

Environmental psychology is the "area of psychology which combines and analyses the transactions and interrelationships of human experiences and actions with pertinent aspects of the socio-physical surroundings" (Canter & Craik, 1981, p. 2). It is essential in understanding human behaviour towards the environment as it explores psychological mechanisms that influence interactions, decision-making, and well-being. Thus, environmental psychology informs interventions that promote sustainable behaviours and address pressing environmental challenges (Yap & Leow, 2024).

However, we must note that no " one-size-fits-all " approach can cover an individual's environmental attitudes, affecting their ecological decision-making and, thus, their eco-friendly behaviour. The present thesis first discusses the factors influencing an individual's environmental attitudes, decision making and behaviour. First, we must define what we mean by environmental attitudes. There is no single definition for environmental attitudes. Gifford and Sussman (2012), for example, define environmental attitudes as a "concern for the environment or caring about environmental issues." (as cited in Hadler et al., 2021, pp 15-35). The multidimensional nature of environmental attitudes is emphasised by others who often distinguish between the conative (behavioural intention), the affective (emotional involvement) and the cognitive (environmental knowledge) dimensions (Hadler et al., 2021). For the present study, we will broadly define environmental attitudes as any predispositions that an individual has about the physical environment around them.

Definition of pro-environmental behaviour

For the purposes of this research, we will adopt the definition of pro-environmental behavior as outlined by Li et al. (2019). According to Li et al.'s definition, pro-environmental behavior encompasses any behaviours taken by individuals or groups with the intent to minimise their negative impact on the environment. This broad category of behavior is crucial for promoting sustainability and mitigating environmental degradation.

Examples of pro-environmental behaviour include practices such as the use of public transport over car usage. Utilising public transport instead of personal vehicles not only decreases individual carbon footprints but also alleviates traffic congestion and lowers greenhouse gas emissions. Waste segregation and effective waste management are vital components of pro-environmental behavior. By sorting waste into recyclable, compostable, and landfill categories, individuals can enhance recycling rates and reduce the volume of waste that ends up in landfills.

Moreover, eco-friendly energy consumption, which includes using renewable energy sources such as solar or wind power, is essential for reducing reliance on fossil fuels and decreasing greenhouse gas emissions. Finally, the choice to purchase green products—such as biodegradable household items and energy-efficient electrical appliances—plays a significant role in supporting sustainable practices and encouraging manufacturers to adopt environmentally friendly methods.

In summary, pro-environmental behavior encompasses a range of deliberate actions that collectively contribute to the protection and preservation of the environment, increasing awareness and engagement in sustainable practices among individuals and communities (Li et al.).

Definition of environmental decision-making

Environmental decision-making involves the process of selecting actions that have significant implications for the environment and natural resources. According to Lienert and Linkov (2019), this process entails assessing multiple interconnected factors, including climate change, pollution levels, resource management strategies, and biodiversity preservation. Each of these elements plays a crucial role in determining the sustainability of ecosystems and the well-being of communities.

For instance, climate change poses serious challenges that require careful consideration in decision-making, as it can lead to extreme weather events, rising sea levels, and shifts in habitat conditions. Pollution, whether air, water, or soil, affects both human health and wildlife, making it imperative to assess potential sources and implement effective mitigation strategies. Resource management encompasses how we utilise and conserve natural resources such as water, minerals, and forests, emphasising the importance of balancing economic activities with environmental protection.

Furthermore, biodiversity is essential for maintaining ecosystem services, and decisions that affect species conservation can have cascading effects on ecological balance. As Lienert and Linkov illustrate, the outcomes of these decisions extend beyond environmental impact; they also have profound effects on social structures and economic stability. Therefore, for the current study, we will adopt Lienert and Linkov's comprehensive definition of environmental decision-making as a framework to guide our analysis. This approach will enable us to explore how integrated decision-making processes can lead to more sustainable and equitable outcomes for society and the environment.

Literature Review

According to Tian and Liu (2022), eco-friendly behaviour is any behaviour that minimises one's negative impact on the environment. Thus, it emphasises the autonomy of actors and reduces harm to the world. We will use Tian and Liu's definition of pro-environmental behaviour for our study.

According to Gifford and Nilsson (2014), if someone expresses concern for the environment, it does not necessarily mean that they will make decisions that align with that environmental concern. This was supported by the study by Voisin et al. (2020), which demonstrated that people may knowingly engage in unfriendly environmental decisions while still endorsing an injunctive norm that people should protect the environment.

People are complex beings with a range of characteristics. These differences affect the level of concern people have for the environment and how they react to environmental challenges, introducing a level of intricacy that makes exploring environmental psychology demanding. Exploring environmental psychology is becoming more important as the Earth faces severe environmental issues, including climate change, rising sea levels and biodiversity loss (Etemesi & Sirmah, 2017). As human behaviours primarily drive severe environmental challenges such as those mentioned earlier, it is imperative to understand the psychological factors contributing to these behaviours (Etemesi & Sirmah).

My study attempts to discover how information about one's perceived environmental impact influences future environmental decisions.

It is essential to understand the influences behind why a person behaves in an environmentally friendly way or does not behave in such a manner to promote sustainable practices, enhance marketing strategies, inform policy decisions, and ultimately contribute to a Healthier Planet Earth (Bansah Et Al., 2024).

Different Factors Influencing Environmental Attitudes, Behaviours And Decision-Making:

Various factors influence individuals' environmental attitudes, pro-environmental behaviours, and ecologically responsible decision-making. These factors can be divided into several categories, including motivational, contextual, personal, and social aspects. Each category encompasses multiple variables. In the following section, we will explore some research on these factors.

Demographic Variables

According to Li et al. (2019), various internal (or individual) and external factors may influence our attitudes, behaviours, or decisions towards the environment. As per Li et al., internal factors include demographic and psychological variables, including but not limited to one's attitudes, social capital, previous recycling experience and socioeconomic characteristics. Li et al. characterised individual variables that influence whether or not we are environmentally conscious as encompassing demographic factors like gender, age, educational background, marital status, location of residence, and personal economic circumstances.

Early research typically indicated that women, married couples, urban residents, and younger individuals with high education levels and substantial incomes tended to show more positive attitudes toward environmentally friendly behaviours (López-Mosquera et al., 2015, as cited in Li et al., 2019). A specific type of environmental behaviour significantly influenced by demographic factors is the willingness to invest in environmentally sustainable funds and pensions (Hampton & Whitmarsh, 2023). A study by Patel et al. (2017) found that unmarried women are generally more inclined to pay a premium for energy-efficient products than married men and unmarried men. This observation indicates that individual values and priorities can differ markedly within demographic groups, ultimately affecting purchasing decisions (Patel et al.).

Mandarić and Hunjet (2024) found similar results, which indicated that individuals' environmental attitudes and behaviours were influenced by the role that gender plays. Mandarić and Hunjet discovered that women tend to exhibit higher levels of concern for any environmental issues and are more willing to engage in pro-environmental behaviours (e.g., recycling programs) than men. Hence, Mandarić and Hunjet concluded that females are more likely in their decision-making processes to prioritise environmental protection.

A study by Zhong et al. (2024) found that people with a greater propensity for green consumption come from higher socioeconomic status (SES) backgrounds. According to Zhong et al., green consumption includes purchasing environmentally friendly products and supporting sustainable practices. Zhong et al. found a disparity in pro-environmental actions based on perceived socioeconomic status, and this disparity may be caused by these individuals contributing more financially to environmental organisations than those from lower SES backgrounds. Individuals from higher SES backgrounds may feel empowered to make a difference because they have a higher sense of control, often leading to more proactive environmental behaviours. An individual's life history strategy also plays a significant role in their ecological decision-making processes; those from higher SES backgrounds adopt a more long-term perspective, thus investing in sustainable practices, while those from lower SES backgrounds may choose to focus on immediate survival needs, which can limit their engagement in environmentally friendly behaviours (Zhong et al.). These findings were replicated by Moreno-Llamas et al. (2024), who discovered that higher SES remained associated with a greater likelihood of using environmentally friendly travel options, avoiding unnecessary car use and expressing willingness to improve public transport, even after accounting for pro-environmental awareness.

The contested interplay between environmental behaviours and demographic variables remains. Zhong et al. (2024) caution against universalising trends in pro-environmental engagement, noting that socioeconomic status (SES) often mediates these relationships. Meanwhile, Mandarić and Hunjet (2024) report gender disparities in pro-environmental engagement. For example, low-SES women may focus on cost efficiency, whereas high-SES women may prioritise eco-friendly products as status symbols. Therefore, rather than isolating demographic factors, this complexity tells us that demographic variables (e.g., gender, ethnicity, class) alone cannot account for pro-environmental behaviours. Instead, we must also account for behavioural, cognitive, and social factors.

Behavioural Factors

Government/policy interventions. Suppose pro-environmental behaviours are made a part of public policy. In that case, people may have the perceived power to act pro-environmentally, as it will be easy to do so if everyone in the individual community is being forced to perform environmentally friendly behaviour. According to Baum and Gross (2016), it is vital to create solutions incorporating various behavioural interventions alongside more extensive structural reforms, as policies to change a single facet can be ineffective.

Thøgersen (2004) found that for the transfer or spillover of environmentally responsible behaviour to occur, there need to be other spaces in which there are obvious opportunities for acting in an environmentally responsible manner. Marselle and Golding (2023) presented the behaviour change wheel as a comprehensive framework for methodically designing, evaluating, and describing interventions focused on altering behaviour, including those related to government and policy. Marselle and Golding found similar results to Thøgersen, and they discovered that establishing legal frameworks that promote environmental conservation in one area (e.g. water consumption) can motivate both individuals and organisations to adopt pro-environmental actions in other areas, such as energy conservation or waste segregation.

Therefore, if governments make it under the law to act pro-environmentally in one area, it is much more likely that people will act pro-environmentally in other areas of their lives. This is seen in the real world in Rwanda; by establishing the anti-plastic law in 2008, no one in Rwanda uses, manufactures, sells, or imports plastic in Rwanda (Ogutu et al., 2023). Policies designed, like the anti-plastic law established in 2008 by Rwanda, constrain certain behaviours and limit opportunities to harm the environment, effectively promoting pro-environmental behaviour amongst human beings (Pham et al., 2023). Thus, people have the obvious opportunity to act more environmentally responsible in areas other than plastic use. This is due to the law also becoming a social norm. According to Gumpp and Johnson (2021), laws can reveal societal values, mainly when there is confusion or a mistaken understanding of their meaning. For instance, according to Gifford (2013), if recycling is seen as the “usual thing to do” (i.e. the social descriptive norm), then people are more likely to engage in recycling due to the pressure of social injunctive norms.

However, according to Raymond et al. (2011), place attachment significantly influences both direct pro-environmental behaviour and indirectly. In other words, once a person has built a personal habit from past behaviours, the habit tends to persist. For example, suppose a person has a habit of littering due to having littered in the past. In that case, the habit of littering will persist, regardless of whether the individual has witnessed that littering is unacceptable to society. In other words, our need to fit in can sometimes be more potent than our values, which are less powerful than our habits.

While the positive influence of legal changes on pro-environmental behaviour is evident, it is vital to recognise that not all people will respond the same way. Factors such as personal attitudes and values regarding the environment, societal norms, and economic circumstances can influence how effectively these interventions will work, thus indicating the complex interplay between legislation and behaviour change in the environmental sector.

Contextual Behavioural Science and Community-Based Social Marketing. Informational and educational campaigns are only effective at changing people's behaviours and decisions if the information and/or education is presented in a way that is easy for the audience to understand and if the behaviour change is convenient, simple, and not costly to the individual (Stapleton et al., 2022). According to Falletta-Cowden et al. (2023), Contextual Behavioural Science (CBS) emphasises the importance of understanding the context in which pro-environmental behaviours occur. CBS recommends that to enhance the effectiveness of informational campaigns, they should take into account the different elements that affect an individual's choices and actions related to the environment to successfully encourage pro-environmental behaviours (Falletta-Cowden et al.) rather than focus on isolated behaviours. According to Falletta-Cowden et al., although informational campaigns typically aim to increase awareness of environmental concerns, CBS contends that merely disseminating information about the state of the current environment is insufficient to motivate changes in behaviour. CBS encourages using multi-level strategies and a process-based approach in designing campaigns for pro-environmental behaviour change campaigns.

According to Zaval and Cornwell (2017), the circumstances (i.e. the context) that surround the decision-making and the process of decision-making both shape human beings' judgements and decisions that people make.

Community-Based Social Marketing (CBSM) draws from CBS by ensuring that the elements that affect an individual's decisions, i.e. the context, are at the core of CBSM (Zehui, 2023). Therefore, instead of using informational and educational campaigns alone, McKenzie-Mohr (2000) proposed a framework using CBSM, composed of four steps: First, uncovering the barriers to pro-environmental behaviours and selecting which behaviours to promote; then, designing strategies to encourage pro-environmental behaviours. After that, we should pilot strategies to promote pro-environmental behaviours, and finally, we should evaluate the selected strategies (McKenzie-Mohr). According to McKenzie-Mohr, there are two types of barriers for an individual to make pro-environmental decisions and, in turn, perform pro-environmental behaviours. These two types of barriers are internal (e.g. I will drive to work because I would rather be comfortable than environmentally sound) and external (e.g. There is no reliable public transport available so I have no choice but to drive to work). The external and internal barriers must first be identified to address them; this can be done through surveys, focus groups and observational studies (McKenzie-Mohr). According to McKenzie-Mohr, once the barriers have been identified, we must create interventions to target the identified barriers. These interventions may involve education and skill-building workshops to enhance individual competence to address internal barriers; resource provision and improving access to environmentally friendly products through government or policy interventions will help address external obstacles.

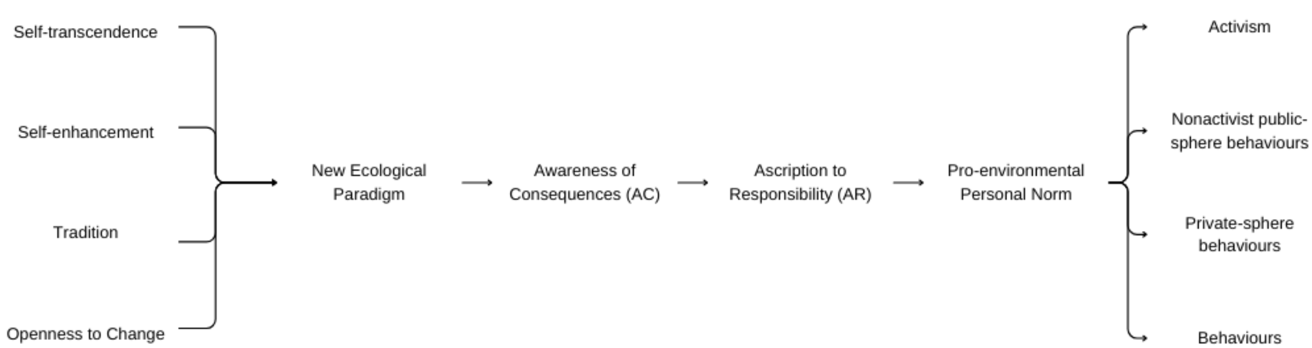
Another approach for marketing pro-environmental behaviours that have been researched is that of the Attitude-Behaviour-Context theory, commonly referred to as the ABC theory, which builds upon Lewin's concept that the interplay between personal attitudinal variables (A) and contextual elements (C) results in specific behaviours (B) (Ertz et al., 2016). According to Ertz et al., the ABC theory is critical since it enables us to grasp the perceived contextual elements that are considered to be at play along with the goal of a specific pro-environmental behaviour. Attitudinal factors include individual beliefs, social norms, values, and tendencies to act environmentally friendly. Conversely, contextual factors encompass objective elements like financial incentives, expenses, regulations, public policy, and subjectively viewed aspects, including the perceived availability of resources.

Numerous contextual factors may influence the prediction of pro-environmental behaviour. There is a particular set of perceived contextual elements that are expected to interact with attitudes to affect eco-friendly behaviours that the ABC theory emphasises (Stern, 2000; Guagnano et al., 1995; Steg and Vlek, 2009; Dietz et al., 1998; Grimmer et al.,2015 as cited in Ertz et al., (2016)). These factors comprise perceived busyness, perceived wealth, and perceived power. Perceived business relates to how an individual views their availability to take action. Perceived wealth suggests the financial resources accessible to that person. Lastly, perceived power is a psychological condition characterised by the belief in one's ability to perform a specific behaviour. According to the ABC theory, perceived busyness, perceived wealth and perceived power are all positively correlated with pro-environmental behaviour (Ertz et al., 2016). This means that if an individual perceives themselves as not having enough time (i.e. being too busy and not available) to perform pro-environmental behaviour (i.e. a decline in time), then there is less likelihood of them performing the environmentally friendly behaviour. On the other hand, if a person has all the time in the world (i.e. available and free) to act in a way that benefits the environment (i.e. an increase in time), then there is more likelihood of the individual to behave in a manner that benefits the environment. The same goes for perceived wealth (i.e. money) and perceived power (i.e. ability).

Cognitive Factors

Values and beliefs. The other leading rational choice theory (RCT), the value-belief-norm theory (VBN theory), posits that every human has three different value orientations. These value orientations influence individuals' perceptions of their responsibility towards environmentally responsible behaviours (Majumder et al., 2023). Values can be divided into three types: egoistic, altruistic, and biospheric. Egoistic values are characterised by a self-oriented perspective, wherein pro-environmental behaviours are motivated by personal gain, status enhancement, and an assessment of individual costs and benefits (according to the work of Verma et al., as cited in Majumder et al., 2023). In contrast, as per the work of Stern et al. (as cited in Majumder et al., 2023) altruistic values reflect a self-transcendent orientation, where pro-environmental behaviour is motivated by concern for others and enacted independently of any perceived personal costs. Complementing these, biospheric values express a deep consideration for the health and integrity of the entire ecological system, encompassing concern for flora, fauna, and the wellbeing of global ecosystems (as per the work of Stern et al., as cited in Majumder et al., 2023). According to Stern et al. (1993, as cited in Turaga et al., 2010), personal values like egoistic and biospheric ones are triggered the same way as altruistic values, following the principles of the norm-activation theory. See Figure 1 below for how different variables interact within the VBN theory.

Figure 1



Variables and their causal ordering in the VBN theory

Note. This figure was produced by Stern et al. in 1999, showing the causal ordering of variables in the VBN theory. From Pro-environmental behaviour: Rational choice meets moral motivation by R. M. R. Turaga, R. B. Howarth and M. E. Borsuk, 2010, *Annals of the New York Academy of Sciences*, *1185*(1), p. 214. Copyright 2010 by New York Academy of Sciences.

According to Majumder et al., those who prioritise egoistic values may participate in pro-environmental actions when they recognise a tangible benefit to themselves, such as improved health outcomes or financial savings associated with energy-efficient products. This focus on self-interest can be a significant motivator for adopting sustainable behaviours (Majumder et al.). People with a social-altruistic mindset care about helping others and base their actions on those values. In contrast, people with an egoistic mindset focus on what benefits themselves. Lastly, those with a biospheric mindset extend their care and values to include animals and the environment. A heightened concern for the welfare of others and the broader community characterises altruistic values. Consequently, individuals prioritising these values tend to perceive a moral responsibility to safeguard the environment for future generations. This sense of obligation is likely to foster the development of pro-environmental attitudes among these individuals (Majumder et al.). These pro-environmental attitudes from a sense of responsibility can lead to pro-environmental behaviours, such as partaking in community clean-up events or advocating for environmental policies.

According to Hampton and Whitmarsh (2023), individuals who assign personal significance to social and political events or demonstrate high levels of openness are more inclined to participate in eco-friendly political activism. In contrast, those not exhibiting these characteristics are generally less likely to engage in such outward support for environmental efforts (Hampton & Whitmarsh).

On the other hand, biospheric values are rooted in a deep concern for the ecosystem and the planet. Thus, individuals with strong biospheric values are often driven by a desire to preserve nature and biodiversity (Majumder et al., 2023). This can lead to significant environmentally friendly behaviours, such as waste-sorting, green consumption, and active participation in eco-friendly initiatives (Majumder et al.).

An individual's values are essential in guiding them in evaluating the costs and benefits of their actions (Aguillar-Luzón et al., 2020). Values such as biospheric values (concern for non-human species and the biosphere) and socio-altruistic values (concern for other people) positively influence pro-environmental behaviours naturally (Aguillar-Luzón et al.). For instance, a person with high biospheric values may participate in community clean-up events or advocate for policies that reduce pollution. In contrast, someone with strong socio-altruistic values may support sustainable community practices, such as promoting recycling programs or participating in local environmental advocacy groups (Davis et al., 2023).

On the other hand, egocentric or egoistic values (i.e. self-centred concerns) tend to, in general, negatively impact the environment, especially if there is no tangible benefit to the individual (Aguillar-Luzón et al., 2020). Aguillar-Luzón et al. found that people are more likely to purchase and use things, like cars and flight tickets, that provide the individual with a higher social status.

Goal framing theory posits three main goal frames to which a person's decision-making styles are related. The first way people make decisions is associated with the hedonic goal frame; the second way that individuals make decisions is related to the normative goal frame; and the third and final way that persons make decisions is associated with the gain goal frame. According to Lidenberg and Steg (2007), a goal frame refers to how people interpret and respond to information. Self-interests are what guide the first way in which individuals make decisions.

The hedonic goal frame assumes that people act following the Rational choice theory (RCT). According to RCT, people will choose the option that will benefit them most through their self-interests (Ganti, 2024). There are two main types of RCTs. According to Turaga et al. (2010), the norm-activation theory posits that activating personally held moral norms influences pro-social behaviours. According to norm-activation theory, having personal moral norms is not enough to ensure that humans will act pro-socially. Schwartz (1997, as cited in Turaga et al., 2010) needs four steps for norm activation. The process starts with activation, which happens when someone realises they need to do something to help the environment and understands there are steps they can take. Activation is complete once they believe they can make a difference and take action. This creates a sense of responsibility to keep doing what is needed to help. Which then causes one to act with this sense of responsibility. According to norm-activation theory, individuals are more likely to engage in pro-environmental decision-making when they know their actions have environmental consequences and feel a personal responsibility to act (Turaga et al.).

A normative goal frame assumes that social norms guide people's decisions. According to Lidenberg and Steg (2013), social norms are “informally enforced rules about which there is at least some consensus in society or amongst a specific group.” By and large, individuals in society will conform to social norms due to a sense of oughtness (Lidenberg & Steg). The stronger the sense of oughtness is, the more likely a person will behave according to social norms (Sripada & Stich, 2006, as cited in Lidenberg & Steg, 2013).

However, for an individual to follow a social norm, the goal of acting by the social norm must be understood. Nonetheless, the motivation to act accordingly can fade unless people are encouraged by their community or the social norm is reinforced (Lidenberg & Steg, 2013). Goal framing theory states that goals may be activated or become focal depending on value priorities and situational factors (Steg et al., 2015, as cited in Onwezen, 2023).

Thøgersen (1996) proposed that people typically view pro-environmental decisions from a moral standpoint (as cited in Lidenberg & Steg, 2007). From this viewpoint, social norm factors play a crucial role in shaping these decisions, indicating that choices are directed by assessments of right versus wrong, with environmental concerns being at the heart of this moral judgment. According to normative goal-framing theory, as Lidenberg and Steg (2007) proposed, a person with a normative goal frame is especially sensitive to what they think they ought to do. However, the more abstract the norms are, the harder it is to know the appropriate decisions. Therefore, when people wish to act following their social norms (i.e. act in a pro-environmental manner) but do not know how to, it is likely that they will act per their more selfish motives following the third way in which people make decisions according to Steg and Vlek (2009).

Having a gain goal frame is guided by a theory known as the Conspicuous Consumption Theory. The Conspicuous Consumption Theory explains why people, especially those with higher socioeconomic statuses (SES), buy things to show their wealth or status, Veblen (1899/2012 as cited in Folwarczny et al., 2024). Although, in recent times, this theory now suggests that one can show off one's wealth or status by buying environmentally friendly products, Folwarczny et al. (2022, as cited in Folwarczny et al., 2024). However, this can only happen if being sustainable or pro-environmental is associated with higher status. Griskevicius et al. (2010) found that individuals who are motivated to make decisions according to the conspicuous consumption theory, these particular individuals will purchase eco-friendly products if the product is more expensive than the non-green alternative. Interestingly, Griskevicius et al. also found that when green products are cheaper, they are less likely to be purchased, which shows that while cheaper green products are better for the environment, an individual may not buy them simply because they do not show off their wealth through the environmentally-friendly choice.

However, numerous behaviours that benefit the environment involve a conflict between pleasure-seeking (gain) goals and financial (hedonic) goals on one side and moral (normative) goals on the other (Steg et al., 2016). According to do Canto et al. (2022), goal conflict is one of three moderators that can be used to moderate the relationship between a specific goal frame (i.e. hedonic, normative and gain) and a targeted behaviour. A situation's dominant goal frame dramatically affects decision-making (Steg et al., 2016). For example, when grocery shopping, they may choose between organic tomatoes, which are better for the environment, and cheaper non-organic tomatoes. The gain goal may push them to choose the less expensive option to save money.

In contrast, the normative goal encourages them to select the organic option because of its positive environmental impact. This type of conflict suggests that a normative goal can be pushed into the background. Hence, when it comes to pro-environmental behaviour, it is essential to consider which of the three primary goals serves as the goal frame and whether the background goals align with or conflict with this goal frame.

The other two variables that can be used to moderate the relationship between a goal frame and a targeted behaviour (in this case, pro-environmental behaviour) are lifestyle and the perception of risk.

Lifestyle choices significantly influence how individuals respond to goal frames. Individuals who adopt a more environmentally friendly lifestyle are considerably more inclined to align their choices and actions with environmental objectives than those who do not embrace such a lifestyle. Those who place a high value on sustainability in their everyday lives tend to be more open to messages that present environmental actions as personal or social goals. Therefore, customising interventions to suit the lifestyles of the target audience can yield more effective results in encouraging pro-environmental behaviour.

The perception of risk plays an essential role in how individuals interpret and respond to goal frames. When people see a significant risk linked to environmental decline, they are often more driven to participate in pro-environmental actions (Zeng et al., 2019). This increased urgency can lead them to prioritise immediate measures, making them more receptive to goal frames highlighting the repercussions of inaction. On the other hand, if the perceived risk is minimal, individuals may not feel motivated to alter their behaviours, regardless of the goal frames they encounter (Latif et al., 2023).

Another internal variable that Li et al. (2019) portrayed was psychological variables. Psychological variables include the need for social change and factors that overlap with other variables, such as political orientation, political ideology, and political identity (Schmitt et al., 2019). People tend to be reluctant to challenge an existing social system without a sense of a need for change and supportive norms (Wright et al., 1990, as cited in Schmitt et al., 2019). For example, suppose a person is strongly affiliated with a local environmental group. In that case, they are more likely to indicate intentions to participate in group activities (Schmitt et al.), such as community tree planting that the group has organised, and identification with environmental activists has been found to predict pro-environmental behaviour (Dono et al., 2010, as cited in Schmitt et al., 2019).

Extrinsic incentives alone are not as effective because extrinsic incentives overshadow moral considerations and cause the individual to focus on the size of the incentive rather than the effort required (Lee, 2022). Another issue that Lee pointed out with the use of extrinsic incentives as motivators for pro-environmental behaviours was that the mere presence of financial rewards could prime individuals to adopt a more self-sufficient mindset, which hinders environmentalism. Also, individuals may infer that the extrinsic incentive is the primary motivation for pro-environmental action, which can hinder the development of pro-environmental attitudes crucial to behaviour change (Lee). Finally, the reliance on extrinsic rewards can prevent the cultivation of intrinsic motivation, which is vital for fostering lasting pro-environmental behaviours (Lee). Hence, while extrinsic incentives have been used in the past as a way to motivate a person to act in a pro-environmental manner, recent critiques of motivational frameworks have highlighted the need to reconcile intrinsic drivers (e.g., biospheric values) with extrinsic incentives (e.g., financial rewards) in order for them to be more efficient.

Emerging research in value orientation has highlighted the role of “mixed motives in sustaining pro-environmental behaviours, unlike Majumder et al. (2023), who categorised value orientations as being either egoistic, altruistic or biospheric. For instance, an individual may adopt solar panels to reduce carbon footprints (biospheric) and lower electricity bills (egoistic). Thus, interventions catering to multifaceted motivations are necessary per Majumder et al. and Steg et al.’s (2016) assertion that gain and normative goal frames often coexist.

Physical and social environment. The immediate physical environment, including community resources and infrastructure, plays a significant role in shaping behaviours. Ogiemwonyi (2024) suggests that an individual's surrounding environment, including cultural practices tied to nature, can significantly influence their attitudes toward environmental protection. Furthermore, Ogiemwonyi emphasises that awareness of one's physical environment can motivate individuals to engage in eco-friendly actions. Ogiemwonyi further highlights the roles of perceived control, economic factors and mediation effects on environmental attitudes, behaviour, and decision-making. Ngo and Lung (2023) conclude that one's immediate physical environment is imperative for influencing an individual's environmental attitudes and behaviours due to its direct effects, interaction with life satisfaction, and contextual factors.

According to Linder et al. (2022), for environmental attitudes and behaviours to align with sustainable behaviours, they must be understood as part of the range of possible behaviours that both the physical and the social environment enable. In other words, staying in the same physical or social environment that individuals were in when forming unfriendly ecological behaviours makes it difficult for them to stop performing those unsustainable behaviours. This was replicated in Verplanken and Roy's(2016) study, which found that pro-environmental behaviour change was more likely if participants had recently moved houses.

According to the habit discontinuity hypothesis, when a context change disrupts an individual's habits, a window opens in which behaviour is more likely to be deliberately considered (Verplaken et al., 2008). The self-activation hypothesis states that it is more likely to guide behaviours when values incorporated in the self-concept are activated (Verplaken et al.). When both of these hypotheses are combined, it is safe to assume that if a person holds environmentally friendly values and relocates, they are more likely to perform pro-environmental behaviours and make pro-environmental decisions. According to Verplaken et al., participants in the research who had recently relocated and were environmentally conscious utilised their cars less often when travelling to the university. More importantly, this finding was evident when compared to individuals who displayed low environmental concern and those with high environmental concern but had not moved recently (Verplaken et al.).

According to Thomas et al. (2016), relocating can act as a “window of opportunity” for initiatives that promote environmentally sustainable behaviours. However, the link between an individual’s environmentally friendly behaviours and ecologically friendly attitudes weakens as time progresses. This weakening implies that an increase in car usage over time may be linked to the longer a person remains in a new setting (Thomas et al.). Haggar et al. (2019) suggest that when people undergo a shift in their physical surroundings, such as relocating, they might develop a heightened awareness of their travel decisions and the environmental consequences of those decisions. Hagger et al. argue that when pro-environmental values are triggered during this "window of opportunity," individuals may be more inclined to modify their travel habits to be consistent with those values due to the heightened awareness that individuals possess.

Cultural narratives embedded in landscapes extend the physical environment's influence on behaviour beyond infrastructure alone. According to Ogiemwonyi (2024), individuals may exhibit stronger pro-environmental norms due to place-based guardianship traditions in communities with deep ties to natural heritage (e.g., Indigenous groups practising kaitiakitanga in New Zealand). Conversely, even among environmentally conscious individuals, if they live in an urban environment dominated by car-centric designs, they are more likely to perpetuate carbon-intensive habits (Ngo & Lung, 2023).

Lack of Knowledge and Education. According to Geiger et al. (2019), individuals may not grasp how their behaviour affects the planet when they lack knowledge of environmental issues. People might not recognise harmful behaviours or the importance of sustainable practices, so that this limited understanding can lead to poor decision-making (Geiger et al.). Another point that Geiger et al. point out is that people may not be aware of practical solutions to environmental problems due to not having proper ecological education. This lack of awareness can result in inaction or reliance on ineffective methods, as they do not know what actions can make a positive difference (Geiger et al.). Geiger et al. state that many individuals overestimate their understanding of environmental topics, leading to the Dunning-Kruger effect. The Dunning-Kruger effect refers to a cognitive bias in which people with limited skills in a task overly inflate their perceived competence (Andrade et al., 2023). This phenomenon arises from insufficient knowledge to properly evaluate their abilities (Andrade et al.). According to Geiger et al., this overconfidence can lead to them believing they are informed when they are not and thus making decisions based on incorrect assumptions of the environment. According to Lumbanraja (2017), the Dunning-Kruger effect may be a product of greenwashing. Greenwashing refers to the tactic businesses employ to deceive consumers about their environmental practices or the ecological advantages of their products (de Freitas Netto et al. (2020). According to de Freitas Netto et al., firms engaging in greenwashing frequently utilise "selective disclosure," highlighting favourable environmental information while minimising or ignoring the negative aspects of their operations.

Fuchs (2023) states that the Dunning-Kruger effect can contribute to the attitude-behaviour gap. In this phenomenon, individuals express positive attitudes towards the environment but may fail to act on those attitudes. The Dunning-Kruger effect plays a role in the exacerbation of the attitude-behaviour gap by causing individuals to overestimate their understanding of environmental issues. It thus leads to complacency in their actions (Fuchs). For instance, if a group of college students participates in a workshop on environmental sustainability after the workshop, they express strong support for these practices, indicating they understand their importance. Despite their positive attitudes, many students overestimate their knowledge about effective recycling methods. However, their understanding of the complexities involved in recycling (like knowing which materials can be recycled and how to sort them properly) is limited. This overconfidence is a classic example of the Dunning-Kruger effect (Fuchs). As a result of this overestimation, students might continue to throw recyclable materials in the trash because they believe they are already doing enough for the environment. This disconnect between their positive attitudes and actual behaviours illustrates the attitude-behaviour gap (Fuchs) exacerbated by the Dunning-Kruger effect.

Sustaining the attitude-behaviour gap requires deeper scrutiny of the role played by the Dunning-Kruger effect. As noted by Geiger et al. (2019), inadequate education systems prioritising rote learning over critical engagement with sustainability challenges are one of the reasons for individuals' overconfidence in environmental knowledge. This bias could be mitigated by grounding abstract concepts in tangible actions, for example, through integrating experiential learning, such as community clean-ups or carbon footprint tracking in the school curriculum. In addition, to reduce misinformation and thus enable more accurate self-assessments of environmental impact, greenwashing must be combatted through stricter advertising regulations (de Freitas Netto et al., 2020).

According to Ma et al. (2023), if individuals are unaware of how their consumption habits affect the environment, they are less likely to make informed decisions that promote sustainable behaviour. This is due to environmental knowledge being a strong predictor of pro-environmental behaviour (Ma et al.). Ma et al. also demonstrated that individuals may not develop pro-environmental attitudes without proper ecological education. This lack of pro-environmental education may lead to people who have neutral or negative attitudes towards sustainability, which may hinder their willingness to engage in pro-environmental actions (Ma et al.).

According to Liu et al. (2020), individuals with more environmental knowledge are more likely to be aware of any environmental issues in the physical environment around them. Liu et al. discovered that environmental knowledge significantly affects environmental attitudes. This discovery is shown again in Ma et al. (2023), where it was found that students who had received an environmental education were more likely to adopt sustainable practices than those who did not.

Lack of awareness of non-conformity to social norms. My project extends the concept of cognitive dissonance to the environmental domain, exploring how awareness of social norms affects motivation to change behaviour. According to Thøgersen (2004), people desire to avoid cognitive dissonance and, therefore, create a drive to ensure that their actions align with their values and principles.

Our research attempts to establish how awareness of non-conformity to the global social norm of behaving in a manner that is more environmentally friendly causes one to make specific decisions over others regarding environmental choices. My study draws on research on non-conformity and cognitive dissonance in pro-environmental behaviour.

Cognitive dissonance is a psychological term that refers to the mental discomfort or tension experienced by an individual when they simultaneously hold two or more contradictory beliefs, values, or ideas or when their actions conflict with their beliefs. This theory, developed by Leon Festinger in 1962, suggests that individuals have an inherent drive to achieve internal consistency. When faced with conflicting cognitions, various strategies motivate people to reduce the dissonance. These strategies may include changing one of the contradictory beliefs, acquiring new information that harmonises the conflicting ideas, or downplaying the importance of one of the contradictions. Cognitive dissonance highlights the human tendency to seek harmony in their thoughts and behaviours and the lengths they will go to maintain psychological equanimity.

According to Perry et al. (2021), social pressure can arise when individuals become aware of their non-conformity to pro-environmental social norms. This awareness often triggers a psychological response, prompting individuals to modify their behaviours to align more closely with these established social expectations. The researchers argue that this phenomenon occurs because social norms embody collective beliefs regarding acceptable behaviours within a community, particularly concerning environmental responsibility.

When individuals recognise that their actions diverge from these norms, they may experience discomfort or anxiety stemming from the potential disapproval of their peers. Perry et al. (2021) emphasise that such feelings of disapproval can create a strong impetus for individuals to conform, as the desire for social acceptance and fear of ostracism significantly influence behaviour. Consequently, understanding the impact of social norms on individual actions highlights the importance of fostering a collective commitment to pro-environmental practices, as it can lead to widespread behavioural changes that benefit the environment.

In my research, we employed a combination of pro-environmental social norms and structured choice tasks to investigate individuals' decision-making processes when considering their ecological impact. By integrating these methodologies, we aimed to uncover the complex psychological, social, and situational factors influencing people's tendencies to make environmentally conscious choices. My study delves deeper into how social influences, such as peer behaviours and community standards, interact with individual preferences and perceived consequences to shape behaviour in an ecological context. Through this multifaceted approach, we seek to provide valuable insights that can inform strategies for promoting sustainable behaviours among diverse populations.

My research draws upon the existing literature on environmental behaviour, thereby contributing valuable insights into the underlying mechanisms that facilitate behaviour change in this domain. We primarily focused on how awareness of pro-environmental social norms affected pro-environmental decision-making.

This explores a crucial aspect that may hinder individuals from adopting sustainable practices. According to the study conducted by Chu and Karr (2016), the historical connections that individuals once had with their environments are increasingly disrupted by contemporary ways of thinking and living. This shift in perspective can lead to a weakened comprehension of how human actions affect the natural world. As modern lifestyles evolve, characterised by heightened consumption patterns and an ever-growing population, the deterioration of the environment has become more pronounced. This trend underscores the critical need for individuals to recognise and confront their roles in contributing to environmental decline (Chu & Karr). Moreover, one significant factor contributing to the public's lack of awareness regarding their environmental impact may stem from insufficient reporting and transparency concerning emissions and various environmental metrics (Chu & Karr). Without accessible and comprehensible data, individuals find it exceedingly difficult to understand the scope and scale of their ecological footprints fully. Consequently, this lack of clarity can hinder proactive engagement and informed decision-making regarding sustainable practices. Without a clear view of how their behaviours influence the environment, individuals may remain disconnected from the pressing environmental issues surrounding them (Chu & Karr).

My study draws from the research by Zhang et al. (2024) to understand why awareness of an individual's non-conformity to this social norm of pro-environmentalism influences their environmental decision-making. Zhang et al.

suggested that people frequently acquire knowledge from the behaviours and mindsets of those around them. When individuals realise their actions do not match the dominant social standard of being environmentally conscious, they might feel compelled to adjust their behaviour to fit in (Zhang et al.). This process of social learning can result in shifts in behaviour as people aim to meet the expectations of their peers or the broader society (Zhang et al.). According to Zhang et al., individuals generally wish to avoid the negative social stigma often associated with non-conformity. Awareness of their non-conformity to the social norm of being environmentally conscious can motivate people to adopt more sustainable practices (Zhang et al.). Zhang et al. also noted that people may be more motivated to align with the environmentally friendly social norm of adopting a low-carbon energy consumption choice as the low-carbon energy options become increasingly more common, influencing their environmental decision-making. Zhang et al. surmised that this awareness of non-conformity to pro-environmental social norms can lead individuals to make specific decisions about their ecological behaviour due to a variety of different reasons, including but not exclusive to social learning, individual motivation to conform, and influence of market dynamics. For example, if new people are to join an existing community that practices recycling, then witnessing the rest of the community recycling while they do not (i.e. a form of social learning) can motivate them to adopt similar practices to the rest of the group (Toyokawa & Gaissmaier, 2022). According to Packard and Schultz (2023), if an individual has a strong biospheric goal frame, which is further enhanced by the rest of the community promoting pro-environmental behaviour and that individual witnesses someone in their community going against the pro-environmental social norm, the individual will feel guilt at the thought of the possibility of acting not following their beliefs and therefore ensure that they will do everything in their power to act pro-environmentally at every opportunity. According to Zhang et al., electric vehicles (EVs) become increasingly available in a particular region, thus causing consumers to have more options to choose from in the market (i.e. a change in market dynamics for EVs). Then, as more individuals observe their friends, family, and neighbours adopt EVs, they may become aware of their non-conformity to the new social norm of driving EVs as they continue to drive traditional petrol or diesel vehicles (Zhang et al.). Thus, this creates a sense of urgency to conform to the new social norm of driving an EV, especially if they value being environmentally responsible (Zhang et al.). Thus, as there is a greater demand for EVs, the market will respond by offering more EVs (Zhang et al.).

According to Lamdjad et al. (2024), six key factors can be attributed to the lack of awareness of an individual’s environmental impact. A lack of awareness regarding an individual's environmental impact may be attributed to a weak environmental culture, where many individuals grow up in environments where environmental issues are not prioritised or discussed, thus leading to a general lack of understanding and concern for environmental matters (Lamdjad et al.). When communities do not prioritise environmental discussions, individuals are less likely to engage with or value environmental issues (Lamdjad et al.). This weak environmental cultural backdrop limits the motivation to seek information or participate in environmental initiatives, leading to a general indifference towards environmental impacts (Lamdjad et al.). A lower educational level often correlates with a weak environmental culture (Lamdjad et al.). According to Lamdjad et al., individuals may lack the knowledge necessary to understand the implications of their actions on the environment if they are not exposed to an environmental education. As a result of this low education level, individuals may develop a limited interest in environmental issues such as climate change (Lamdjad et al.). People are less likely to engage in environmental issues if they do not understand the science behind climate change and its relevance (Lamdjad et al.). Information regarding environmental issues fails to reach those interested or who need to be informed if the information is not effectively disseminated (Lamdjad et al.). This lack of effective communication limits the resources available for outreach and education and is often due to politicians and government agencies not prioritising environmental education and awareness initiatives (Lamdjad et al.). Finally, according to Lamdjad et al., individuals are less likely to engage in environmental activities due to not being educated, having a lack of interest, and not receiving adequate communication from decision-makers. As fewer people participate in environmental initiatives, this leads to a continued lack of awareness of their environmental impact, and the lack of engagement perpetuates this cycle.

The lack of effectiveness of injunctive social norm activation is further highlighted in Kotyza et al. (2024), where it was discovered that simply making participants aware of social norms may not be sufficient to influence their decision-making regarding pro-environmental choices. However, it is pointed out that participants must have a personal value or belief that leads them naturally to perform sustainable actions for the individual to experience negative emotions due to non-conformity to the pro-environmental social norm (Trujillo et al., 2021).

In summary, there are multiple reasons for the lack of awareness of an individual's environmental impact and, hence, people’s non-conformity towards the social norm of performing their behaviour in an environmentally conscious manner. This lack of awareness of human beings’ non-conformity to the social norm of acting in a pro-environmental manner leads to a discrepancy between individuals' pro-environmental attitudes and their actual behaviours. This discrepancy or disconnect is often referred to as the attitude-behaviour gap.

Disconnect between pro-environmental attitudes and behaviours. There is a disconnect between pro-environmental attitudes and behaviours, commonly known as the attitude-behaviour gap. According to Vieira et al. (2023), individuals may not consistently engage in behaviours that demonstrate their concern for the environment and their positive attitude towards the Earth. Even if someone holds ecological values and cares about sustainable practices, their actions might not always align with those beliefs, resulting in a disconnect between attitudes and behaviours (Vieira et al.). Vieira et al. suggested that there might be several psychological barriers causing this disconnect to occur. Vieira et al. proposed that some of these psychological barriers include but are not exclusive to tokenism, which is defined as when some individuals believe that small actions are sufficient for change, which can lead to a lack of further engagement, is the first of several psychological barriers mentioned by Vieira et al.. Interpersonal relationships mean that people may fear social disapproval or criticism, which can deter individuals from engaging in certain pro-environmental behaviours (Vieira et al.). Lack of knowledge or not knowing how to make effective changes can also be a significant barrier (Vieira et al.). This psychological barrier is again shown in the work of Bleys et al. (2018), which says that people are not likely to engage in environmentally sustainable practices if they are not informed about environmental issues and the actions that could promote more eco-friendly behaviour. Feeling that change is unnecessary, meaning that some individuals may think that their actions are unnecessary or that climate change is not a pressing issue, is another psychological barrier that Vieira et al. point out. Finally, Vieira et al. identify conflicting goals as one of the psychological barriers, which means that people often have other priorities that conflict with pro-environmental actions, such as perceived business and perceived wealth.

Another possible reason for this disconnect that Vieira et al. (2023) pointed out is that certain pro-environmental behaviours are also associated with perceived costs that are often more costly or inconvenient when compared to the non-ecofriendly alternative. Other factors include the observation that not all environmentally friendly behaviours are shaped by attitudes uniformly. For example, choices that have a lower environmental impact, such as recycling or water conservation, are often a lot easier to embrace than choices with a higher ecological impact, such as reducing car usage or lowering air travel (which have a more substantial effect) that often make it necessary to make more considerable lifestyle adjustments (Vieira et al.). Additionally, Vieira et al. noted that psychological obstacles influenced the connection between attitudes and behaviours in specific areas, such as food choices and waste management, but not in others, like driving or flying; this indicates that the underlying reasons for inaction can differ significantly based on the behaviour being examined. One possible explanation for this connection is that psychological barriers related to social disapproval or fear of criticism can be more pronounced in areas involving food choices and waste management; however, driving and flying could be seen as a more individualistic choice and, therefore, the influence that society has on them is less impactful (Vieira et al.). Another possible explanation for the influence of psychological barriers on the connection between attitudes and behaviours, specifically in food-related contexts, is that interpersonal dynamics can create pressure that leads to behaviours contrary to one's environmental attitudes (Gifford & Chen, 2016).

According to Redondo and Puelles (2016), individuals who do not have a sense of self-control often cannot translate their pro-environmental attitudes into pro-environmental behaviours. A sense of self-control is defined as the ability to regulate one's thoughts, emotions and behaviours in response to environmental demands (Tiffany & Tiffany, 1996). Another psychological barrier that Vieira et al. (2023) did not focus on might be this inability to self-control. The relationship between environmental health and personal health care is notably intertwined (Redondo & Puelles). Individuals who did not focus on maintaining a diet and hydration that was perceived as healthy for their bodies often encountered difficulties when taking actions they believed would be advantageous for the environment (Redondo & Puelles). This disconnect suggests that their approach to personal health mirrored their attitudes toward environmental responsibility, reflecting a broader pattern in their decision-making.

In the study by Bleys et al.(2018), they discovered that many individuals tend to underestimate the extent of their ecological impact. This phenomenon is attributed primarily to these individuals' strong pro-environmental attitudes. They often believe that their personal behaviours and lifestyle choices, which they perceive as environmentally friendly, significantly mitigate their negative environmental impact. However, this optimistic self-assessment can lead to a disconnect between their attitudes and the consequences of their decisions and, as a result, their behaviour, resulting in an inaccurate perception of their ecological footprint.

According to Bravo and Farjam (2022), although people may express strong environmental beliefs, they may not engage in corresponding behaviour. Bravo and Farjam found that this disconnect may lead individuals to overstate their environmentally friendly behaviours in self-reports, thus creating a self-reported self-serving bias.

The weak correlation that was found between pro-environmental attitudes and pro-environmental behaviour by Bleys et al. (2018) was supported by Bravo and Farjam (2022), where it was indicated that there is little correlation between self-reported pro-environmental actions and actual behaviours, such as the purchase of carbon-offset credits. Bravo and Farjam emphasised that a person's political affiliation significantly influences their self-reported environmental behaviours.

People may describe behaviours that correspond with their political beliefs rather than genuine actions (Bravo & Farjam). This discrepancy can result in individuals feeling they are acting in an environmentally responsible way based on their beliefs, while their actual behaviours do not support this (Bravo & Farjam). They may want to appear more committed to environmental causes than their actions reflect, thus inflating their self-reported behaviours (Bravo & Farjam).

It is also known that people often tend to view themselves positively in various contexts (Bergquist, 2020). This tendency is more commonly referred to as self-serving bias. Bergquist proposed that individuals often view themselves as superior to the average person in terms of positive behaviours and that engaging in pro-environmental actions is considered a positive trait; consequently, most individuals are likely to see themselves as more environmentally friendly than their peers. Individuals also are found to have self-serving bias. Self-serving bias indicates that people often exaggerate their environmentally conscious actions or behaviours, as Koller et al. (2023) noted. Koller et al. discovered that individuals who tended to overstate their eco-friendly behaviours were those with a more pronounced environmentalist identity. Koller et al. surmised that self-reported self-serving bias can lead to overestimating making environmentally friendly decisions and performing appropriately. This overestimation of pro-environmental behaviour was mainly influenced by personal identity. Understanding this cognitive bias is crucial for accurately assessing and promoting genuine pro-environmental actions.

Miller and Rice (2024) propose an intriguing explanation for the phenomenon where individuals may express a strong commitment to environmental protection but fail to translate that commitment into corresponding behaviours. This explanation revolves around environmental efficacy, which they define as an individual's confidence in their ability to effect meaningful change regarding environmental issues. Miller and Rice argue that ecological efficacy is pivotal to understanding the gap between attitudes and actions in environmentalism. When individuals feel empowered and believe their actions can lead to positive environmental outcomes, they are more likely to engage in pro-environmental behaviours. Conversely, if a person harbours doubts about their capacity to make a tangible impact—perhaps due to perceived obstacles, a lack of resources, or previous failures—their motivation to act may significantly decline. Miller and Rice emphasise that this lack of belief in one's efficacy can undermine intentions. Therefore, even individuals who passionately advocate for environmental protection may remain passive, not because they lack concern or interest, but because they do not perceive themselves as capable of effecting change. This dichotomy highlights the importance of fostering a sense of environmental efficacy among individuals to bridge the gap between pro-environmental attitudes and actual behaviours.

Social Factors

Social Capital. According to Pretty and Ward (2001), social capital captures the idea that an essential part of the basis for sustainable livelihoods is social bonds and social norms. Social capital facilitates cooperation by lowering working costs (Pretty & Ward). Due to this, social capital is vital for environmental decision-making, as people make decisions through multiple influences, including the members of your community. Community members help to shape who an individual is by being part of an individual's social network and supporting the individual in building relationships. Through this social network and building of relationships, community members impact an individual's decision-making and, thus, their ecological decision-making.

According to Wan and Du (2022), social capital refers to the collective action within a community, relationships, norms and networks. It includes aspects such as social participation, social norms, social trust, and social networks (Wan & Du). Individuals are more likely to engage in environmentally friendly actions in private and public domains if they possess higher social trust and stronger social norms (Wan & Du). According to Wan and Du, an individual’s willingness to adopt pro-environmental behaviours is enhanced when people have high trust in other community members. This tendency to believe in others is social trust (Wan & Du). People are more likely to believe in the effectiveness of collective environmental behaviours in communities with high social trust. Individuals possessing more information and resources related to environmental issues tend to have more extensive networks (Wan & Du). This more extensive social network enhances active participation in social events and ecological organisations, enhancing individuals' sense of responsibility towards the environment (Wu & Du).

According to Cho and Kang (2017), social capital is considered a valuable asset that individuals can leverage to achieve various goals, including those related to the environmental field (Cho & Kang). Social capital plays a significant role in shaping ecological behaviours by strengthening community bonds, establishing shared norms, building trust, providing access to resources, and facilitating collective action.

Social norms - manipulation in my research

We will draw upon the Attitude-Behaviour-Context theory (ABC theory). Ertz et al. (2016) suggest that attitudinal factors encompass personal beliefs, norms, values, and tendencies to act environmentally friendly. In the present world, the general global social norm is to act pro-environmentally.

As Biel (2017) highlighted, social norms influence environmentally friendly behaviour. Individuals will use these social norms as a framework to evaluate their actions against the expectations of their peers (Biel). According to Biel, if an individual believes that their social group values and engage in eco-friendly behaviours, they are more inclined to adopt a particular environmentally friendly behaviour. This tendency arises because people aim to align with the social norms in their social circles, which can lead to a more collective movement towards sustainable practices (Biel). This tendency was also seen in the works of Nolan et al. (2008), who found that when people are provided normative information about the percentage of other households in the same community that engage in specific energy conservation behaviours (e.g. turning off lights, using fans instead of air conditioning); over 4 weeks, results showed a 10% reduction in household electricity use compared to an information-only control condition.

Currently, several studies on environmental decision-making involve choice tasks. Lange et al. (2018) examined how actual outcomes for an individual and their environment can result from the choices made in a pro-environmental behaviour task (PEBT). Lange et al. did this by looking at how participants answered a survey that asked them about how often they participated in twelve environmentally significant behaviours, the 15 questions on the environmental paradigm scale, a self-assessment tool designed to evaluate values that were suggested to relate to pro-environmental actions; and three items that constitute the ecological self-identity scale. After completing the five scales, Lange et al. asked participants to complete 72 trials of the PEBT. The PEBT involved a series of choices between a car and a bicycle for a particular trip. Lange et al. (2018) found that there was a positive correlation between the proportion of environmentally friendly bicycle choices and the waiting time difference between the ecologically friendly (Bicycle) and environmentally unfriendly (Car) options. Lange et al. also discovered a positive correlation between the proportion of environmentally friendly decisions and the self-reported measures of environmental attitudes, environmental concern, environmental identity, ecological behaviour, and biospheric value orientation. Zhou et al. (2024) investigated the relationship between positive emotions and pro-environmental behaviour. Engagement in environmentally friendly behaviour leads to an increase in positive emotions after the fact, according to findings by Zhou et al..

This would occur in a positive feedback loop, making people want to perform more pro-environmental behaviour; in other words, when people feel good about their environmental actions and decisions, they would be more likely to engage in such ecological decisions and actions. Zhou et al. found this out through The Carbon Emission Task, which required participants to make choices that impacted their carbon emissions. At the same time, the Work for Environmental Protection Task involved participants in laborious activities focused on promoting environmental sustainability. According to Zhou et al., both tasks aimed to assess actual behaviour instead of depending solely on self-reports, frequently lacking validity. Participants' feelings were assessed after they finished the tasks, and the connection between their choices and emotional reactions was examined (Zhou et al.). Zhou et al. suggest that positive emotions can significantly influence pro-environmental behaviour, creating a positive feedback cycle that encourages sustainable behaviour. Essl et al. (2023) hypothesised that costs and perceived environmental benefits significantly influence pro-environmental behaviour, with personal attitudes also playing a crucial role. Essl et al. employed a specific methodology to test this hypothesis. The methods of the choice task were designed as an incentivised, one-shot decision task (Essl et al.). In other words, participants were asked to decide whether to spend their money on planting trees or keep the money for themselves. Essl et al. ensured that participants faced a tradeoff between immediate financial rewards and long-term environmental benefits. When higher carbon dioxide (CO2) offsets were brought to the forefront of participants' minds, participants were encouraged to plant more trees (Essl et al.). This suggests that individuals are more inclined to make financial sacrifices in the short run when aware of long-term environmental gains. The number of trees planted was positively correlated with individuals’ environmental attitudes and values (Essl et al.).

According to Xing et al. (2022), social norms influence individuals' actions, especially in collectivistic cultures. This influence is more pronounced in collectivistic cultures due to the ability of social norms to facilitate effective, coordinated, and predictable actions within groups (Antweiler, 2019). The attitude-behaviour-context (ABC) theory suggests that social norms are crucial in encouraging individuals to undertake pro-environmental actions (Xing et al.). Xing et al. state that people are likelier to participate in these behaviours when they perceive that their peers value environmental efforts. The impact of social norms can motivate people to join in observable collective actions, such as protests or community clean-up efforts, as group dynamics play an essential role in collectivistic cultures (Xing et al.). In order to prompt more individuals to engage in environmental initiatives, community campaigns, particularly those that emphasise positive behaviours and group involvement, which strengthen social norms, are required (Xing et al.). This strengthening of social norms is supported by a study by Yang et al. (2024), which discovered that pro-environmental behaviour is positively influenced by altruistic and biospheric values emphasised in collectivistic cultures. Due to group harmony and collective well-being being seen as highly important in collectivistic cultures, individuals are likelier to adopt behaviours they see as the norm (Yang et al.). Therefore, when pro-environmental behaviour is seen as the norm, individuals are more likely to conform (Yang et al.).

While Xing et al. (2022) focused on the role that social norms play in a collectivistic culture (such as that of China) in influencing pro-environmental behaviour, other research, such as that of Bergquist et al. (2019), looks into how social norms function for influencing pro-environmental behaviour in individualistic cultures. Bergquist et al. stated that injunctive and descriptive social norms significantly influence personal choices and actions. According to Bergquist et al., individuals often internalise social norms in individualistic cultures. People may feel a heightened motivation to participate in environmentally friendly behaviours because people in these societies usually adopt these social norms as personal beliefs (Bergquist et al.). This internalisation creates a sense of obligation for individuals to act consistently with these norms (Bergquist et al.). The “norm internalisation” theory posits that specific norms are absorbed and transformed into goals in their own right rather than just serving as a means to achieve particular objectives or to evade social penalties (Gavrilets & Richerson, 2017). Therefore, Bergquist et al. assert that campaigns to foster the adoption of sustainable behaviours can effectively leverage both injunctive and descriptive norms. Hence, by appealing to individuals’ intrinsic desire for social approval and their inclination to conform to perceived societal standards, such campaigns can enhance the likelihood of behaviour change towards more sustainable practices within individualistic societies.

The current study contributes to this knowledge stream by investigating whether when a person is told they are acting in opposition to a global social norm of behaving in a manner that benefits the environment, the individual will make decisions that align with that of the global social norm. The current study will investigate this norm and whether people will act according to it when given the option not to. By analysing what happens to people’s decision-making when individuals are told they are not acting according to the global social norm, the study will contribute to the growing knowledge base of environmental psychology.

The current study will employ the independent variable of pro-environmental social norm groups (i.e. participants will be informed that their environmental impact is lower, higher, or the same as that of an average person), the dependent variables of delay discounting tasks related to participants’ transportation choices, suggestions related to participants’ investment choices and a monetary donation question. The current study will also examine participants' carbon footprints and environmental attitudes to investigate the relationship between carbon footprints and environmental attitudes with participants' choices.

Hypotheses

A general social norm today is to act in a manner that helps the environment (Perry et al., 2021). Despite the vast amount of research into social norms and their role in environmental psychology, more research is still needed to explore the awareness of pro-environmental social norms. Therefore, this study examines how awareness of the social norm around acting pro-environmentally influences individuals to conform to the norm and make more pro-environmental decisions. The current research proposes that awareness of the environment and social norms around an individual will cause the individual to act in a manner that conforms to these social norms. While past literature in environmental psychology has primarily focused on the adoption of social norms (For example, Xing et al. (2022); Yang et al. (2024); and Bergquist et al. (2019)), there has never been any real focus on how having an awareness of social norms impacts our environmental decision-making. The current study builds on the literature by examining why awareness of the social norm around acting pro-environmentally causes individuals to conform and make more pro-environmental decisions.

The current study seeks to answer the research question and related research queries through two different hypotheses:

Hypothesis 1: An individual's environmental attitudes are positively correlated with one's pro-environmental decision-making (i.e. make more pro-environmental choices in the delay discounting tasks, investment choices and the monetary donation task)

Hypothesis 2: Participants in the high-impact condition will ensure you make more pro-environmental decisions than people in the low and average-impact conditions.

Method

Participants:

A total of 253 adults aged 16 to 85, were included in the sample. Most participants were female (65.22%), and all had completed some secondary schooling. Participants were from all around the world and all of the varying ethnicities (European (14.87%), Maori (1.86%), Pacific (5.58%), Asian (51.30%), MELAA [Middle Eastern/Latin American/African] (1.12%), and Other (25.28%)). Ethics approval was obtained from the Auckland University of Technology Ethics Committee (AUTEC) before participant recruitment (AUTEC Reference 24/146). The recruitment process involved a combination of posters, social media advertisements (e.g., Facebook, Instagram, Reddit, and LinkedIn), and snowball sampling. The sample size of ≥ 250 was deemed necessary for detecting a correlation coefficient of ±.1, with a power level of 69.7% and a p-value ≤.05 (AI Therapy Statistics, 2024), based on similar past research (Thøgersen, (2004); Bosone et al., (2022); Lee et al., (2016); Pasca (2022)).

Materials:

The independent variable was based on three different condition groups that participants were placed into: a positive impact group (who was told, "Your carbon footprint is lower than that of the average person"), an average impact group (who was told, "Your carbon footprint is the same as that of the average person") or a negative impact group(who was told, "Your carbon footprint is higher than that of the average person"). The dependent variables were participants' choices regarding transportation discounting tasks, decisions about one's investment funds, and a monetary donation task. The intervening variable to predict environmental decisions further mediated this. Three condition groups were used to manipulate the dependent variables.

Environmental Attitudes:

Participants' pre-existing environmental attitudes were measured using statements such as “I feel a personal responsibility to protect the environment”, “I think it is essential to reduce carbon emissions to combat climate change”, “I believe in the importance of protecting endangered species”; and “I am concerned about the effects of deforestation on the environment”. There were 23 statements on environmental attitudes (see Appendix B for a complete list of all the questions from this section), and participants rated their level of agreement or disagreement towards each statement on a scale ranging from 1 (strongly disagree) to 7 (strongly agree). An exploratory factor analysis using principal axis factoring with direct oblimin rotation supported a single-factor model accounting for 40.65% of the variance. The Cronbach’s alpha was .93 (with a one-factor analysis,) indicating excellent internal reliability.

Carbon footprint:

The carbon footprint was measured using an amended version of a pre-existing online calculator (https://www.footprintcalculator.org/home/en) that consisted of different questions about a particular category to calculate one’s carbon footprint. The categories were Food, Shelter, Mobility, Goods, and Services. An example of one of the questions from the food category was, “How often do you eat animal-based products?”. An example question for the shelter category was, “Approximately what percentage of your home's electricity comes from renewable sources? (either directly or through purchased green power)”. An example from the mobility category was “When you travel by car, how often do you carpool?”. All questions from the goods and services category were omitted for this research. Participants were required to select an appropriate answer for each of the questions. The carbon footprint calculator aligned with the international ecological footprint standards and was deemed credible and consistent. Some questions and multi-choice options were amended to fit New Zealand (NZ) standards. For example, one of the questions that had the multi-choice options amended was: “Which housing type best describes your home (your current place of residence)?” where we amended the choices to include options such as “student accommodation” and “Other”. The original choices were: “Free-standing, no running water”, “free-standing, running water”, “multi-story apartment”, “duplex, row house or building unit with 2-4 houses”, and “luxury condominium”. These options were amended to become: “free-standing/freehold house”, “multi-story apartment”, “duplex, row house, or building with 2-4 housing units”, “student accommodation”, and “other”. The other option was a text option in which they had to specify the type of accommodation they lived in while answering the questionnaire.

Procedure:

Potential participants were invited to complete the survey online using Qualtrics (www.qualtrics.com). The survey included multiple-choice questions on demographic characteristics, participants' environmental attitudes, and a set of questions based on a pre-existing online carbon footprint calculator (https://www.footprintcalculator.org/home/en). Before participants were asked any questions regarding their choices, they were told that they either had the same impact as that of an average person on the Earth (the neutral group), a higher impact than that of an average person on the Earth (the negative group), or a lower impact than that of an average person on the Earth (the positive group). Participants were randomly selected into a group using a double blinding. After they had been told what group the participant was part of, they were asked a series of transportation discounting tasks, questions about investing choices, and a monetary donation question.

An example of one of the discounting tasks included: “Imagine you have the option to choose between driving your vehicle or using public transportation. On a scale of 1 (Definitely drive now) to 10 (Definitely take public transportation), how likely are you to take public transportation now versus driving your vehicle if your destination is 10 MINUTES away."; where each question had a different duration amount given to it. Another type of transportation discounting task asked, "On a scale of 1 (Definitely buy the petrol car now) to 10 (Definitely wait and save for the EV), how likely are you to opt for the electric vehicle (EV), if you can afford it in 2 WEEKS?". Where each question had a different time frame for when one could afford the EV. Finally, the third transportation discounting task asked, "On a scale of 1 (Definitely purchase the petrol version) to 10 (Definitely purchase the electric version), how likely are you to opt for the electric version if it costs $2000 more than the petrol version?" where the amount of money changed in each question.

An example of one of the investment questions included: "Imagine that you are allowed to change your investment account to a climate-friendly fund. How likely are you to change to a climate-friendly fund if you get an 'equivalent' rate of return?"; there were three investment choice questions, each with a change in the rate of return. The other two questions focused on a higher and a lower rate of return.

Finally, they had to answer whether they wished to donate half of their winnings to an environmentally friendly charity or keep their winnings. Complete instructions and task details are available in Appendix B.

Results

To address the research question, the following hypotheses were tested:

Hypothesis 1 (H1): An individual's environmental attitudes positively correlate with pro-environmental decision-making.

Hypothesis 2 (H2): Participants in the high-impact condition will make more pro-environmental decisions than people in the low and average-impact conditions.

Table 1 shows the results of correlational analyses between environmental attitudes, CO2 emissions, and measures of environmental decision-making regarding transport decisions. A weak, non-significant negative relationship existed between environmental attitudes and CO2 emissions. Hence, environmental attitudes appeared not to predict environmental behaviours, at least as measured by the carbon footprint survey.

Participants completed three choice tasks in this study. The first task was a delay-discounting task, in which they were asked to indicate their willingness to take public transport or to buy an electric vehicle (EV). Across questions, the delay to destination, time to save enough money to buy an EV, or the extra cost of the EV varied. Significant positive correlations existed between the delay-discounting measure (area under the curve; AUC) for all three types of questions. Therefore, participants who were more willing to take public transport when their destination was farther away were also more likely to wait to buy an EV or pay more money. The AUC measures were not correlated with environmental attitude.

Table 1

Correlation Table for Transportation Delay Discounting Measures Against Environmental Attitudes and Carbon Footprint Emissions.

		3	4	5
1. PT vs Car				
2. Wait for EV				
	25**			

3. Pay more for EV	18**	60**		-			
4. Environmental Attitudes	04	08	.03	-		-	
5. CO2 emissions	.05	.06	.01	-	.12	-	-

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

Figure 2

Delay Discounting Task Showing the Likelihood of an Individual Taking Public Transport over Their Car Given the Destination is a Certain Time Away.

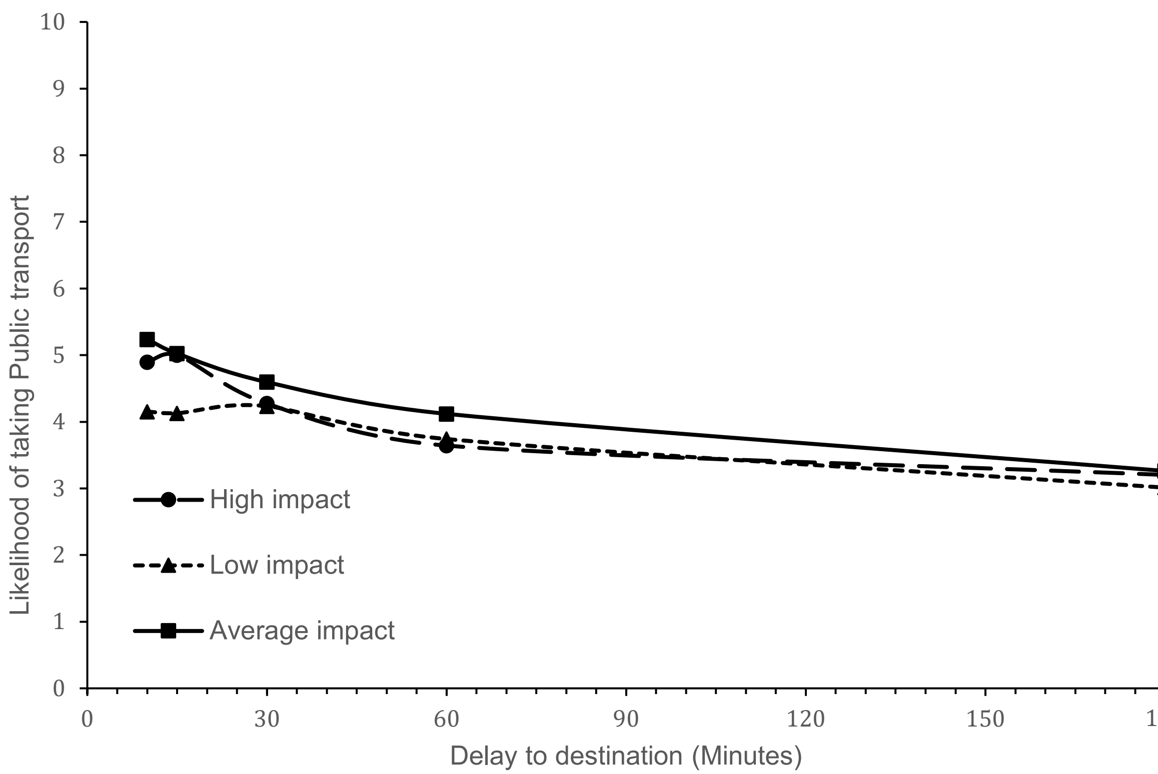


Figure 2 shows the likelihood of an individual taking public transport (10) over driving to the destination (0) given that their destination was a certain amount of time away (i.e. 10 minutes, 15 minutes, 30 minutes, 1 hour, and 3 hours away). In all three conditions, the likelihood of an individual taking public transport over driving to the destination decreased as the delay increased. Overall, for all the participants, regardless of their impact group, the possibility of taking public transport versus their vehicle remained at the lower end of the spectrum. Participants in the high-impact condition were slightly more likely to take public transport no matter how long it took them to reach the destination. Participants in the lower impact condition were less likely to take public transport no matter how long it took them to reach the destination. Participants in the high-impact condition were less likely to take public transport than someone in the average-impact condition but more likely than someone in the low-impact condition.

Figure 3

Delay Discounting Task Assessing How Long One Will Wait to Pay for an Electric Vehicle Given Time to Afford It.

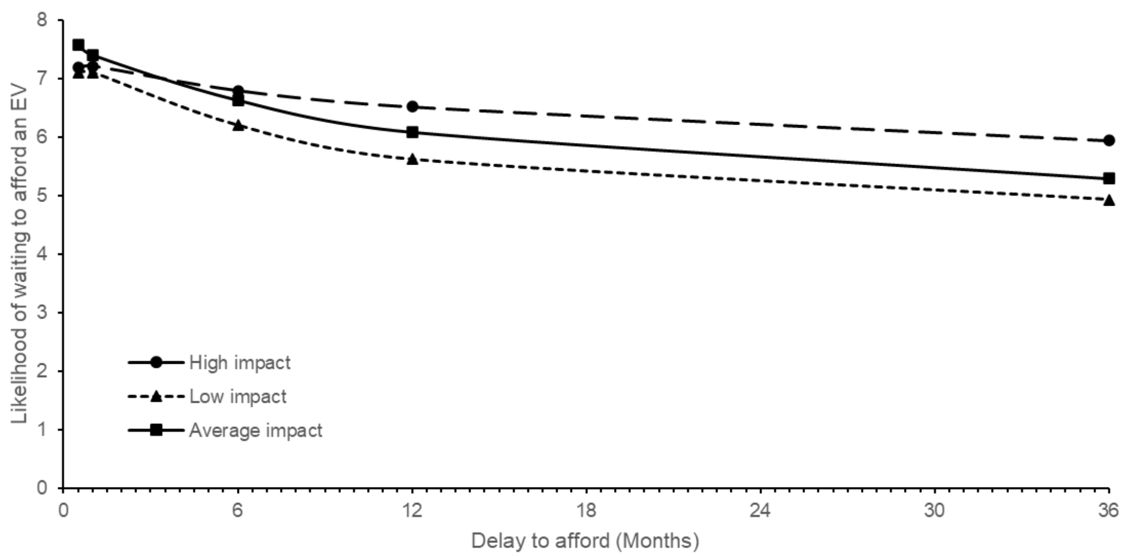


Figure 3 illustrates the likelihood of an individual waiting to pay for an Electric Vehicle (EV) given that it would have taken them a certain amount of time (i.e., 2 weeks, 1 month, 6 months, 1 year, 3 years) to be able to afford an EV. In all three conditions, the likelihood of waiting to afford an EV decreased as the delay to afford the EV increased. When there was no delay in affording an EV, participants in the average impact condition were slightly likelier to choose the EV than participants in the low or high impact conditions. As the delay to afford the EV increased, the likelihood of choosing an EV decreased the fastest in the low-impact condition, next-fastest in the average-impact condition, and slowest in the high-impact condition. Therefore, participants who were informed that their impact on the environment was higher than the average person made more environmentally friendly decisions (waiting to afford an EV) than participants who were informed that their impact was lower.

Figure 4

Delay Discounting Task Showing the Likelihood of an Individual Purchasing an Electric Vehicle Given That it Will be a Certain Amount More Than if They Were to Purchase a Petrol or Diesel Vehicle

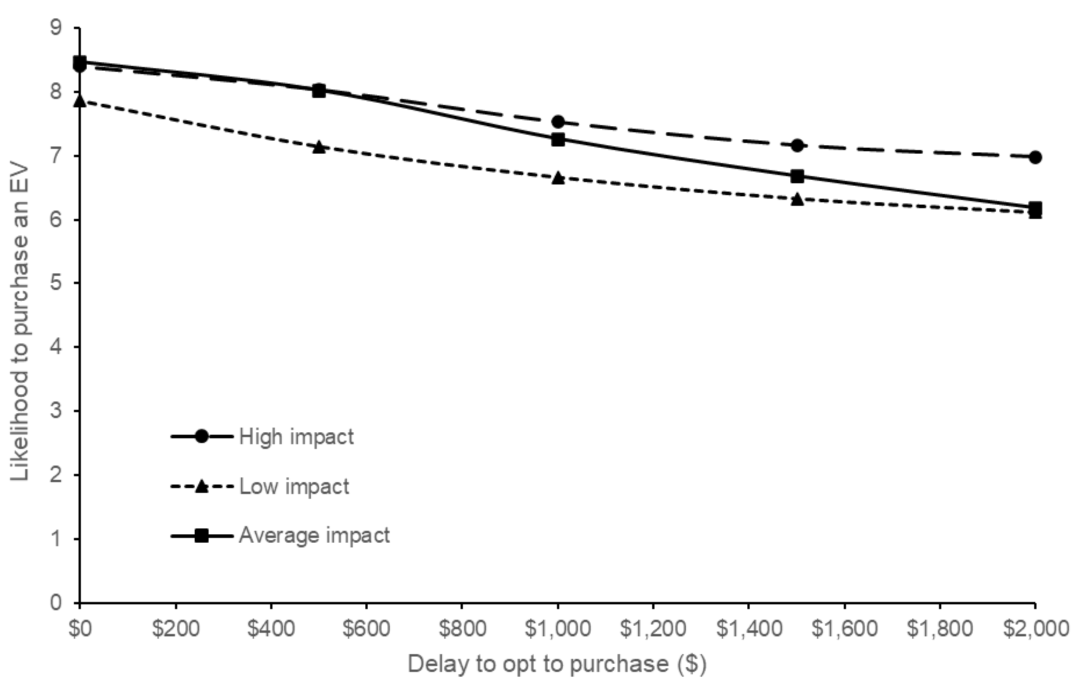


Figure 4 illustrates the likelihood of an individual purchasing an Electric Vehicle (EV) given that it would have been a certain amount (i.e., \$0 more, \$500 more, \$1000 more, \$1500 more, \$2000 more) more expensive than a diesel or petrol vehicle. In all three conditions, the likelihood of purchasing an EV decreased as the amount of the EV increased. When the price of an EV was the same as a diesel or petrol vehicle, participants in the average impact condition were slightly more likely to purchase the EV than participants in the low or high impact conditions. As the price of the EV increased, the likelihood of purchasing an EV decreased the fastest in the low-impact condition, next-fastest in the average-impact condition, and slowest in the high-impact condition. Therefore, participants who were informed that their impact on the environment was higher than the average person made more environmentally friendly decisions (waiting to afford an EV) than participants who were informed that their impact was lower.

We compared AUC values between the three conditions using one-way ANCOVAs with environmental attitudes and CO2 emissions as covariates. There were no significant differences between conditions for the decisions to take public transport over your own car in the three conditions, $F(2,247) = 2.39$, $p = .09$. There was no significant difference in the decision to wait to afford an EV over purchasing a petrol or diesel vehicle now in the three conditions, $F(2,247) = .47$, $p = .63$. There was no significant difference in the decision to pay more for an EV over purchasing a petrol or diesel vehicle for a lower amount in the three conditions, $F(2,247) = 2.88$, $p = .06$. Hence, H2 is rejected.

The second of the choice tasks was related to individual investment fund options. Participants were asked whether they would change to a more climate-friendly fund if it offered a lower, equivalent, or higher rate of return than their current fund. Table 2 shows the results of correlational analyses between environmental attitudes, CO2 emissions, and measures of environmental decision-making. Pearson product correlation of the changing to a climate-friendly fund, if it had an equal rate of return and environmental attitudes, was found to have a low positive correlation and was statistically significant. Pearson product correlation of changing to a climate-friendly fund if it had a lower rate of return and environmental attitudes was found to have a low positive correlation and was statistically significant. Hence, H1 was supported. This shows that an increase in environmental attitudes would have increased the likelihood of changing investment funds to a climate-friendly fund if the participant was to get either an equal or a lower rate of return when you change.

Table 2

Correlation Table showing Pearson Correlation Values for Individual Climate-Friendly Investment Funds Against Environmental Attitudes and Carbon Footprint Emissions.

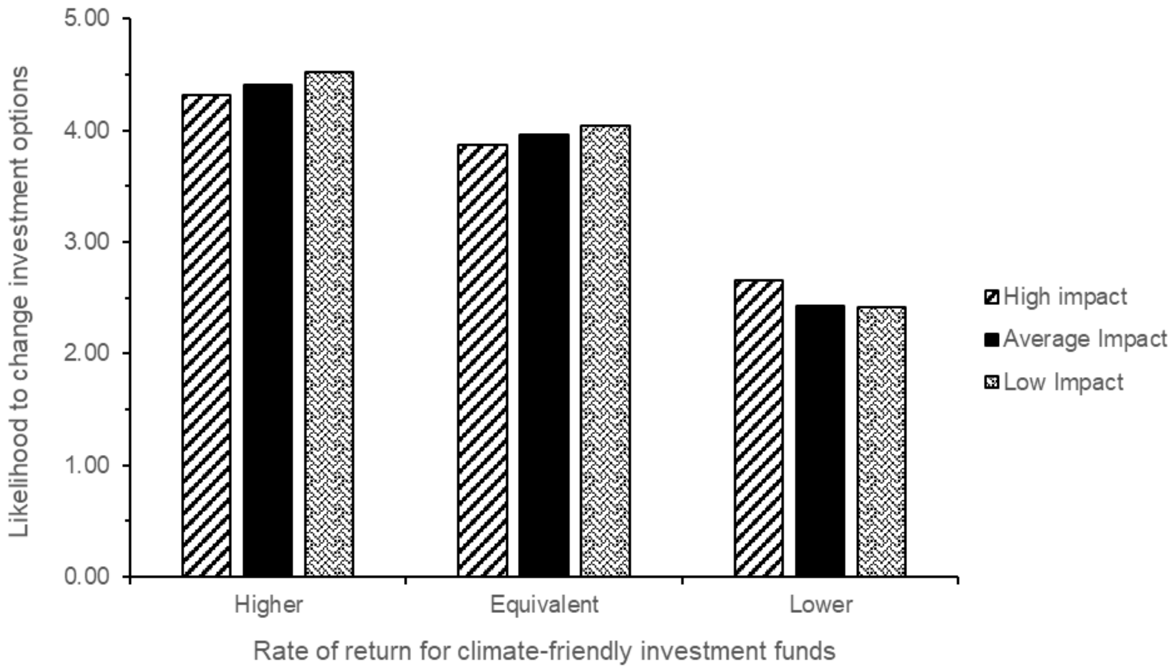
	1	2	3	4	5
1. Climate-friendly fund with an equal rate of return	1				
2. Climate-friendly fund with a higher rate of return	.58**	1			
3. Climate-friendly fund with a lower rate of return	.33**	.08	1		
4. Environmental Attitudes	.33**	.11	.36**	1	
5. CO_2 emissions	.00	-.04	-.09	-.12	1

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

The three investment fund questions were compared across three conditions using one-way ANCOVAs with environmental attitudes and CO2 emissions as covariates. There was no significant difference in the decision to change your investment fund to a climate-friendly one if you were to get an equal rate of return in the three conditions, $F(2,151) = 0.14$, $p = .87$. There was no significant difference in the decision to change your investment fund to a climate-friendly one if you were to get a higher rate of return in the three conditions, F (2,151) = 0.14, p = .67. There was no significant difference in the decision to change your investment fund to a climate-friendly one if you were to get a lower rate of return in the three conditions, F(2,253) = 0.14, p = .25. Hence, H2 is rejected.

Figure 5

Bar graph depicting the likelihood of a participant changing their investment fund to a climate-friendly fund given that the rate of return would be equivalent, higher or lower than their original fund



As depicted in Figure 5, participants were more likely to change investment funds if they anticipated a higher rate of return, independent of their impact condition. Conversely, participants were less inclined to switch to a climate-friendly fund when expecting a lower rate of return, regardless of their condition. Even with an equal rate of return, all participants still had a relatively high likelihood of changing their investment fund, with this effect being more significant in both low and average-impact conditions. Specifically, participants in the high-impact condition showed a greater willingness to switch to a climate-friendly investment fund only when expecting an equivalent or higher rate of return. However, if participants in the high-impact condition anticipated a lower rate of return, they were less likely to change investment funds. The third of the choice tasks was related to an individual's willingness to donate their eligible winnings to a climate-friendly charity. Pearson product correlation of the desire to donate to a climate-friendly charity and environmental attitudes was found to have a low positive correlation and was statistically significant. Hence, H1 is supported. This shows that increased environmental attitudes would increase the willingness to donate eligible winnings to a climate-friendly charity.

Table 3

Correlation Table showing Pearson Correlation Values for Individual Monetary Donations Towards a Pro-Environmental Charity Against Environmental Attitudes and Carbon Footprint Emissions.

	1	2	3
1. Donate half of your eligible winnings, or keep it all?	1		
2. CO2 emissions	-.14*	1	
3. Environmental Attitudes	.30**	-.12	1

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The decision to donate half of your potential winnings to an environmentally friendly charity or to keep all of your potential winnings was compared across all three conditions using a one-way ANCOVA with the covariates of environmental attitudes and carbon footprint emissions. There was no significant difference in the decision to donate half of your potential winnings to an environmentally friendly charity or to keep all of your potential winnings in the three conditions, $F(2,253) = 1.39$, $p = .25$. Hence, H2 is rejected.

The study investigated the relationship between environmental attitudes, pro-environmental decision-making and awareness of social norms, testing two hypotheses. Hypothesis 1 (H1), which posited that environmental attitudes positively correlate with pro-environmental decisions, received mixed support: while no significant links were found between attitudes and transportation choices (e.g., taking public transport or purchasing electric vehicles (EVs) or CO_2 emissions, attitudes weakly predicted financial decisions (e.g., switching to climate-friendly investment funds with equal (r = .33) or lower (r = .36) returns) and donation behaviour (r = .30). Hypothesis 2 (H2), suggesting that high-impact-condition participants (told their environmental impact was above average) would make more pro-environmental decisions, there was non-significant difference in participants future decisions according to the ANCOVA results (p > .05 for transportation, investment, and donation tasks). However, figures 1–3 revealed trends: high-impact participants showed slower declines in pro-environmental choices (e.g., waiting longer for EVs or paying more for them) than low-impact groups. However, they were paradoxically less likely than average-impact participants to take public transport. Financial incentives strongly influenced decisions, with participants across conditions prioritising higher investment returns over environmental impact. Environmental attitudes did not translate to reduced emissions or consistent behavioural shifts, highlighting an attitude-behaviour gap.

Discussion

Overview Of Key Findings

This study investigated the relationship between environmental attitudes, awareness of social norms and pro-environmental decision-making through choice tasks (i.e. delay-discounting tasks, questions about an individual's investment choices, and a question about whether or not an individual would be willing to donate money to a climate-friendly charity). Results revealed that telling participants their environmental impact was lower, higher, or the same as (than) that of an average person could not predict an individual's future decisions. These findings align with the theoretical frameworks like Pellegrini and Tagliabue (2024) of social norms and peer influence. Pellegrini and Tagliabue (2024) proposed that the influence of social norms can also play a role in decision-making. For example, if an individual's social circle predominantly uses personal vehicles, they may feel pressured to conform, making switching to alternative transportation methods harder. However, financial decisions may be less influenced by peer behaviour, allowing for more flexibility in changing those choices (Pellegrini & Tagliabue, 2024). Pelligrini and Tagliabue's (2024) findings align with the current study's finding that individuals are less likely to change their transportation decisions than they are to change their financial decisions.

Results revealed that while environmental attitudes can predict an individual's future financial decisions (i.e. investment choices and monetary donations), they cannot predict future transportation choices. These findings align with theoretical frameworks like Chater and Vlaev's (2011) comparative decision theory. Chater and Vlaev (2011) proposed that people make choices based on the value they impose on the decision, compare a particular choice with another choice, and decide based on whichever decision the individual scores to be "higher" in value. The findings suggest that pro-environmental interventions may require more financial incentives or contextual support. At the same time, tailored messaging (e.g., personal impact framing) warrants further exploration to bridge the gap between intentions and actions.

According to McKenzie-Mohr (2002), one significant barrier to effective pro-environmental action is the lack of awareness regarding one’s environmental impact. Only by examining the influence of an individual’s environmental impact can we expect meaningful shifts in their decision-making processes toward more sustainable behaviours.

Overall, our study enhances understanding in this field and provides critical insights that can inform the design of targeted interventions to promote and reinforce sustainable behaviours among individuals.

Hypothesis 1: Environmental Attitudes Positively Correlate With Pro-Environmental Decision-Making.

Supported Domains (Investment / Donation Choice Tasks)

Hypothesis 1 is partially supported by the results, which provide evidence for individuals with high environmental attitudes making pro-environmental decisions when the decisions were not based on an arbitrary concept and were easy to make without the need to make any substantial changes to their lifestyles (i.e. change their investment fund to a climate-friendly fund or make a donation to an environmentally friendly charity). Both of these decisions would not affect the individuals' lifestyles significantly, as the individual would likely already have an investment fund of some kind to which they are automatically contributing some money towards a cause where they (most likely) do not know anything. This partial support is backed by low-effort symbolic actions (e.g., donations and green investments) that align with attitudes because they reflect moral identity and require minimal sacrifice or personal cost to the individual (; Li et al., 2019). The results align with Li et al. (2019), who emphasised that when personal identity and low perceived costs align with pro-environmental behaviours, they are more likely to occur. For example, individuals may strengthen their self-concept by being environmentally conscious through symbolic behaviours such as donating to climate-friendly charities and investing their money into an eco-friendly investment fund. This positive self-concept resonates with Gifford and Nilsson (2014), who argue that to maintain a positive self-image while avoiding more effortful changes, an individual often will choose to adopt an "easy" pro-environmental behaviour (e.g. investing in a climate-friendly fund).

The weak correlation between attitudes and CO2 emissions (Table 1) shows that despite strong environmental attitudes, individuals invariably underestimate their ecological footprints (Bleys et al., 2018). This correlation indicates that for participants to align with societal expectations, participants overreport their "green" behaviours. This tendency is also known as self-serving bias (Bergquist, 2020) and is exacerbated by the Dunning-Kruger effect (Geiger et al., 2019).

Unsupported Domains (Transportation Choice Tasks)

On the other hand, hypothesis 1 is only partially supported because there is no significant correlation between environmental attitudes and future transportation-related decisions (e.g., public transport use and EV adoption).

One possible reason the results did not support the hypothesis may be that some of the questions asked to evaluate a participant's environmental attitudes did not necessarily relate to the participant's transportation choices (e.g., "I support the preservation of natural habitats for wildlife"). However, when the results were re-analysed, including only the questions relevant to transportation, investment, and donations, the results did not change.

These results are also supported by the Value-Belief-Norm (VBN) theory, which states that low-effort, symbolic actions (e.g. donations) are driven by attitudes rooted in biospheric and altruistic value orientations, while hedonic and gain goals (e.g., comfort, cost) dominate transportation choices (Steg et al., 2016). The VBN theory also relates to the goal-framing theory (Lindenberg & Steg, 2013), which suggests that hedonic and gain goals often override normative environmental motives in high-effort decisions. The current study showed that an individual chooses to make more pro-environmental decisions.

The low-cost hypothesis can also be used to interpret why this study may have discovered these results (Keuschnigg & Kratz, 2017). The low-cost hypothesis posits that the perceived cost or effort it takes to perform a pro-environmental behaviour mediates the relationship between environmental attitudes and pro-environmental behaviour (Keuschnigg & Kratz, 2017). In other words, individuals weigh the personal costs (financial, time, social, and effort) against the perceived environmental benefits of a particular behaviour before performing it. Low-cost behaviours (e.g., changing investment funds, making donations) require minimal sacrifice in time and effort, so attitudes strongly predict these behaviours.

Meanwhile, high-cost behaviours (e.g., buying an electric vehicle and adapting to public transport) involve significant trade-offs (i.e., lifestyle changes), weakening the attitude-behaviour link. Structural and situational barriers are also often faced for high-cost behaviours. Therefore, even environmentally conscious individuals may prioritise practicality over ideals. An individual may even rationalise inaction through cognitive dissonance strategies when costs are high, thereby either minimising the environmental impact of their actions as they believe their actions will not make a difference in the grand scheme of things; otherwise, an individual can overemphasise external constraints such as their financial situation. For example, an individual may choose to purchase a plastic water bottle as it is cheaper than the eco-friendly reusable water bottle and may rationalise their purchase by telling themselves that “one plastic bottle is not going to save the world”; otherwise the individual may say that the reusable water bottle is a lot more expensive than the cheaper plastic option and thus overemphasise that they are “poor” and therefore cannot afford the reusable water bottle as a way to make themselves feel better.

The work of Diekmann and Preisendorfer (2003) found that while environmental attitudes weakly predict high-cost behaviour (e.g. reducing car use), they do strongly predict low-cost behaviours (e.g. donations) (as cited in Huang et al., 2020). Steg and Vlek’s (2009) framework posits that individuals must overcome hedonic (comfort) and gain (financial) goal frames for them to perform any high-cost behaviour (e.g. purchasing EVs, using public transport). Lindenberg and Steg’s (2013) observation that self-interest often trumps normative goals in contexts that require a sacrifice is reflected in the findings in this study that participants will prioritise immediate convenience (e.g. driving their car) over long-term environmental benefits.

Verplanken and Roy (2016) define habits as “learned dispositions to repeat past responses.” Verplanken and Roy (2016) also state that habits are highly automated behaviours or behaviour patterns. That is to say, habits are behaviours that occur automatically without our knowledge of them even occurring. Therefore, habits are hard to break. Likewise, transportation habits (e.g. car reliance) are deeply ingrained and require context disruption (e.g. moving homes) to change. The study’s abstract feedback (telling a participant, “You are causing more harm to the environment than the average person”) may have lacked the contextual catalyst needed to disrupt these habits, unlike the physical relocation in Verplanken and Roy’s work.

Hypothesis 2: Participants In The High Impact Condition Will Make More Pro-Environmental Decisions Than People In The Low And Average Impact Conditions.

Hypothesis 2 is rejected statistically because there were no significant differences between conditions. The lack of statistically significant results supporting hypothesis 2 includes but is not limited to, weak manipulation of social norms, low perceived efficiency, and sample limitations. The study’s manipulation (i.e., informing participants of their environmental impact compared to the average person) failed to alter decisions significantly. Thøgersen (2004) discovered that cognitive dissonance is one of the main drivers for behaviour change. The present study’s results were inconsistent with the cognitive dissonance theory. The present study's absence of such effects suggests that the psychological mechanisms needed for change fail to activate through abstract normative feedback. The concept of environmental efficacy (Miller & Rice, 2024\) may be one possible cause for this difference in results. Environmental efficacy occurs when participants who feel powerless to reduce their environmental impact to avoid cognitive dissonance are likely to dismiss feedback. For example, participants who feel incapable of reducing their carbon footprint are more likely to rationalise their inaction through self-serving bias. Environmental efficacy highlights the limitations of abstract, global norm messaging by contradicting the assertion that awareness of non-conformity to social norms inherently drives behavioural alignment (Zhang et al., 2024).

Habit discontinuity hypothesis and normative goal framing

On the other hand, while statistically insignificant, graphical trends indicate that participants in the high-impact condition were marginally more willing to wait longer or pay more for electric vehicles than low-impact groups. These graphical trends parallel Verplanken and Roy's (2016) habit discontinuity hypothesis, which states that a disruptive contextual shift (e.g. relocating homes) is necessary to create behavioural change. For instance, Verplanken et al. (2008) found a 29% increase in sustainable travel choices when relocation occurred compared to the negligible effects of informational campaigns. These marginal trends also reflect the weak priming of normative goal frames (Lindenberg & Steg, 2013), which states that awareness of social norms may weakly prime pro-environmental attitudes and, thus, environmentally friendly behaviours. Trends suggest normative feedback may weakly influence decisions, but more substantial interventions (e.g. dynamic norms, such as peer comparisons) are needed. According to Helferich et al. (2023), descriptive norms, which include dynamic norms such as peer comparisons, may be more impactful in influencing environmental decision-making, as they reflect actual behaviours of peers rather than prescribed behaviours. Thus, dynamic norms can be a more substantial intervention as they can feel more realistic and attainable, creating a greater engagement in pro-environmental behaviour (Helferich et al., 2023).

In this theory, the normative feedback not being meaningful enough for an intervention may have been due to the input being too vague and abstract to create the salient injunctive norm that others expect the individual to act sustainably (Cialdini et al., 1990). This may be due to the study's focus on the use of descriptive norms (i.e. comparisons to other's behaviour, e.g. telling participants that "you are causing more harm to the environment than the average person") and its failure to activate injunctive norms (i.e. Moral expectations, e.g., telling the participant that "most people in your community disapprove of high carbon footprints") which would have a more substantial normative pressure (Cialdini et al., 1990).

Contextual and Cultural Mediators

However, due to the study having an informative but not contextual feedback mechanism, it did not manage to disrupt the deeply entrenched habits that individuals can form, such as car dependency. The fact that these graphical trends occur but are not substantial enough to be statistically significant could be related to the point made by Xing et al. (2022) and Yang et al. (2024) that normative feedback may work better in collectivistic cultures. This may be due to how individualistic societies prioritise an individual's gain goals over conforming with the society at large (Steg et al., 2016). According to Xing et al. (2022) and Yang et al. (2024), giving people information about how they are performing in comparison to someone else (i.e. telling the participants that "Your carbon footprint is lower than the average person. This means that your impact on the environment is better than the average person" or "Your carbon footprint is higher than the average person. This means that your impact on the environment is worse than the average person" or "Your carbon footprint is about the same as the average person. This means that your impact on the environment is the same as the average person") may not be practical in an individualistic culture like New Zealand, for example. This aligns with Zhang et al. (2024), who found that while descriptive norms had no effect, injunctive norms (e.g. peer disapproval) increased low-carbon choices by 18%. Similarly, participants from a higher socio-economic status group may attempt not to engage in any sustainable action which cannot earn them a higher status (e.g. taking public transport) but may engage in specific noticeable, sustainable actions (e.g., driving an EV as a status symbol). In contrast, participants in lower socio-economic brackets prioritise survival needs over environmental norms. They thus may choose to purchase a diesel or petrol vehicle over the EV as it is the cheaper, more affordable option. This lack of engagement from higher socio-economic status groups suggests that other confounding variables may have contributed to the trends discovered in the graphs.

Contextual Factors as Decision Catalysts

According to Essl et al. (2023), the ABC theory defines context as elements that enable or constrain behaviours; these elements can be objective (e.g., economic constraints, infrastructure) and subjective (e.g., perceived time, wealth, or power). In a study by Essl et al. (2023), high-cost decisions like EV adoption or public transport use were heavily mediated by financial accessibility and infrastructural gaps. As participants faced trade-offs between environmental ideals and economic realities, they faced the mediation of financial accessibility (Essl et al., 2023). These trade-offs were previously demonstrated in the findings of Essl et al. (2023), who discovered that when individuals perceive financial strain, their willingness to pay a premium for an EV drops sharply regardless of their environmental attitudes. This finding aligns with the low-cost hypothesis (Huang et al., 2020), where attitudes predict behaviour only when personal sacrifices are minimal. This finding was again repeated in this study, as seen in Figure 3. When participants were told they would have to pay more for an EV (i.e. the pro-environmental behaviour), their willingness dropped.

The current study's findings also align with the delay-discounting (DD) theory, which explains how people value rewards available at different times (Schwenke et al., 2022). In other words, delay discounting refers to the decrease in the value of an outcome as the delay in receiving that outcome increases (Berry et al., 2017). According to Schwenke et al. (2022), The DD theory suggests that individuals prefer smaller rewards that are available sooner over larger rewards that are available later. This tendency to devalue larger future rewards is known as "discounting behaviour" (Schwenke et al., 2022). According to Hirsh et al. (2015), the immediate gratification of driving may outweigh the perceived future long-term benefits of the more eco-friendly choices (i.e. taking public transport or adopting the EV in the case of the current study). The results of the current study align with that of Hirsh et al. (2015) and suggest that individuals are less likely to choose the environmentally friendly option (e.g. taking public transport or adopting an EV), which is the more "self-controlled" choice (meaning the choice that will bring a longer-term gain) over the environmentally-unfriendly option(i.e. using public transport or adopting an EV) as the delay for that choice or the effort required (e.g., the amount of money paid) increases.

Even motivated individuals who do not possess a supportive system (i.e. correct infrastructure) struggle to adopt sustainable practices. Individuals' ability to access alternatives (e.g. reliant public transport, EV charging stations) determines their willingness to make pro-environmental decisions (Linert & Linkov, 2019).

Theoretical Implications

The two hypotheses have several different theoretical implications. The following three subsections outline three of these implications.

Reconciling Competing Frameworks

VBN Theory vs Goal-Framing Theory. The study's findings offer opportunities for theoretical integration between the Value-Belief-Norm (VBN) theory (Stern et al., 1999\) and the goal-framing theory (Lindenberg & Steg, 2013\) by exposing tensions between the two theories. The dominance of hedonic (comfort) and gain (financial) goals in high-cost decision-making (e.g. EV adoption or public transport use) challenges the assumption made by the VBN theory, which posits that altruistic and biospheric values drive pro-environmental decision-making. Steg et al. (2016) asserted that self-interest often overrides normative motives in resource-intensive contexts. Steg et al. (2016) claim that participants are reluctant to prioritise EVs despite having strong environmental attitudes, which aligns with this study's findings.

The low-cost hypothesis further clarifies the divergence between one's attitudes and decisions in this study (Huang et al., 2020). The VBN theory's emphasis on values aligns with low-cost behaviours (e.g., donations, green investments) as they require minimal sacrifice and reinforce moral identity. However, the activation of competing goal frames occurs due to the involvement of significant trade-offs when performing high-cost behaviours (such as EV adoption). Therefore, a hybrid model of the VBN theory and the goal-framing theory is suggested, where while contextual barriers dictate behavioural outcomes, values frame goals. For example, without structural support (e.g., subsidies and infrastructure), gain goals dominate an individual's biospheric values, which may prime the individual to desire sustainability. This synthesis offers a more nuanced lens to explain why individuals care about sustainability but struggle to act on it by resolving the tension between idealism (VBN) and pragmatism (goal-framing).

Challenging Rational Choice Models

The core assumptions of the rational choice theory (Chater & Vlaev, 2011) posit that individuals systematically weigh environmental benefits against personal costs; the current study's findings undermine this assumption. The limitation of “rational” decision-making in real-world contexts is revealed through participants' inability to translate attitudes into high-cost actions (i.e. transport tasks), even when they are aware of their environmental impact. Instead, deliberative cost-benefit analyses are often bypassed regarding behaviours frequently dictated by habitual inertia (Verplanken & Roy, 2016\) and cognitive bias (e.g., self-serving bias, Bergquist, 2020).

For instance, routine habits resist conscious intent, as illustrated by the persistence of car dependency even among participants with strong environmental attitudes. This illustration aligns with the habit discontinuity hypothesis (Verplanken et al., 2008). However, rational choice models fail to account for the irrational persistence of unsustainable behaviours due to their assumptions that individuals act as utility-maximising agents. The study’s results render rational calculations irrelevant and validate the ABC theory (Ertz et al., 2016).

Limitations

Methodological Constraints

Condition effects were obscured due to the cultural and socioeconomic heterogeneity introduced by the global and diverse sample size. This variability reflects the broader challenges with generalising norm-based interventions across demographics.

Weak injunctive norm activation also caused the manipulation of social norms to suffer (Cialdini et al., 1990). Unlike peer disapproval or community-specific messaging (Zhang et al., 2024), generic feedback (e.g., “You are causing more harm than the average person”) lacked the moral framing necessary to evoke guilt or responsibility.

The double-blinding procedure limited the researcher’s real-time ability to address participant confusion. However, it did reduce experimenter bias.

Manipulation Check Absence

It is hard to verify whether participants internalised the feedback about their environmental impact as the study did not include a formal manipulation check. For example, it is unclear whether "high-impact" participants saw their behaviour as having a detrimental consequence or disregarded feedback as irrelevant. As the efficacy of the intervention hinges on the participant’s psychological engagement with the normative message, this gap weakens causal inferences.

Ambiguity of the “Average Person” Reference

Participants likely interpreted the term inconsistently due to the use of the descriptive norm of comparing a participant’s environmental impact to that of an average person, which was ambiguous as there was no definition for the “average person’s environmental impact.” Due to the study’s population coming from a global sample, some participants may have assumed a local or demographic-specific benchmark while others had an international average. For example, a high-SES participant (Zhong et al., 2024) might consider the “average person” to have a lower carbon footprint, while a participant from a low-SES band might perceive the opposite; a participant in India (i.e. a collectivistic society) might compare themselves to their immediate neighbours while another in New Zealand (i.e. an individualistic society) may imagine a global citizen when conceiving the average person.

As the reference group’s identity shapes how participants perceive their impact Thøgersen (2024), this variability dilutes the normative feedback’s salience. The intervention’s psychological mechanism of cognitive dissonance fails to activate effectively without a clear benchmark present.

Clear and actionable feedback is needed for environmental efficacy, i.e. the belief that one’s actions can reduce ecological harm (Miller & Rice, 2024). Participants lacked a concrete benchmark to gauge their progress and adjust their behaviours accordingly due to the failure to define “average person.” In other words, participants cannot discern how much they need to change to align with the norm when they are told they have a “higher-than-average impact.” Therefore, the feedback fails to empower participants with a pathway to improvement without a concrete baseline, thus rendering the feedback inert.

Cialdini et al. (1990) noted that successful interventions employ both descriptive and injunctive norms concurrently, which differs from the study’s normative feedback mechanism (“your impact is higher/lower than average”). For instance, to compel alignment with communal expectations, adding injunctive elements like “90% of your peers disapprove of high carbon footprints” could amplify cognitive dissonance.

Theoretical Gaps

As highlighted in this study, habit theory must be reconciled with normative frameworks. Norm-activation theory (Turaga et al., 2010) focuses on moral responsibility, while Verplanken and Roy (2016) emphasise context disruption for habit change. Hybrid models where normative priming and contextual catalysts (e.g., policy shifts) could jointly disrupt unsustainable routines, these hybrid models could be yielded from the integration of these perspectives. Thereby, hybrid models of habit theory (Verplanken & Roy) and norm-activation theory (Turaga et al.) may propose a disruption in context along with a focus on moral responsibility to enact a change in an individual's pro-environmental decision-making.

Policy and Intervention Design

The insignificant results of Hypothesis 2 highlight the inadequacy of norm-based interventions in isolation. Effective policies must pair normative messaging with structural solutions, integrating Community-Based Social Marketing (CBSM) principles (McKenzie-Mohr, 2000). For example, through the fostering of collective responsibility (subjective context) and legislative alternatives (objective context), the anti-plastic law in Rwanda (Ogutu et al., 2023\) was a success. Similarly, subsidies to reduce financial barriers (gain goals) and infrastructure to enhance accessibility (hedonic goals) are required for pro-environmental behaviours, like EV adoption and public transport use, to be performed (Botte et al., 2020; Liu et al., 2024).

A roadmap for translating the constructive collaboration between ability (structural) and motivation (normative) into practice is provided by CBSM's four-step framework (1. Identifying barriers, 2\. Designing strategies, 3\. Piloting interventions and 4\. Evaluating outcomes). For instance, identifying internal barriers (e.g. perceived inconvenience, car dependency) and external barriers (e.g. lack of EV charging stations, expensive public transport, public transport cancelling at the last minute) is required when addressing transportation habits. Structural solutions like tax rebates for EVs or expanded bus routes (McKenzie-Mohr, 2000\) should be combined with normative messaging (e.g., "80% of your neighbours support EV adoption) for interventions. The means and motivation for sustainable behaviours were created and exemplified in Rwanda’s anti-plastic law through the use of pairing legislative bans (objective context) with community education campaigns (subjective context) (Ogutu et al., 2023).

The ABC theory emphasises the need to further align attitudinal and contextual factors for intervention to refine the CBSM policy and intervention design strategy. Attitudinal factors are exemplified by campaigns that activate biospheric values by linking EVs to moral identity (e.g., “Be a climate leader”). Contextual factors are demonstrated by charging infrastructure to reduce inconvenience (thus increasing hedonic goals) and subsidies to lower the costs of EVs (thus increasing gain goals).

Baum and Gross's (2016) discovery of an increase of 50% in compliance is found through the combination of behavioural nudges (e.g., normative feedback) and structural reforms (e.g. subsidies), is mirrored by this dual focus of attitudinal and contextual factors when designing for policy and interventions. Similarly, Thøgersen’s (2004) work on spillover effects suggests that broader pro-environmental decisions and behaviours can be inspired through policies that constrain harmful environmental behaviour in one domain (e.g., plastic bans) and are paired with visible alternatives.

Critically, cultural and socioeconomic diversity must also be accounted for when designing interventions. Norms that emphasise communal well-being (e.g., “Protect our community’s environment”) may enhance conformity (Xing et al., 2022\) in collectivistic cultures. However, incentives that align sustainability with personal gain (e.g. EV tax breaks) may work better in individualistic societies. As per Zhong et al. (2024), to overcome survival-focused decision-making for low-SES groups, policies must prioritise affordability (e.g. subsidised public transport).

In summary, the study’s null results for hypothesis 2 underscore a broader truth: systemic inertia cannot be overcome through norms alone. Policies that restructure individuals' decision-making processes to make sustainability the default, affordable, and socially rewarded option are required for lasting change.

Future Directions: A Roadmap for Research

The present study's findings highlight critical gaps in understanding the efficacy of normative feedback and the attitude-behaviour gap in environmental decision-making. Building on these insights, the following avenues to advance theory, methodology, and practical interventions in ecological psychology are proposed for future research.

Strengthening Normative Interventions

There is a lack of salience that comes from the use of generic comparisons (e.g. “your impact is higher than average”) that the present study suggests is a consequence of the weak effect of normative feedback. Dynamic norm messaging, which emphasises trending behaviours rather than static averages, should be tested in future research. For example, “90% of people in your community reduced their carbon footprint last year” could be highlighted in future interventions. To address the manipulation weakness in the present study, such dynamic norm framing could be used to enhance the population’s perceived achievability and social pressure. The emphasis on incremental progress could be achieved through dynamic norm messaging (e.g., “Your neighbourhood reduced waste by 40 % last month) through enhanced feedback salience. To sustain engagement, this dynamic norm messaging may be coupled with gamified platforms that encourage friendly competition by rewarding participants for surpassing community benchmarks. Future iterations might highlight progressive trends (e.g., “Local EV adoption has doubled this year”) to foster optimism and perceived behavioural control.

Localised norm campaigns should replace global averages with community-specific benchmarks (e.g., neighbourhood carbon footprints). This approach prioritises contextually relevant barriers and solutions, thus aligning with McKenzie-Mohr’s (2000) community-based social marketing.

Integrating Habit Disruption with Norm Activation

Despite strong environmental attitudes, the need to merge habit theory with norm-activation frameworks is underscored by the persistence of high-cost behaviours (e.g., car dependency). Future studies could investigate whether norm-based interventions delivered during life changes (e.g. relocation, marriage, parenthood) amplify sustainable choices, thus building on Verplanken and Roy's (2016) habit discontinuity hypothesis. For instance, pairing infrastructure support (e.g., free bus passes) with feedback like "Your new neighbours prioritise public transport" could be used to test the collaborative potential of habit disruption and normative pressure. Critical windows for habit disruption are offered during life transitions (e.g., parenthood, retirement). Thus, to capitalise on heightened openness to change while aligning with identity shifts (e.g., "eco-conscious parent"), tailored interventions could be offered during these periods, such as subsidised EV test drives for new parents.

Cross-cultural and Socioeconomic Replications

In normative decision-making, the role of cultural context remains underexplored. The observation of Xing et al. (2022) in low-carbon energy consumption that social norms exert more substantial pressure in group-oriented contexts could be clarified by replicating this study in collectivist cultures (e.g. China, Japan). Similarly, to address disparities in green consumption (Zhong et al., 2024), stratifying analyses by socioeconomic status (SES) could be used. For example, future research could test subsidised EVs in low-income neighbourhoods to reveal whether financial barriers would advance equity-focused interventions and override normative motives.

Leveraging Technology for Personalised Interventions

Emerging technologies offer novel ways to bridge the attitude-behaviour gap. Griskevicius et al.'s (2010) work on conspicuous conservation suggests that AI-driven nudges can tailor feedback to individual value orientations (e.g. biospheric vs. egoistic). For instance, an AI-driven app might tailor feedback to users' value orientations: recommend cost-saving tips to egoistic users, community benefits for altruistic ones, and suggest solar panels to biospheric ones. Similarly, to extend beyond abstract carbon metrics, virtual reality (VR) simulations could immerse participants in climate-impact scenarios (e.g., deforestation, rising sea levels) to activate moral norms (Thøgersen, 2004). However, ethical safeguards are essential to prevent distress. Future studies could explore hybrid messaging strategies—such as pairing environmental benefits with cost-saving metrics—to amplify engagement across diverse value profiles by taking advantage of emerging technologies.

Mobile apps that reframe public transit as a time-saving option (e.g., "Use your commute to read/work") could mitigate the effect of perceived busyness by aligning sustainable choices with participants' immediate priorities.

Policy-Relevant Field Experiments

Collaborations with policymakers are essential to translate the present study's findings into real-world impact. One promising avenue that future research can use the findings of this study to make a real-world impact is through the exploitation of the status quo bias in financial decision-making, which states that individuals have a preference regarding the current state of affairs remaining the same (Essl et al., 2023) by partnering with pension funds to trial opt-out sustainable investment plans. Such interventions could redirect capital toward climate-positive assets while preserving individual choice by terming environmentally responsible portfolios as the default. Concurrently, experimental evaluations of electric vehicle (EV) subsidy framing could yield critical insights into motivational drivers. For instance, the normative focus of Community-Based Social Marketing (McKenzie-Mohr, 2000), with behavioural economic principles, is seen through reframing subsidies as an invitation to "in a green community" rather than a mere financial incentive. Policy-makers could leverage the insights into how culture plays a part in the practice of pro-environmental culture into urban planning, for example, renaming streets after local ecosystems or embedding ecological art in public spaces, to reinforce sustainability as a collective identity.

Addressing Structural and Ethical Barriers

Future research must rigorously investigate systemic inequalities perpetuating disparities in pro-environmental decision adoption. Investigations into “green elitism”, wherein sustainability policies inadvertently exclude marginalised groups through expensive costs and inaccessible design, for instance, premium pricing for organic products, could be performed to inform equitable interventions. For example, to mitigate socioeconomic barriers to pro-environmental participation, the introduction of community gardens or subsidised public transport vouchers, as proposed by Zhong et al. (2024), could be used. Concurrently, modern environmental interventions (e.g. urban gardens in low-income areas) could be integrated into partnerships with Indigenous communities that practice traditional ecological knowledge, such as sustainable fishing practices, thereby democratising access while fostering local ownership. Through fostering culturally resonant strategies that align local wisdom with global sustainability objectives, as Yang et al. (2024) highlighted, such collaborations challenge Western individualistic paradigms, which must be addressed during future research.

Conclusion: Synthesising the Paradox

This study highlights an inconsistency that challenges the prevalent belief in a straightforward linear relationship between environmental attitudes and behaviours. It exposes the persistent discrepancy between individuals who fail to translate their expressed strong pro-environmental attitudes and beliefs into consistent behavioural outcomes. Many individuals inadvertently undermine their internal and external factors. These internal factors can include values and beliefs, while external factors can include their physical and social environment.

As Yap and Leow (2024) illustrate, while an individual's intention to act in an environmentally friendly manner is a necessary starting point, it is ultimately insufficient for driving actual change unless it is accompanied by collective efforts to reform the broader environments in which these individuals live in. For instance, initiatives such as expanding transit networks, subsidising the cost of electric vehicles, and incentivising renewable energy adoption are essential for fostering an environment where sustainable choices become the norm rather than the exception.

Consequently, there is an urgent need for a paradigm shift: we must focus on engineering systemic changes that render sustainable choices more accessible and inevitable rather than placing blame on individuals for failing to act. This is a call to action in light of the climate crisis. To achieve affordable green technologies, ensure equitable access to public transport, and develop normative frameworks that reward environmentally beneficial practices, a coalition of policymakers, urban planners, and institutions must collectively work to dismantle existing barriers and redesign choice architectures. This approach fosters individual agency and cultivates a systemic environment which promotes sustainability.

Additional research is needed to bridge the current gap between attitudes and decisions and identify more comprehensive measures that predict pro-environmental behaviours that can be further used to promote more pro-environmental behaviours.

The present study adds to the growing body of evidence suggesting that the presence of pro-environmental social norms is positively correlated to individuals' behaviours in the realm of financial decisions; however, the presence of social norms is unable to predict one's choices in the area of transportation decisions for the current study. These results align with the ABC theory, emphasising that contextual enablers are necessary for attitudinal motives. The present study advocates for hybrid frameworks that integrate value-driven norms with systemic reforms, thereby challenging the usefulness of rational choice models. To bridge the gap between concern and action, while policymakers tailor interventions to address cultural and socioeconomic disparities, they must prioritise structural overhauls—such as affordable green technologies and equitable public transit. Future research should explore dynamic norm messaging, habit disruption during life transitions, and personalised nudges to foster sustainable behaviours. Ultimately, this work underscores that individual agency, while vital, must be harmonised with systemic redesign to make sustainability an inevitable outcome of daily life.

References

Andrade, E. R., Alves, I. S., Stenders, R. M., & Reis, A. L. (2023). Human and environmental bias affecting risk perception in military radiological and nuclear operations. *Defence Science Journal*, *73*(1), 20-28. https://doi.org/10.14429/dsj.73.18212

Antweiler, C. (2019). On the human addiction to norms: Social norms and cultural universals of normativity. In N. Roughley & K. Bayertz (Eds.), *The normative animal?: On the anthropological significance of social, moral, and linguistic norms* (pp. 83-100). Oxford University Press, USA. https://doi.org/10.1093/oso/9780190846466.003.0004

Bansah, P., Gaffar, V., Disman, D., & Yeliawati, A. K. (2024). Unraveling green consumer behaviour: A systematic literature review. *TIJAB (The International Journal of Applied Business)*, *8*(2), 164-182. https://doi.org/10.20473/tijab.v8.i2.2024.49605

Baum, C. M., & Gross, C. (2016). Sustainability policy as if people mattered: Developing a framework for environmentally significant behavioral change. *Journal of Bioeconomics*, *19*(1), 53–95. https://doi.org/10.1007/s10818-016-9238-3

Beil, A. (2017). Environmental Behaviour: Changing Habits in a Social Context. In B. Hansson (Ed.), *Individual and structural determinants of environmental practice* (pp. 11–25). Routledge. https://doi.org/10.4324/9781315252377-2

Bergquist, M. (2019). Most people think they are more pro-environmental than others: A demonstration of the better-than-average effect in perceived pro-environmental behavioral engagement. *Basic and Applied Social Psychology*, *42*(1), 50-61. https://doi.org/10.1080/01973533.2019.1689364

Bergquist, M., Nilsson, A., & Schultz, W. P. (2019). A meta-analysis of field-experiments using social norms to promote pro-environmental behaviors. *Global Environmental Change*, *59*, 101941. https://doi.org/10.1016/j.gloenvcha.2019.101941

Berry, M., Nickerson, N., & Odum, A. (2017). Delay discounting as an index of sustainable behavior: Devaluation of future air quality and implications for public health. *International Journal of Environmental Research and Public Health*, *14*(9), 997. https://doi.org/10.3390/ijerph14090997

Bleys, B., Defloor, B., Van Ootegem, L., & Verhofstadt, E. (2017). The environmental impact of individual behavior: Self-assessment versus the ecological footprint. *Environment and Behavior*, *50*(2), 187-212. https://doi.org/10.1177/0013916517693046

Botte, M., Tufano, I., & D'Acierno, L. (2020). Infrastructure Access Policies to Promote Sustainable Driving Behaviours in Railway Contexts. In L. Barolli, F. Amato, F. Moscato, T. Enokido, & M. Takizawa (Eds.), *Web, artificial intelligence and network applications: Proceedings of the workshops of the 34th International Conference on advanced information networking and applications (WAINA-2020)* (pp. 1352-1361). Springer Nature. https://doi.org/10.1007/978-3-030-44038-1_123

Bravo, G., & Farjam, M. (2022). Actions speak louder than words: Attitudes, behaviour, and partisan identity in a polarised environmental domain. *Energy Research & Social Science*, *90*, 102547. https://doi.org/10.1016/j.erss.2022.102547

Canter, D. V., & Craik, K. H. (1981). Environmental psychology. *Journal of Environmental Psychology*, *1*(1), 1–11. https://doi.org/10.1016/S0272-4944(81)80013-8

Chater, N., & Vlaev, I. (2011). The instability of value. *Decision Making, Affect, and Learning*, 81-100. https://doi.org/10.1093/acprof:oso/9780199600434.003.0004

Cho, S., & Kang, H. (2016). Putting behavior into context. *Environment and Behavior*, *49*(3), 283-313. https://doi.org/10.1177/0013916516631801

Cho, Y., Thyroff, A., Rapert, M. I., Park, S., & Lee, H. J. (2013). To be or not to be green: Exploring individualism and collectivism as antecedents of environmental behavior. *Journal of Business Research*, *66*(8), 1052–1059. https://doi.org/10.1016/j.jbusres.2012.08.020

Chu, E., & Karr, J. (2017). Environmental impact: Concept, consequences, measurement ☆. *Reference Module in Life Sciences*. https://doi.org/10.1016/b978-0-12-809633-8.02380-3

Cryer, P., Kopnina, H., Piccolo, J. J., Taylor, B., & Washington, H. (2017, July 4). Why ecocentrism is the key pathway to sustainability. *Millennium Alliance for Humanity and Biosphere*. https://mahb.stanford.edu/blog/statement-ecocentrism/

Davis, A. C., Arnocky, S., & Stroink, M. L. (2023). Biospheric values predict ecological cooperation in a commons dilemma scenario. *Ecopsychology*, *15*(2), 172–183. https://doi.org/10.1089/eco.2021.0067

De Freitas Netto, S. V., Sobral, M. F., Ribeiro, A. R., & Soares, G. R. (2020). Concepts and forms of greenwashing: A systematic review. *Environmental Sciences Europe*, *32*(1). https://doi.org/10.1186/s12302-020-0300-3

Dermont, C. (2018). Environmental decision-making: The influence of policy information. *Environmental Politics*, *28*(3), 544–567. https://doi.org/10.1080/09644016.2018.1480258

Diekmann, A., & Preisendörfer, P. (2003). Green and Greenback. *Rationality and Society*. https://doi.org/10.1177104346310315400

do Canto, N. R., Grunert, K. G., & Dutra de Barcellos, M. (2022). Goal-framing theory in environmental behaviours: Review, future research agenda and possible applications in behavioural change. *Journal of Social Marketing*, *13*(1), 20-40. https://doi.org/10.1108/jsocm-03-2021-0058

Duda, E. (2022). Building the learning environment for sustainable development: A co-creation approach. *ArXiv*. https://doi.org/10.48550/arXiv.2208.14151

Ertz, M., Karakas, F., & Sarigöllü, E. (2016). Exploring pro-environmental behaviors of consumers: An analysis of contextual factors, attitude, and behaviors. Journal of Business Research, 69(10), 3971-3980. https://doi.org/10.1016/j.jbusres.2016.06.010

Essl, A., Hauser, D., Suter, M., & Von Bieberstein, F. (2023). The tree task: An Incentivized, one-shot decision task to measure pro-environmental behavior. *Social Science Research Network*, 1-26. https://doi.org/10.2139/ssrn.4513825

Etemesi, I. N., & Sirmah, P. (2017). The potential of environmental psychology to alleviate climate change - A review. *Asian Journal of Multidisciplinary Studies*, *5*(8), 159-164. http://ir-library.kabianga.ac.ke/handle/123456789/613

Falletta-Cowden, N., Hayes, S. C., Forman, M., Levin, M. E., & Petersen, J. M. (2023). Creating progress in contextual behavioral science: Overcoming the hurdles of the past—Facing the challenges of the future. In M. P. Twohig (Ed.), *The Oxford handbook of acceptance and commitment therapy* (pp. 733–754). Oxford University Press. https://doi.org/10.1093/oxfordhb/9780197550076.013.34

Festinger, L. (1962). Cognitive dissonance. *Scientific American*, *207*(4), 93-106. https://www.jstor.org/stable/24936719

Folwarczny, M., Gasiorowska, A., Sigurdsson, V., & Otterbring, T. (2024). Conspicuous consumption and conscientious conservation: Testing for a status-prosociality link through need for uniqueness and variety seeking. *Cleaner and Responsible Consumption*, *14*, 100-219. https://doi.org/10.1016/j.clrc.2024.100219

Fuchs, K. (2023). Consciousness toward environmental sustainability, tourism education and the Dunning-Kruger effect. *Tourism, An International Interdisciplinary Journal*, *71*(1), 211–216. https://doi.org/10.37741/t.71.1.13

Ganti, A. (2011, February 14). *Rational choice theory: What it is in economics, with examples*. Investopedia. https://www.investopedia.com/terms/r/rational-choice-theory.asp

Gavrilets, S., & Richerson, P. J. (2017). Collective action and the evolution of social norm internalization. *Proceedings of the National Academy of Sciences*, *114*(23), 6068-6073. https://doi.org/10.1073/pnas.1703857114

Geiger, S. M., Geiger, M., & Wilhelm, O. (2019). Environment-specific vs. general knowledge and their role in pro-environmental behavior. *Frontiers in Psychology*, *10*. https://doi.org/10.3389/fpsyg.2019.00718

Gifford, R. (2012). Environmental Psychology Matters. *Annual Review of Psychology*, *65*, 541-579. https://doi.org/10.1146/annurev-psych-010213-115048

Gifford, R. D., & Chen, A. K. (2016). Why aren't we taking action? Psychological barriers to climate-positive food choices. *Climatic Change*, *140*(2), 165-178. https://doi.org/10.1007/s10584-016-1830-ys

Gifford, R., & Nilsson, A. (2014). Personal and social factors that influence pro-environmental concern and behaviour: A review. *International Journal of Psychology*, n/a-n/a. https://doi.org/10.1002/ijop.12034

Gifford, R., & Sussman, R. (2012). Environmental Attitudes. In S. D. Clayton (Ed.), *The Oxford Handbook of Environmental and Conservation Psychology* (pp. 65–80). Oxford Academic. https://doi.org/10.1093/oxfordhb/9780199733026.013.0004

Godinho Filho, M., Gonella, J. D., Latan, H., & Ganga, G. M. (2024). Awareness as a catalyst for sustainable behaviors: A theoretical exploration of planned behavior and value-belief-norms in the circular economy. *Journal of Environmental Management*, *368*, 122181. https://doi.org/10.1016/j.jenvman.2024.122181

Griskevicius, V., Tybur, J., & Van den Bergh, B. (2010). Going green to be seen: Status, reputation, and conspicuous conservation. *Journal of Personality and Social Psychology*, *98*(3), 392-404. https://doi.org/10.1037/a0017346

Gumpp, T., & Johnson, Z. (2021). Laws and social norms: Forces for behaviour change. *LSE Psychological & Behavioural Science*. https://blogs.lse.ac.uk/psychologylse/2021/09/28/laws-and-social-norms-forces-for-behaviour-change/

Hadler, M., Klösch, B., Schwarzinger, S., Schweighart, M., Wardana, R., & Bird, D. N. (2021). Measuring environmental attitudes and behaviors. In P. M. Cham (Ed.), *Surveying climate-relevant behavior* (pp. 15-35). Springer Nature Link. https://doi.org/10.1007/978-3-030-85796-7_2

Hidalgo-Crespo, J., Velastegui-Montoya, A., Amaya-Rivas, J. L., Soto, M., & Riel, A. (2023). The role of personality in the adoption of pro-environmental behaviors through the lens of the value-belief-norm theory. *Sustainability*, *15*(17), 12803. https://doi.org/10.3390/su151712803

Hirsh, J. L., Costello, M. S., & Fuqua, R. W. (2015). Analysis of delay discounting as a psychological measure of sustainable behavior. *Behavior and Social Issues*, *24*(1), 187–202. https://doi.org/10.5210/bsi.v24i0.5906

Hooper, N., & Larsson, A. (2015). Contextual Behavioural Science. In *The research journey of acceptance and commitment therapy (ACT)* (pp. 23–25). Springer. https://doi.org/10.1057/9781137440174_4

Huang, L., Wen, Y., & Gao, J. (2020). What ultimately prevents the pro-environmental behavior? An in-depth and extensive study of the behavioral costs. *Resources, Conservation and Recycling*, *158*, 104747. https://doi.org/10.1016/j.resconrec.2020.104747

Keuschnigg, M., & Kratz, F. (2017). Thou shalt recycle: How social norms of environmental protection narrow the scope of the low-cost hypothesis. *Environment and Behavior*, *50*(10), 1059-1091. https://doi.org/10.1177/0013916517726569

Koller, K., Pankowska, P. K., & Brick, C. (2022). Identifying bias in self-reported pro-environmental behavior. *Current Research in Ecological and Social Psychology*, *4*, 100087. https://doi.org/10.1016/j.cresp.2022.100087

Kotyza, P., Cabelkova, I., Pierański, B., Malec, K., Borusiak, B., Smutka, L., Nagy, S., Gawel, A., Bernardo López Lluch, D., Kis, K., Gál, J., Gálová, J., Mravcová, A., Knezevic, B., & Hlaváček, M. (2024). The predictive power of environmental concern, perceived behavioral control and social norms in shaping pro-environmental intentions: A multicountry study. *Frontiers in Ecology and Evolution*, *12*, 1289139. https://doi.org/10.3389/fevo.2024.1289139

Kriss, P. H., Loewenstein, G., Wang, X., & Weber, R. A. (2011). Behind the veil of Ignorance: Self-serving bias in climate change negotiations. *Judgment and Decision Making*, *6*(7), 602-615. https://doi.org/10.1017/s1930297500002643

Lamdjad, I., Alfalahi, B. O., Alnujaifi, M., & Alheety, N. A. (2024). The development of the level of environmental awareness among the residents in cities and residential neighborhoods. *Edelweiss Applied Science and Technology*, *8*(4), 41-55. https://doi.org/10.55214/25768484.v8i4.1101

Lange, F., Steinke, A., & Dewitte, S. (2018). The pro-environmental behavior task: A laboratory measure of actual pro-environmental behavior. *Journal of Environmental Psychology*, *56*, 46-54. https://doi.org/10.1016/j.jenvp.2018.02.007

Latif, B., Gaskin, J., Gunarathne, N., Sroufe, R., Sharif, A., & Hanan, A. (2023). Climate change risk perception and pro-environmental behavior: The moderating role of environmental values and psychological contract breach. *Social Responsibility Journal*, *20*(3), 538–567. https://doi.org/10.1108/srj-02-2023-0084

Lee, M. P. (2022). Chapter 29: When money fails to talk: unintended consequences of using monetary incentives to elicit sustainable behaviours. In G. George, M. R. Haas, H. Joshi, A. M. McGahan, & P. Tracey (Eds.), *Handbook on the business of sustainability: The organization, implementation, and practice of* *sustainable growth* (pp. 544–561). Edward Elgar Publishing. https://doi.org/10.4337/9781839105340.00039

Li, D., Zhao, L., Ma, S., Shao, S., & Zhang, L. (2019). What influences an individual's pro-environmental behavior? A literature review. *Resources, Conservation and Recycling*, *146*, 28–34. https://doi.org/10.1016/j.resconrec.2019.03.024

Lienert, J., & Linkov, I. (2019). Editorial featured papers on environmental decisions. *EURO Journal on Decision Processes*, *7*(3-4), 151-157. https://doi.org/10.1007/s40070-019-00108-2

Lindenberg, S., & Steg, L. (2013). Goal-framing theory and norm-guided environmental behavior. In H. C. Trijp (Ed.), *Encouraging sustainable behavior: Psychology and the environment* (pp. 37-54). Psychology Press. https://doi.org/10.4324/9780203141182

Lindenberg, S., & Steg, L. (2007). Normative, gain and hedonic goal frames guiding environmental behavior. *Journal of Social Issues*, *63*(1), 117-137. https://doi.org/10.1111/j.1540-4560.2007.00499.x

Linder, N., Giusti, M., Samuelsson, K., & Barthel, S. (2021). Pro-environmental habits: An underexplored research agenda in sustainability science. *Ambio*, *51*(3), 546-556. https://doi.org/10.1007/s13280-021-01619-6

Liu, J., Li, L., He, L., Ma, X., & Yuan, H. (2024). Consumers or infrastructure firms? Who should the government subsidize to promote electric vehicle adoption when considering the indirect network and herd effects. *Transport Policy*, *149*, 163-176. https://doi.org/10.1016/j.tranpol.2024.02.007

Liu, P., Teng, M., & Han, C. (2020). How does environmental knowledge translate into pro-environmental behaviors?: The mediating role of environmental attitudes and behavioral intentions. *Science of The Total Environment*, *728*, 138126. https://doi.org/10.1016/j.scitotenv.2020.138126

Lumbanraja, A. U. (2018). When officials don't know what they don't know: Dunning-Kruger effect in the case of green budgeting for local government. *Proceedings of the 2nd International Conference on Indonesian Economy and Development (ICIED 2017)*, *126*, 100-111. https://doi.org/10.2991/icied-17.2018.20

Ma, L., Shahbaz, P., Haq, S. U., & Boz, I. (2023). Exploring the moderating role of environmental education in promoting a clean environment. *Sustainability*, *15*(10), 8127. https://doi.org/10.3390/su15108127

Majumder, R., Plotkina, D., & Rabeson, L. (2023). Environmentally responsible values, attitudes and behaviours of Indian consumers. *Environmental Values*, *32*(4), 433-468. https://doi.org/10.3197/096327122x16611552268645

Mandarić, D., & Hunjet, S. A. (2024). Gender disparities in pro-environmental attitudes: Implications for sustainable business practices in Croatia. *GATR Journal of Business and Economics Review*, *9*(1), 73-84. https://doi.org/10.35609/jber.2024.9.1(4)

Marselle, M. R., & Golding, S. E. (2023). Applying the Behaviour Change Wheel to mitigate the biodiversity crisis. In B. Gatersleben & N. Murtagh (Eds.), *Handbook on pro-environmental behaviour change* (pp. 353-371). Edward Elgar Publishing. https://doi.org/10.4337/9781800882133

McKenzie-Mohr, D. (2000). New ways to promote Proenvironmental behavior: Promoting sustainable behavior: An introduction to community-based social marketing. *Journal of Social Issues*, *56*(3), 543–554. https://doi.org/10.1111/0022-4537.00183

Milfont, T. L., & Duckitt, J. (2010). The environmental attitudes inventory: A valid and reliable measure to assess the structure of environmental attitudes. *Journal of Environmental Psychology*, *30*(1), 80–94. https://doi.org/10.1016/j.jenvp.2009.09.001

Miller, L. B., & Rice, R. E. (2024). (Mis)matched direct and moderating relationships among pro-environmental attitudes, environmental efficacy, and pro-environmental behaviors across and within 11 countries. *PLOS ONE*, *19*(6), e0304945. https://doi.org/10.1371/journal.pone.0304945

Moreno-Llamas, A., García-Mayor, J., & De la Cruz-Sánchez, E. (2024). Social inequalities hamper pro-environmental mobility intentions in Europe. *Cities*, *145*, 104716. https://doi.org/10.1016/j.cities.2023.104716

Ngo, T., & Lung, S. C. (2023). Impact of physical and social living environments on pro-environmental intentions. *Scientific Reports*, *13*(1), 1-11. https://doi.org/10.1038/s41598-023-41372-2

Ní Choisdealbha, Á., Timmons, S., & Lunn, P. D. (2020). Experimental evidence for the effects of emissions charges and efficiency information on consumer car choices. *Journal of Cleaner Production*, *254*, 120140. https://doi.org/10.1016/j.jclepro.2020.120140

Nolan, J. M., Schultz, P. W., Cialdini, R. B., Goldstein, N. J., & Grikevicius, V. (2008). Normative Social Influence is Underdetected. *Personality and Social Psychology Bulletin*, *34*(7), 913-922. https://doi.org/10.1177/0146167208316691

Ogiemwonyi, O. (2024). Determinants of green behavior (Revisited): A comparative study. *Resources, Conservation & Recycling Advances*, *22*, 200214. https://doi.org/10.1016/j.rcradv.2024.200214

Ogutu, M. O., Akor, J., Mulindwa, M. S., Heshima, O., & Nsengimana, C. (2023). Implementing circular economy and sustainability policies in Rwanda: Experiences of Rwandan manufacturers with the plastic ban policy. *Frontiers in Sustainability*, *4*, 1092107. https://doi.org/10.3389/frsus.2023.1092107

Onwezen, M. (2022). Goal-framing theory for sustainable food behaviour: The added value of a moral goal frame across different contexts. Food Quality and Preference, 105, 104758. https://doi.org/10.1016/j.foodqual.2022.104758

Packard, C. D., & Schultz, P. W. (2023). Emotions as the enforcers of norms. *Emotion Review*, *15*(4), 279-283. https://doi.org/10.1177/17540739231194315

Patel, J., Modi, A., & Paul, J. (2017). Pro-environmental behavior and socio-demographic factors in an emerging market. *Asian Journal of Business Ethics*, *6*(2), 189-214. https://doi.org/10.1007/s13520-016-0071-5

Pellegrini, M., & Tagliabue, M. (2024). An overview of psychological factors in mobility choices: The impact on pro-environmental behavior. *Discover Sustainability*, *5*(161). https://doi.org/10.1007/s43621-024-00372-6

Perry, G. L., Richardson, S. J., Harré, N., Hodges, D., Lyver, P. O., Maseyk, F. J., Taylor, R., Todd, J. H., Tylianakis, J. M., Yletyinen, J., & Brower, A. (2021). Evaluating the role of social norms in fostering pro-environmental behaviors. *Frontiers in Environmental Science*, *9*. https://doi.org/10.3389/fenvs.2021.620125

Pham, H. N., Thai, N. T., Heffernan, T. W., & Reynolds, N. (2023). Environmental policies and the promotion of pro-environmental consumer behavior: A systematic literature review. *Journal of Macromarketing*, *44*(1), 30–58. https://doi.org/10.1177/02761467231201507

Pichert, D., & Katsikopoulos, K. V. (2011). Green defaults: Information presentation and pro-environmental behaviour. *Heuristics*, 713–723. https://doi.org/10.1093/acprof:oso/9780199744282.003.0037

Pretty, J., & Ward, H. (2001). Social capital and the environment. *World Development*, *29*(2), 209-227. https://doi.org/10.1016/S0305-750X(00)00098-X

Raymond, C. M., Brown, G., & Robinson, G. M. (2011). The influence of place attachment, and moral and normative concerns on the conservation of native vegetation: A test of two behavioural models. *Journal of Environmental Psychology*, *31*(4), 323-335. https://doi.org/10.1016/j.jenvp.2011.08.006

Redondo, I., & Puelles, M. (2016). The connection between environmental attitude–behavior gap and other individual inconsistencies: A call for strengthening self-control. *International Research in Geographical and Environmental Education*, *26*(2), 107-120. https://doi.org/10.1080/10382046.2016.1235361

Schmitt, M. T., Mackay, C. M., Droogendyk, L. M., & Payne, D. (2019). What predicts environmental activism? The roles of identification with nature and politicized environmental identity. *Journal of Environmental Psychology*, *61*, 20–29. https://doi.org/10.1016/j.jenvp.2018.11.003

Schultz, P. W. (2014). Strategies for promoting proenvironmental behavior: Lots of tools but few instructions. *European Psychologist*, *19*(2), 107-117. https://doi.org/10.1027/1016-9040/a000163

Schwenke, D., Wehner, P., & Scherbaum, S. (2022). Effects of individual and dyadic decision-making and normative reference on delay discounting decisions. *Cognitive Research: Principles and Implications*, *7*(1). https://doi.org/10.1186/s41235-022-00422-5

Stapleton, A., McHugh, L., & Karekla, M. (2022). How to effectively promote eco-friendly behaviors: Insights from contextual behavioral science. *Sustainability*, *14*(21), 13887. https://doi.org/10.3390/su142113887

Steg, L., Lindenberg, S., & Keizer, K. (2016). Intrinsic motivation, norms and environmental behaviour: The dynamics of overarching goals. *International Review of Environmental and Resource Economics*, *9*(1–2), 179-207. https://doi.org/10.1561/101.00000077

Steg, L., & Vlek, C. (2009). Encouraging pro-environmental behaviour: An integrative review and research agenda. *Journal of Environmental Psychology*, *29*(3), 309-317. https://doi.org/10.1016/j.jenvp.2008.10.004

Thomas, G. O., Poortinga, W., & Sautkina, E. (2016). Habit discontinuity, self-activation, and the diminishing influence of context change: Evidence from the UK understanding society survey. *PLOS ONE*, *11*(4), e0153490. https://doi.org/10.1371/journal.pone.0153490

Thompson, J., Schaefer, L., & Menzel, J. (2012). Internalization of thin-ideal and muscular-ideal. *Encyclopedia of Body Image and Human Appearance*, 499-504. https://doi.org/10.1016/b978-0-12-384925-0.00079-1

Thøgersen, J. (2004). A cognitive dissonance interpretation of consistencies and inconsistencies in environmentally responsible behavior. *Journal of Environmental Psychology*, *24*(1), 93-103. https://doi.org/10.1016/s0272-4944(03)00039-2

Tian, H., & Liu, X. (2022). Pro-environmental behavior research: Theoretical progress and future directions. *International Journal of Environmental Research and Public Health*, *19*(11), 6721. https://doi.org/10.3390/ijerph19116721

Tiffany, D. W., & Tiffany, P. G. (1996). Control across the life span: A model for understanding self-direction. *Journal of Adult Development*, *3*(2), 93–108. https://doi.org/10.1007/bf02278775

Toyokawa, W., & Gaissmaier, W. (2022). Conformist social learning leads to self-organised prevention against adverse bias in risky decision making. *eLife*, *11*. https://doi.org/10.7554/eLife.75308

Trujillo, C. A., Estrada-Mejia, C., & Rosa, J. A. (2021). Norm-focused nudges influence pro-environmental choices and moderate post-choice emotional responses. *PLOS ONE*, *16*(3), e0247519. https://doi.org/10.1371/journal.pone.0247519

Turaga, R. M., Howarth, R. B., & Borsuk, M. E. (2010). Pro-environmental behavior: Rational choice meets moral motivation. *Annals of the New York Academy of Sciences*, *1185*(1), 211-224. https://doi.org/10.1111/j.1749-6632.2009.05163.x

Verplanken, B., & Roy, D. (2016). Empowering interventions to promote sustainable lifestyles: Testing the habit discontinuity hypothesis in a field experiment. *Journal of Environmental Psychology*, *45*, 127-134. https://doi.org/10.1016/j.jenvp.2015.11.008

Verplanken, B., Walker, I., Davis, A., & Jurasek, M. (2008). Context change and travel mode choice: Combining the habit discontinuity and self-activation hypotheses. *Journal of Environmental Psychology*, *28*(2), 121-127. https://doi.org/10.1016/j.jenvp.2007.10.005

Vieira, J. P., Castro, S. L., & Souza, A. S. (2023). Psychological barriers moderate the attitude-behavior gap for climate change. *PLoS One*, *18*(7), e0287404. https://doi.org/10.1371/journal.pone.0287404

Vilar, R., Milfont, T. L., & Sibley, C. G. (2020). The role of social desirability responding in the longitudinal relations between intention and behaviour. *Journal of Environmental Psychology*, *70*, 101457. https://doi.org/10.1016/j.jenvp.2020.101457

Voisin, D., Gosling, P., Amoura, C., Miraucourt, D., Weber, T., & Dappe, Q. (2020). If they are all green, I take responsibility for my eco-unfriendly behaviors: Effects of injunctive norm on sense of responsibility following cognitive dissonance. *International Review of Social Psychology*, *33*(1). https://doi.org/10.5334/irsp.113

Wan, Q., & Du, W. (2022). Social capital, environmental knowledge, and pro-environmental behavior. *International Journal of Environmental Research and Public Health*, *19*(3), 1443. https://doi.org/10.3390/ijerph19031443

Willcock, S., Cooper, G. S., Addy, J., & Dearing, J. A. (2023). Earlier collapse of Anthropocene ecosystems driven by multiple faster and noisier drivers. *Nature Sustainability*, *6*(11), 1331–1342. https://doi.org/10.1038/s41893-023-01157-x

Xing, Y., Li, M., & Liao, Y. (2022). Trust, identity, and public-sphere pro-environmental behavior in China: An extended attitude-behavior-Context theory. *Frontiers in Psychology*, *13*, 919578. https://doi.org/10.3389/fpsyg.2022.919578

Yang, Y., Yuan, Y., Liu, P., Wu, W., & Huo, C. (2024). Crucial to me and my society: How collectivist culture influences individual pro-environmental behavior through environmental values. *Journal of Cleaner Production*, *454*, 142211. https://doi.org/10.1016/j.jclepro.2024.142211

Yap, C. K., & Leow, C. S. (2024). A comprehensive review (1963–2024) of environmental psychology: Trends, themes, and future directions. *Applied Psychology Research*, *3*(2), 1623. https://doi.org/10.59400/apr.v3i2.1623

Zaval, L., & Cornwell, J. F. (2017). Effective education and communication strategies to promote environmental engagement. *European Journal of Education*, *52*(4), 477-486. https://doi.org/10.1111/ejed.12252

Zehui, Z. (2023). Pro-environmental behavior and actions: A review of the literature. https://doi.org/10.2139/ssrn.4449998

Zeng, J., Jiang, M., & Yuan, M. (2020). Environmental risk perception, risk culture, and pro-environmental behavior. *International Journal of Environmental Research and Public Health*, *17*(5), 1750. https://doi.org/10.3390/ijerph17051750

Zhang, C., Wu, X., Qian, K., Zhao, S., Madani, H., Chen, J., & Chen, Y. (2024). Environmental awareness and social sustainability: Insights from an agent-based model with social learning and individual heterogeneity. *Sustainability*, *16*(17), 7853. https://doi.org/10.3390/su16177853

Zhong, B., Niu, N., Li, J., Wu, Y., & Fan, W. (2024). How subjective socioeconomic status influences pro-environmental behavior: The mediating role of sense of control and life history strategy. *Behavioral Sciences*, *14*(7), 591. https://doi.org/10.3390/bs14070591

Zhou, L., Brick, C., Sachisthal, M. S., Aldoh, A., & Sauter, D. (2024). Warm glow and pro-environmental behavior: Supportive evidence from behavioral tasks. https://doi.org/10.31234/osf.io/wrvdz

Appendix A: Ethics Approval

Ethics memo 1

7 June 2024

Stef Gomes-Ng

Faculty of Health and Environmental Sciences

Dear Stef

Ethics Application: 24/146 Mind the Gap: Exploring the influence of environmental awareness dissonance on ecological behaviours.

Thank you for submitting your application for ethical review. We are pleased to advise that a subcommittee of the Auckland University of Technology Ethics Committee (AUTEC) approved your ethics application, subject to:

1. It is unclear how the 3 different foot-print categories are getting applied in advance of the survey. Please demonstrate each condition as it will be applied to participants'
2. Amendment of the study Advertisement as follows:
   a. Consideration of whether the title 'how much do you care....' really reflective of the study goals;
   b. Inclusion of the AUT's logo and AUTEC's approval wording;
   c. State that this is student research;
3. Amendment of the Survey as follows:
   a. Provision of this in the format that participants will see it, including having the Information Sheet as the first block;
   b. Reconsideration of the question. "Which housing type best describes your home?" Customise to the NZ context. Is home taken to mean current residence (which might be student accommodation). What is the relevance of 'running water' and why is it not applied to all resident types? Is 'luxury condominium' relevant to a NZ resident;
   c. Before the questions about donating to charity please describe the use of the collected responses in calculating the 'winnings' pool available in the prize draw
4. Amendment of the Information Sheet as follows:
   a. Please consider using a lay title;
   b. Change the tense of writing and pronouns to be applicable to the reader e.g. change "participants will be recruited..." to "you have responded to a poster...";
   c. In the 'How do I agree to participate?' section' amend the advice concerning withdrawal to correspond with an anonymous survey in which data cannot be removed once the survey is completed;
   d. Add that the researcher gets their qualification to the 'benefits' section;
   e. Expand on data storage, stating who will have access to the anonymous dataset and why, and the storage period;
5. Review the tense of the debriefing sheet e.g. change "you will be randomly assigned..." to " you were randomly assigned...". Also, provide a link for where a summary of results may be found rather than requiring respondents to correspond with the researcher.

Please provide a response to the conditions in a memo and attach any altered documents, such as the Information Sheet, Consent Forms, Survey.

A revised EA1 is not required unless specifically requested in the conditions.

Please reference the application number and study title in all correspondence.

The Committee is always willing to discuss with applicants the points that have been made. There may be information that has not been made available to the Committee, or aspects of the research may not have been fully understood.

When the conditions have been met, you will be notified of the full approval of your ethics application. Full approval is not effective until all the conditions have been met. Data collection may not commence until full approval has been confirmed. If these conditions are not met within six months, your application may be closed, and a new application will be required if you wish to continue with this research.

If you have any enquiries about this application, please contact us at ethics@aut.ac.nz.

(This is a computer-generated letter for which no signature is required)

The AUTEC Secretariat

Auckland University of Technology Ethics Committee

Cc: jxn1500@autuni.ac.nz; Jay Wood

Ethics memo 2

21 June 2024

Stef Gomes-Ng

Faculty of Health and Environmental Sciences

Dear Stef

Ethics Application: 24/146 Mind the Gap: Exploring the influence of environmental awareness dissonance on ecological behaviours.

Thank you for submitting your responses to AUTEC's conditions which indicated the survey supplied was directly exported from Qualtrics. However, there is no light grey text explaining the action that occurs if the person responds to being younger than 16 (i.e. being taken to a thank you but not eligible page) or the link to a separate survey for entering details for a prize draw;

The following conditions remain outstanding:

1. Provision of a pdf file of the Qualtrics survey, ensuring that that Information Sheet is dated and is the first block of the survey;
2. Clarification of what happens in the survey if the potential participant indicates that they are younger than 16 years old.

Please provide a response to the conditions in a memo and attach any altered documents, such as the Information Sheet, Consent Forms, Survey.

A revised EA1 is not required unless specifically requested in the conditions.

Please reference the application number and study title in all correspondence.

The Committee is always willing to discuss with applicants the points that have been made. There may be information that has not been made available to the Committee, or aspects of the research may not have been fully understood.

When the conditions have been met, you will be notified of the full approval of your ethics application. Full approval is not effective until all the conditions have been met. Data collection may not commence until full approval has been confirmed. If these conditions are not met within six months, your application may be closed, and a new application will be required if you wish to continue with this research.

If you have any enquiries about this application, please contact us at ethics@aut.ac.nz.

(This is a computer-generated letter for which no signature is required)

The AUTEC Secretariat

Auckland University of Technology Ethics Committee

Cc: jxn1500@autuni.ac.nz; Jay Wood

Ethics memo 3

24 June 2024

Stef Gomes-Ng

Faculty of Health and Environmental Sciences

Dear Stef

Re Ethics Application: **24/146 Mind the Gap: Exploring the influence of environmental awareness dissonance on ecological behaviours.**

Thank you for your responses to AUTEC's conditions.

Your ethics application has been approved for three years until 24 June 2027.

Standard Conditions of Approval

1. The research is to be undertaken in accordance with the Auckland University of Technology Code of Conduct for Research and as approved by AUTEC.
2. All public facing documents must have the AUTEC approval number and be of a high standard of spelling and grammar. Dates on the Information Sheet(s) and Consent Form(s) must be consistent.
3. Any amendments to the project must be approved by AUTEC prior to being implemented.
4. A progress report is due annually on the anniversary of the approval date.
5. A final report is due at the expiration of the approval period, or, upon completion of project.
6. Any serious or adverse events must be reported to AUTEC. This includes unforeseen issues that might affect the project's continued ethical acceptability.
7. AUTEC grants ethical approval only. You are responsible for obtaining management permission for access from any institution or organisation at which your research is being conducted and you need to meet all ethical, legal, public health, and locality obligations or requirements for the jurisdictions in which the research is being undertaken.

The application number and title need to be referenced on all correspondence related to this project.

All forms are available online http://www.aut.ac.nz/research/researchethics

(This is a computer-generated letter for which no signature is required)

The AUTEC Secretariat

Auckland University of Technology Ethics Committee

Cc: jxn1500@autuni.ac.nz; Jay Wood

Appendix B:

a) Survey

Questionnaire:

Project Title

Your impact on the environment

An Invitation

My name is Dharma Gopalakrishnan, and I am currently undertaking a Master of Arts in Psychology at AUT. As part of my thesis, I am writing to invite you to participate in a voluntary student research project, investigating people's environmental attitudes and behaviours.

What is the purpose of this research?

This study attempts to uncover how your attitudes and information about your environmental impacts influence decision-making. The findings of this research will be used as part of my Masters thesis.

How was I identified, and why am I invited to participate in this research?

You have been recruited through a mixture of posters, advertisements on social media and snowball sampling. You must be over the age of 16 to participate.

How do I agree to participate in this research?

If you would like to participate, you can click the arrow at the bottom of this page to begin the survey. Your participation in this research is voluntary (it is your choice), and whether or not you choose to participate will neither benefit nor disadvantage you. You can withdraw from the study at any time. If you choose to withdraw, we are unable to remove your data because your participation is anonymous. Because your participation is anonymous, submission of the survey will be taken as consent.

What will happen in this research?

Your participation will involve completing an online survey about your environmental attitudes and decision-making, which should take you approximately 20 minutes to complete. After participating, you will be given the opportunity to enter a prize draw. Entering the prize draw is optional.

What are the discomforts and risks?

Some of the questions in this survey will ask you about your environmental impact. If you find this topic uncomfortable, you may withdraw at any time. Your responses will remain anonymous.

How will these discomforts and risks be alleviated?

You will be reassured that none of the data will be shared with anyone outside of the researchers and that their identities will remain anonymous. Your identity will remain anonymous regardless of whether or not you choose to take part in the prize draw, as your data will not be linked to that of the prize draw data.

What are the benefits?

Your participation in this research project will help advance our knowledge of environmental psychology. Additionally, this research will contribute toward my Master's degree.

How will my privacy be protected?

Your participation in this study is anonymous. This means that your data can never be linked to your identity. It will never be possible for anyone looking at the data to know that you provided it.

Your anonymous data will be stored indefinitely and securely with the student researcher and project supervisors. Only the researcher and supervisors will have access to your data. Data will only be used for the purposes of this project; it will never be used for any other purpose.

What are the costs of participating in this research?

The only cost of participating in this research is the time that you take to complete the survey; this should take no longer than approximately 20 minutes.

What opportunity do I have to consider this invitation?

You will have until October 25th to complete the survey, at which point it will be closed.

Will I receive feedback on the results of this research?

A summary of findings will be available at https://aut.au1.qualtrics.com/jfe/form/SV_dhY9hSwVGN0t6KO after the study has concluded.

What do I do if I have concerns about this research?

Any concerns regarding the nature of this project should be notified in the first instance to the Project Supervisor, Stef Gomes-Ng, stef.gomes-ng@aut.ac.nz, (+649) 921 9001 ext. 27312.

Concerns regarding the conduct of the research should be notified to the Executive Secretary of AUTEC, liz.binns@aut.ac.nz, (+649) 921 9999 ext 6038.

Whom do I contact for further information about this research?

Please keep this Information Sheet and a copy of the Consent Form for your future reference. You are also able to contact the research team as follows:

Researcher Contact Details:

Dharma Gopalakrishnan, jxn1500@autuni.ac.nz

Project Supervisor Contact Details:

Stef Gomes-ng, stef.gomes-ng@aut.ac.nz, (+649) 921 9001 ext. 27312

Approved by the Auckland University of Technology Ethics Committee on type the date final ethics approval was granted, AUTEC Reference number 24/146.

Are you over 16?

- Yes (1)
- No (2)

How old are you?

- 16 - 24 (1)
- 25 - 34 (2)
- 35 - 44 (3)
- 45 - 54 (4)
- 55 - 64 (5)
- 65 - 74 (6)
- 75 or older (7)

Gender

- Male (1)
- Female (2)
- Non-binary / third gender (3)
- Prefer not to say (4)

Choose one or more ethnicity that you consider yourself to be

▢ European (1)

▢ Māori (2)

▢ Pacific (3)

▢ Asian (4)

▢ MELAA (Middle Eastern / Latin American / African) (5)

▢ Other ethnicity (Please specify) (6) ____________________

What is the highest level of education you have completed?

- Less than Primary (1)
- Primary (2)
- Some Secondary (3)
- Secondary (4)
- Vocational or Similar (5)
- Some University but no degree (6)
- University - Bachelor's Degree (7)
- Graduate or professional degree (MA, MS, MBA, PhD, Law Degree, Medical Degree etc) (8)

What was your approximate total household income during the past year?

- Less than $25,000 (1)
- $25,000-$49,999 (2)
- $50,000-$99,999 (3)
- $100,000-$199,999 (4)
- More than $200,000 (5)
- Prefer not to say (6)

Select to what degree you personally agree with the following statements

---

I believe it is important to conserve natural resources.

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

I try to reduce my energy consumption whenever possible.

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

I feel a personal responsibility to protect the environment.

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

I believe in the importance of recycling materials.

- ○ Strongly disagree (1)
- ○ Somewhat disagree (2)
- ○ Neither agree nor disagree (3)
- ○ Somewhat agree (4)
- ○ Strongly agree (5)

I am concerned about the impact of pollution on the environment.

- ○ Strongly disagree (1)
- ○ Somewhat disagree (2)
- ○ Neither agree nor disagree (3)
- ○ Somewhat agree (4)
- ○ Strongly agree (5)

I support the preservation of natural habitats for wildlife.

- ○ Strongly disagree (1)
- ○ Somewhat disagree (2)
- ○ Neither agree nor disagree (3)
- ○ Somewhat agree (4)
- ○ Strongly agree (5)

I am willing to pay more for products that are environmentally friendly.

- ○ Strongly disagree (1)
- ○ Somewhat disagree (2)
- ○ Neither agree nor disagree (3)
- ○ Somewhat agree (4)
- ○ Strongly agree (5)

I believe in the importance of protecting endangered species.

- ○ Strongly disagree (1)

- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

I think it is essential to reduce carbon emissions to combat climate change.

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

I support efforts to protect clean air and water.

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

I believe in the importance of sustainable agriculture and food production.

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

I advocate for the conservation of biodiversity.

- Strongly disagree (1)
- Somewhat disagree (2)

- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

Select to what degree you personally agree with the following statements

I am concerned about the effects of deforestation on the environment

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

I support policies that promote renewable energy sources.

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

I try to minimize my use of single-use plastics.

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

I support efforts to preserve and restore natural ecosystems.

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)

- Somewhat agree (4)
- Strongly agree (5)

I believe that individuals can make a difference in protecting the environment.

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

I advocate for stricter environmental regulations and laws.

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

I believe in the importance of reducing waste and promoting recycling.

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

I am concerned about the impact of climate change on future generations.

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

I try to support businesses and organizations that prioritize environmental sustainability.

- o Strongly disagree (1)
- o Somewhat disagree (2)
- o Neither agree nor disagree (3)
- o Somewhat agree (4)
- o Strongly agree (5)

I believe in the importance of protecting oceans and marine life.

- o Strongly disagree (1)
- o Somewhat disagree (2)
- o Neither agree nor disagree (3)
- o Somewhat agree (4)
- o Strongly agree (5)

I am committed to living a lifestyle that minimizes harm to the environment.

- o Strongly disagree (1)
- o Somewhat disagree (2)
- o Neither agree nor disagree (3)
- o Somewhat agree (4)
- o Strongly agree (5)

I believe that individuals can make a difference in protecting the environment.

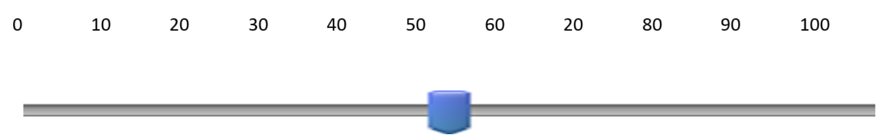
- o Strongly disagree (1)
- o Somewhat disagree (2)
- o Neither agree nor disagree (3)

- Somewhat agree (4)
- Strongly agree (5)

Approximately how often do you eat animal-based products? (beef, pork, chicken, fish, eggs, dairy products)

- Never (vegan) (1)
- Infrequently (vegetarian - eggs/dairy, no meat) (2)
- Occasionally (really like veggies - occasional meat, eggs/dairy) (3)
- Often (balanced meat/veggies - meat a few times a week, eggs/dairy almost daily) (4)
- Very often (meat daily) (5)

Approximately how much of the food that you eat is unprocessed, unpackaged, or locally grown? (in percentages)



Which housing type best describes your home (i.e. your current residence)?

- Freestanding, no running water (1)
- Freestanding, running water (2)
- Multi-story apartment (3)
- Duplex, row house or building with 2-4 housing units (4)
- Student Accommodation (5)

What material is your house primarily constructed with?

- Wood (1)
- Brick/concrete (2)
- Steel (3)

○ Other (4)

How many people live in your household?

○ 1 (1)
○ 2 (2)
○ 3 (3)
○ 4 (4)
○ 5 (5)
○ 6 (6)
○ 7 (7)
○ 8 (8)
○ 9 (9)
○ 10+ (10)

What is the size of your home (current residence)?

○ Tiny (Approx. $5m^2$ - $15m^2$) (1)
○ Small (Approx. $16m^2$ - $50m^2$) (2)
○ Medium (Approx. $51m^2$ - $140m^2$) (3)
○ Large (Approx.$141m^2$ - $465m^2$) (4)
○ Huge (Approx.$466m^2$+) (5)

Do you have externally supplied electricity in your home?

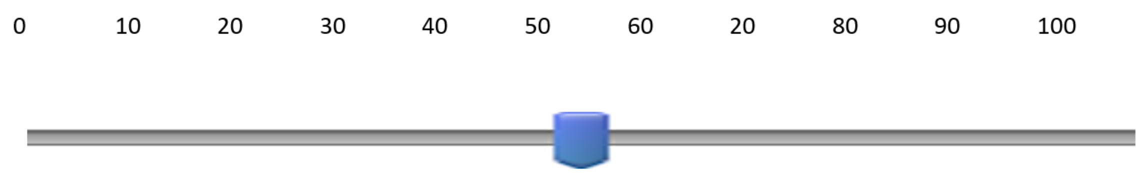
○ Yes (1)
○ No (2)

Estimate how energy efficient your home is?

○ Very inefficient (poor insulation, few LED lamps, heating/cooling systems used often) (1)
○ Below average (inefficient lighting, standard appliances) (2)
○ Average (modern appliances, climate controls) (3)

- Above average (well insulated, efficient lighting and appliances, careful use) (4)
- Efficiency-centred design (passive heating/cooling, advanced temperature control and ventilation, low electricity use) (5)

Approximately what percentage of your home's electricity comes from renewable sources? (either directly or through purchased green power)



Compared to your neighbours, approximately how much rubbish do you generate?

- Much Less (1)
- Less (2)
- Same (3)
- More (4)
- Much more (5)

-----Approximately how much time do you spend travelling by car or motorcycle each week?

	No time at all	A lot of time
	0	15
Car		
Motorcycle		

Page Break

Approximately what is your primary vehicle's average fuel efficiency? (in Liters/100kms)

(Only answer for your primary vehicle)

	Efficient or Electric								Inefficient			
	2	4	6	8	10	12	14	16	18	20	22	24
Car												
Motorcycle												

When you travel by car, approximately how often do you carpool?

- ○ Never (1)
- ○ Sometimes (2)
- ○ About half the time (3)
- ○ Most of the time (4)
- ○ Always (5)

Roughly how long to you spend travelling by public transportation each week?

Estimate how many hours you fly each year. (if more than 200 hrs per year just select 200)

Only ONE of the following THREE graphics will be randomly shown to each participant at the end of the carbon footprint calculator


YOUR CARBON FOOTPRINT IS LOWER THAN THE AVERAGE PERSON
THIS MEANS YOUR IMPACT ON THE ENVIRONMENT IS BETTER THAN THE AVERAGE PERSON


YOUR CARBON FOOTPRINT IS HIGHER THAN THE AVERAGE PERSON
THIS MEANS YOUR IMPACT ON THE ENVIRONMENT IS WORSE THAN THE AVERAGE PERSON


YOUR CARBON FOOTPRINT IS ABOUT THE SAME AS THE AVERAGE PERSON
THIS MEANS YOUR IMPACT ON THE ENVIRONMENT IS THE SAME AS THE AVERAGE PERSON

Imagine you have the option to choose between driving your personal vehicle or using public transportation.

On a scale of 1 (Definitely drive now) to 10 (Definitely take public transportation), how likely are you to take public transportation now versus driving your own vehicle if your destination is 10 MINUTES away.

- 0 (0)
- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)
- 8 (8)
- 9 (9)
- 10 (10)

On a scale of 1 (Definitely drive now) to 10 (Definitely take public transportation), how likely are you to take public transportation now versus driving your own vehicle if your destination is 15 MINUTES away.

- 0 (0)
- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)
- 8 (8)
- 9 (9)
- 10 (10)

On a scale of 1 (Definitely drive now) to 10 (Definitely take public transportation), how likely are you to take public transportation now versus driving your own vehicle if your destination is 30 MINUTES away.

- 0 (0)
- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)
- 8 (8)
- 9 (9)
- 10 (10)

On a scale of 1 (Definitely drive now) to 10 (Definitely take public transportation), how likely are you to take public transportation now versus driving your own vehicle if your destination is 1 HOUR away.

- 0 (0)
- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)
- 8 (8)
- 9 (9)
- 10 (10)

On a scale of 1 (Definitely drive now) to 10 (Definitely take public transportation), how likely are you to take public transportation now versus driving your own vehicle if your destination is more than 1 HOUR away.

- ○ 0 (0)
- ○ 1 (1)
- ○ 2 (2)
- ○ 3 (3)
- ○ 4 (4)
- ○ 5 (5)
- ○ 6 (6)
- ○ 7 (7)
- ○ 8 (8)
- ○ 9 (9)
- ○ 10 (10)

Page Break

Imagine you have the choice between purchasing a conventional petrol car or an electric vehicle (EV) for your daily commute.

On a scale of 1 (Definitely buy the petrol car now) to 10 (Definitely wait and save for the EV), how likely are you to opt for the electric vehicle, if you can afford it in 2 WEEKS?

- 0 (0)
- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)
- 8 (8)
- 9 (9)
- 10 (10)

On a scale of 1 (Definitely buy the petrol car now) to 10 (Definitely wait and save for the EV), how likely are you to opt for the electric vehicle, if you can afford it in 1 MONTH?

- 0 (0)
- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)
- 8 (8)
- 9 (9)
- 10 (10)

On a scale of 1 (Definitely buy the petrol car now) to 10 (Definitely wait and save for the EV), how likely are you to opt for the electric vehicle, if you can afford it in 6 MONTHS?

- 0 (0)
- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)
- 8 (8)
- 9 (9)
- 10 (10)

On a scale of 1 (Definitely buy the petrol car now) to 10 (Definitely wait and save for the EV), how likely are you to opt for the electric vehicle, if you can afford it in 1 YEAR?

- 0 (0)
- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)
- 8 (8)
- 9 (9)
- 10 (10)

On a scale of 1 (Definitely buy the petrol car now) to 10 (Definitely wait and save for the EV), how likely are you to opt for the electric vehicle, if you can afford it in more than 1 YEAR?

- 0 (0)

- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)
- 8 (8)
- 9 (9)
- 10 (10)

Imagine you are buying a new car and can chose between a petrol version or an electric version

----

On a scale of 1 (Definitely purchase the petrol version) to 10 (Definitely purchase the electric version), how likely are you to opt for the electric version if it costs $2000 more than the petrol version?

- 0 (0)
- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)
- 8 (8)
- 9 (9)
- 10 (10)

On a scale of 1 (Definitely purchase the petrol version) to 10 (Definitely purchase the electric version), how likely are you to opt for the electric version if it costs $1500 more than the petrol version?

- 0 (0)
- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)
- 8 (8)
- 9 (9)
- 10 (10)

On a scale of 1 (Definitely purchase the petrol version) to 10 (Definitely purchase the electric version), how likely are you to opt for the electric version if it costs $1000 more than the petrol version?

- 0 (0)
- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)
- 8 (8)
- 9 (9)
- 10 (10)

On a scale of 1 (Definitely purchase the petrol version) to 10 (Definitely purchase the electric version), how likely are you to opt for the electric version if it costs $500 more than the petrol version?

- 0 (0)
- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)
- 8 (8)
- 9 (9)
- 10 (10)

On a scale of 1 (Definitely purchase the petrol version) to 10 (Definitely purchase the electric version), how likely are you to opt for the electric version if it costs the same as the petrol version?

- 0 (0)
- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)
- 8 (8)
- 9 (9)
- 10 (10)

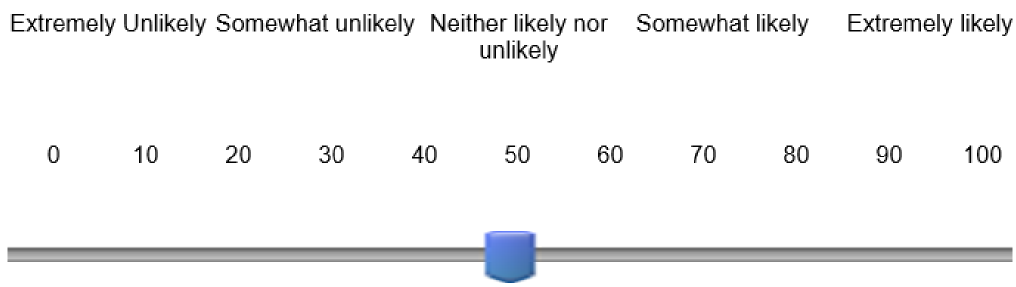
Do you have an investment account (e.g. KiwiSaver, Superannuation, 401K, Retirement Savings, stocks)?

- o Yes (1)
- o No (2)

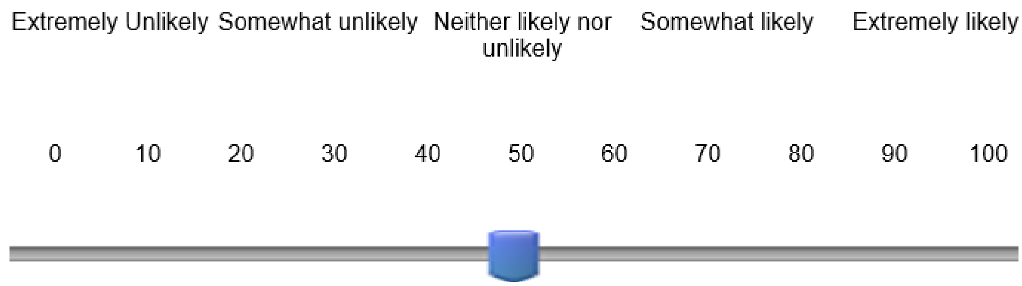
Do you think your investment account is a climate friendly fund? (i.e. does not contribute towards companies that cause environmental harm [Deforestation; environmental degradation e.g., pollution, chemical spills; production/distribution of palm oil; development/release of GMOs; and production/distribution of highly hazardous pesticides] or fossil fuel production or fossil fuel power generation)

- o Yes (1)
- o No (2)
- o I'm not sure (3)

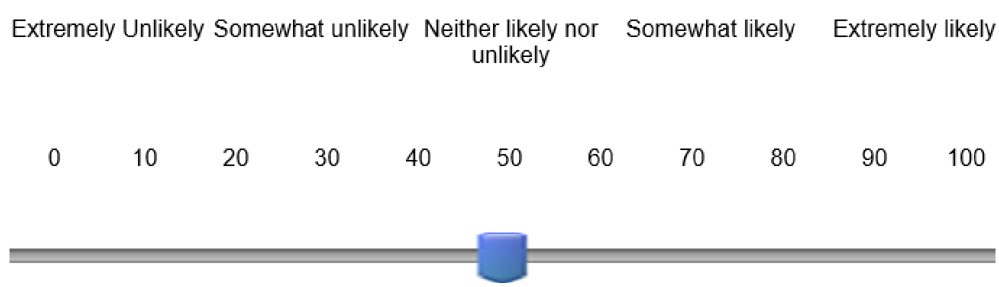
Imagine that you are given the opportunity to change your investment account to a climate-friendly fund. How likely are you to change to a climate friendly fund if you get an **equivalent** rate of return?



Imagine that you are giving the opportunity to change your investment account to a climate friendly fund. How likely are you to change to a climate friendly fund if you get a **higher** rate of return?



Imagine that you are given the opportunity to change your investment account to a climate-friendly fund. How likely are you to do so if you get a **lower** rate of return?



At the end of this study, there will be a raffle of up to $1000, which will be split into $20 Westfield vouchers. You can choose to donate half of your winnings to an environmentally friendly charity such as WWF, Global Footprint Network, Climate Foundation. The number of vouchers will be based on the proportion of individuals who chose to contribute their winnings, while the remaining amount will be utilized for the raffle. For instance, if half of the participants decide to donate their winnings, we will anonymously donate $500 (i.e. half of the total budget) to an environmentally friendly charity, and the remaining $500 will be used for the raffle, resulting in 25 participants being drawn, each of whom will receive a $20 Westfield voucher.

Do you wish to donate half of your potentially eligible winnings to an environmentally friendly charity such as WWF, Global Footprint Network, or Climate Foundation, or do you wish to keep all of your potential winnings?

- ○ Donate half of your potential winnings (1)
- ○ Keep all potential winnings (2)

This is in a separate form so that data are not linked

Please indicate if you wish to take part in the prize draw

- ○ Yes (1)
- ○ No (2)

What is your email address for the researcher to contact you if you do win the prize draw? *

---

b) Participant Information Sheet

Date Information Sheet Produced:

23 May 2024

Project Title

Mind the Gap: Exploring the influence of environmental awareness dissonance on ecological behaviours.

An Invitation

My name is Dharma Gopalakrishnan, and I am currently undertaking a Master of Arts in Psychology at AUT. As part of my thesis, I am writing to invite you to participate in a voluntary research project, investigating people's environmental attitudes and behaviours.

What is the purpose of this research?

This study attempts to uncover how your attitudes and information about your environmental impacts influence decision-making. The findings of this research will be used as part of my Master's thesis.

How was I identified, and why am I invited to participate in this research?

Participants will be recruited through a mixture of posters, advertisements on social media and snowball sampling. All participants must be over the age of 16.

How do I agree to participate in this research?

If you would like to participate, you can click the arrow at the bottom of this page to begin the survey. Your participation in this research is voluntary (it is your choice), and whether or not you choose to participate will neither benefit nor disadvantage you. You can withdraw from the study at any time. Suppose you decide to withdraw from the study. In that case, you will be offered the choice between having any data identifiable as belonging to you removed or allowing it to continue to be used. However, once the findings have been produced, removal of your data may not be possible. Because your participation is anonymous, submission of the survey will be taken as consent.

What will happen in this research?

Your participation will involve completing an online survey about your environmental attitudes and decision-making, which should take you approximately 20 minutes to complete. After participating, you will be given the opportunity to enter a prize draw. Entering the prize draw is optional.

What are the discomforts and risks?

Some of the questions in this survey will ask you about your environmental impact. If you find this topic uncomfortable, you may withdraw at any time. Your responses will remain anonymous.

How will these discomforts and risks be alleviated?

Participants will be reassured that none of the data will be shared with anyone outside of the researchers and that their identities will remain anonymous. The participant's identities will be anonymous regardless of whether or not they choose to take part in the prize draw, as their data will not be linked to that of the prize draw data.

What are the benefits?

Participating in this research project will help advance our knowledge of environmental psychology and contribute toward the researcher's qualification.

What are the costs of participating in this research?

The only cost of participating in this research is the time that participants take to complete the survey; we estimate that this should take no longer than approximately 20 minutes.

What opportunity do I have to consider this invitation?

Participants must complete the survey by October 25th, at which point it will be closed.

Will I receive feedback on the results of this research?

A summary of findings will be available on request from the primary researcher.

What do I do if I have concerns about this research?

Any concerns regarding the nature of this project should be notified in the first instance to the Project Supervisor, *Stef Gomes-Ng, stef.gomes-ng@aut.ac.nz, (+649) 921 9001 ext. 27312*.

Concerns regarding the conduct of the research should be notified to the Executive Secretary of AUTEC, *liz.binns@aut.ac.nz*, (+649) 921 9999 ext 6038.

Whom do I contact for further information about this research?

Please keep this Information Sheet and a copy of the Consent Form for your future reference. You are also able to contact the research team as follows:

Researcher Contact Details:

Dharma Gopalakrishnan, jxn1500@autuni.ac.nz

Project Supervisor Contact Details:

Stef Gomes-ng, stef.gomes-ng@aut.ac.nz, (+649) 921 9001 ext. 27312

Approved by the Auckland University of Technology Ethics Committee on *24/06/2024*, AUTEC Reference number *24/146*.

c) Debriefing sheet

This study aimed to examine how a person's attitudes about their environmental impact influence their environmental decision-making. We were interested in how providing information about one's carbon footprint influences your environmental decision-making.

You were asked questions regarding your environmental impact. You were then told that you either (1) had a positive impact on the environment, (2) harmed the environment, or (3) had the same impact as the average person. If you were part of the positive impact group, you would have received a lower carbon footprint score that indicates that you did more good for the environment (i.e. made more pro-environmental decisions) than you actually did. If you were part of the negative impact group, you would have received a higher carbon footprint score indicating that you do more harm to the environment (i.e., act less environmentally friendly). If you were part of the group that was told that you had the same impact as the average person, you would have received a carbon footprint score equivalent to that of an average person (i.e. you act per the social norms of your country). ***In reality, you were randomly assigned to one of the above three groups; your impact group does not reflect your actual environmental impact.***

We expect that when people are made aware that their environmental impact is higher than they think (i.e., a high carbon footprint score means that their decisions are environmentally unfriendly), they will make more pro-environmental decisions. On the other hand, when a person is made aware that their environmental impact is less than what they think (i.e., a low carbon footprint score, meaning that they are making pro-environmental decisions) or that they have an average environmental impact (i.e., the same carbon footprint score as the average person), they'll make less pro-environmental decisions.

If you are interested in your carbon footprint score, please visit https://carbon-calculator.climatehero.org/. If you wish to find out ways to reduce your carbon footprint further, visit https://explore.panda.org/climate/how-to-reduce-your-carbon-footprint.

If you are interested in this study's findings, please visit https://aut.au1.qualtrics.com/jfe/form/SV_dhY9hSwVGN0t6KO for a summary of the findings. Finally, it would be appreciated if you do not discuss this experiment with anyone else who may be eligible to participate, as such prior knowledge may impact our findings.

Your participation is greatly appreciated. Should you have any complaints or concerns, you may contact the researcher's Dharma Gopalakrishnan (jxn1500@autuni.ac.nz), Dr Stef Gomes-Ng(+64 9 921 9001 ext. 27312; stef.gomes-ng@aut.ac.nz), or the Executive Secretary of Auckland University of Technology Ethics Committee (AUTEC), (ethics@aut.ac.nz, (+649) 921 9999 ext. 6038).

Approved by the Auckland University of Technology Ethics Committee on 24/06/2024, AUTEC Reference Number 24/146