

Consumers' responses to sustainability initiatives: the impacts of response efficacy and fatalism

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Abstract

Purpose – This research aims to explore how sustainability messages focused on different sustainability initiatives influence consumers' willingness to pay premiums (WTPP) for sustainable products. It further investigates how response efficacy, fatalism, sustainability types and biometric joy help explain the relationship between sustainability initiatives and WTPP for sustainable products.

Design/methodology/approach – This research uses a quantitative methodology, drawing on data from online experiments and biometric facial expressions. Three experimental studies were carried out to explore consumers' responses to sustainable products. The proposed hypotheses were tested using between-subjects analysis of variance (ANOVA) and Hayes' PROCESS Models.

Findings – The findings demonstrate that consumers exhibit higher perceived response efficacy and biometric joy, which, in turn, enhance their WTPP for products featuring sustainable ingredients or packaging than those focusing on sustainable manufacturing, logistics or donations. In addition, the results measured and manipulated fatalism were found to significantly moderate the relationship between the manipulation of sustainability initiatives and WTPP through response efficacy and biometric joy. While sustainability initiatives emerged as the primary driver of WTPP, sustainability types (i.e. environmental vs social) also significantly moderated specific relationships depending on the sustainability initiative presented.

Research limitations/implications – This research highlights the effectiveness of sustainable packaging and ingredients as sustainability initiatives in promoting consumers' perceived response efficacy, biometric joy and WTPP for sustainable products. It also underscores the role of controlling consumer fatalism in further strengthening these outcomes.

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Practical implications – This research offers decision-makers valuable insights into how consumers perceive various sustainability initiatives and the mechanisms underlying their responses, enabling more effective sustainability communication strategies for brands.

Originality/value – This research integrated response efficacy, fatalism and biometric joy to address the sustainable consumption attitudes and behaviour gap, offering novel strategies for effective sustainability messaging and future research directions.

Keywords Sustainability initiatives, Willingness to pay premiums, Response efficacy, Fatalism, Biometric technology

Paper type Research paper

Introduction

Growing consumers' awareness of environmental and social challenges associated with their consumption patterns has driven demand for sustainable products (Han, 2021). Policymakers also set ambitious goals, such as the United Nations Sustainable Development Goals (SDGs) established in 2015, aligning with increasing demand for sustainable products to guide societies towards sustainable development (Garcia-Garcia *et al.*, 2021). In response to such trends, businesses have integrated sustainability initiatives into their operational activities, fostering more responsible production and consumption (SDG 12) (Berger, 2019; Thøgersen, 2017). Production and consumption span the entire supply chain from resource extraction and manufacturing to the use and disposal of products (Govindan and Hasanagic, 2018). Each process consists of several activities, which consumers may perceive as either tangible or intangible. For instance, a chocolate bar sold in Australia might be sourced from cocoa grown in Africa and processed in Europe, illustrating how global production processes can significantly impact the environment and society (McCullough *et al.*, 2019). Therefore, it is important to shift the existing production and consumption patterns towards sustainable methods (Richardson *et al.*, 2022).

Sustainability, as conceptualised in the Brundtland Report (1987, p. 8), refers to consuming the available resources to meet the needs of the current generation without compromising the ability of future generations to meet their own needs. Sheth *et al.* (2011) defined sustainability for businesses based on the concept of Triple Bottom Line (TBL), highlighting three sustainability pillars: environmental (e.g. low-carbon production, packaging and distribution), social (e.g. fair labour/trade to source, produce and distribute products) and economic (e.g. investing in sustainability while maintaining business financial stability). This concept not only makes businesses responsible for their economic return but also holds them accountable to the environment and society. These three pillars focus on achieving two sustainability types:

- (1) environmental; and
- (2) social.

Prior studies have often explored the environmental type of sustainability initiatives (e.g. Roy *et al.*, 2020), with little attention towards the social type (e.g. Modak *et al.*, 2019). Suh and Yoo (2024) investigated the role of sustainability types (environmental vs social) and product attributes (hedonic vs utilitarian) on consumers' intentions to purchase sustainable products. They found that utilitarian attributes and environmental advantages triggered more positive intentions to purchase sustainable products. However, they have not explored environmental vs social sustainability across different initiatives.

The two sustainability types (environmental and social) can be implemented across different functional areas of organisations, from sourcing sustainable raw materials as

ingredients for processed products to delivering finished products to supermarkets (Hanson *et al.*, 2019; Pritchard and Wilson, 2018) and donating to environmental or social causes (Modak *et al.*, 2019). Food manufacturers may include certain sustainably sourced components in their products. For instance, Patagonia Provisions supports sustainability through organic farming and responsible seafood sourcing (Macarthur and Heading, 2019). In animal-based products like beef, sustainability typically refers to environmentally and ethically conscious practices in animal raising and feeding (Kinley *et al.*, 2020). Product's packaging can also significantly contribute to environmental issues, suggesting that using sustainable packaging for products can be another way to practise sustainability (Haliez *et al.*, 2024).

Given that products' ingredients and packaging are tangible and close to consumers, as they can feel and interact with them, consumers may exhibit more positive responses to these sustainability initiatives (Seo *et al.*, 2016), compared to integrating sustainability into products' manufacturing processes or logistics activities. Initiatives related to Corporate Social Responsibilities (CSR), like donating to environmental and social causes, are also expected to be perceived as less tangible when compared to packaging and ingredients (Modak *et al.*, 2019). Therefore, as sustainability can be implemented in different forms, which can cause different consumer responses, it is important to identify which form is more salient in promoting sustainable behaviour. Although prior research has acknowledged that consumers respond differently to various sustainability initiatives (Hosta and Zabkar, 2021), how and why consumers differentiate among these initiatives, particularly when originating from different business functions, remains unclear. This remarkable gap hinders marketers from designing effective sustainability strategies that resonate with consumer attitudes. This study explores consumer responses to a range of sustainability initiatives implemented across different functional areas, such as using sustainable ingredients in the product itself, adopting eco-friendly packaging, improving manufacturing and logistics processes to reduce environmental impact and supporting environmental or social causes through corporate donations, recognising that responses may vary depending on the sustainability initiative incorporated into a product.

Given that sustainability can be operated in different forms, consumers' support for sustainability initiatives may also differ, presenting opportunities and challenges. Involving consumers in sustainability efforts can enhance brands' reputations (Gelderman *et al.*, 2021). However, sustainable products often come with premium prices due to the complexity of incorporating sustainability into operations. This creates a challenge, as consumers may be unwilling to pay premium prices, highlighting the gap between their intentions and actual behaviour (Nazarenko and Saleh, 2024). In other words, although consumers mainly state that they are willing to support companies' sustainability efforts, most do not walk their talk when it comes to spending extra on premium sustainable options (Yamoah and Acquaye, 2019). Hence, it is important to understand what drives consumers' willingness to pay premium prices (WTPP) for sustainable products to bridge this gap between their intentions and sustainable behaviours.

One key psychological and behavioural factor that helps explain consumers' responses to sustainability initiatives is response efficacy, which is defined as one's belief in the effectiveness of their actions (herein purchasing sustainable products) in mitigating a concern or threat (Bandura and Walters, 1977). Specifically, consumers are more likely to purchase sustainable items if they believe their actions can effectively offset the adverse impacts of purchasing less sustainable or unsustainable alternatives (Raine and Christensen, 2017). However, the effectiveness of these actions, and thus perceived response efficacy, varies depending on the specific sustainability initiatives businesses implement. For

example, consumers may spend more on sustainable packaging than on sustainably transported products. While existing research has largely taken an integrated approach to examining consumers' WTPP for sustainability initiatives (e.g. [Dörge et al., 2021](#); [Pang et al., 2021](#)), there has remained a gap in understanding how perceived response efficacy may vary across the different sustainability initiatives and how such difference leads to different WTPP for sustainable products.

Fatalism is another emerging factor that helps further explain the underlying mechanism of consumer WTPP for sustainable products. Fatalistic individuals view sustainability concerns as inevitable, leading to negative outlooks that hinder positive behavioural responses ([Entwistle, 2021](#)). Recent studies have found a negative correlation between fatalistic beliefs and an individual's intention to be involved in protective behaviours, such as sustainable consumption (e.g. [Ngien and Jiang, 2022](#); [Mayer and Smith, 2019](#)). However, the existing literature lacks a comprehensive understanding of how consumer fatalism shapes their perceived response efficacy and WTPP, focusing on different sustainability initiatives.

Beyond psychological and behavioural factors, research has extensively emphasised the pivotal role of consumers' emotional reactions in predicting their cognitive responses, such as WTPP ([Rozin and Fallon, 1987](#)). Facial expressions, a widely used biometric technology, have been used to capture consumers' emotional responses to product information (e.g. [Le Goff and Delarue, 2017](#); [Reisenzein et al., 2013](#)). Despite the growing application of biometric technologies in examining consumer responses, little attention has been given to how such methods can be used to understand the role of consumers' emotional reactions in shaping their WTPP for sustainable products. This research uses facial expression technology to explore consumers' positive emotional reactions, specifically biometric joy, towards sustainability messages through their facial gestures. Integrating biometric methods with self-reported responses improves the robustness and accuracy of findings by examining both consumers' conscious and unconscious responses, reducing the possibility of social desirability impact ([Chao and Lam, 2011](#)).

The findings of this research benefit multiple stakeholders in the context of marketing and sustainability, including business owners, policymakers and researchers. For businesses, the results provide guidance on whether shifting from one sustainability initiative to another is likely to enhance consumer WTPP. For example, understanding whether investment in sustainable ingredients yields higher consumer WTPP than investment in sustainable packaging can inform strategic decision-making. Moreover, the findings underscore the importance of positive fatalism messaging in amplifying the effectiveness of such initiatives through controlling consumer fatalism. Such insights provide businesses with practical strategies on how to craft effective sustainability communication materials to persuade consumers to purchase sustainable products. For policymakers, the insights contribute to policy prioritisation and efficient resource allocation. For instance, if the findings indicate that specific sustainability initiatives, such as sustainable packaging, elicit higher consumer WTPP than another initiative, such as donation, policymakers can direct regulations, subsidies and incentives towards sustainability initiatives that trigger higher consumer WTPP. This targeted approach not only maximises the effectiveness of limited policy resources but also accelerates consumer adoption of sustainable products. Finally, the findings benefit researchers to advance their theoretical understanding by identifying the psychological mechanisms through which sustainability initiatives shape consumer WTPP, thereby providing a foundation for designing future research in this domain. Specifically, this research addresses the following questions:

- RQ1. How is consumers' WTPP for sustainable goods influenced by the nature of sustainability initiatives incorporated in goods?
- RQ2. How do sustainability types (i.e. environmental vs. social) explain the relationship between sustainability initiatives and consumers' WTPP for sustainable goods?
- RQ3. How do factors like response efficacy and fatalism explain the mechanisms underlay consumers' WTPP for sustainable goods?

Exploratory research question:

- RQ4. How does biometric joy explain the relationship between sustainability initiatives and WTPP for sustainable goods, and what are the roles of consumer fatalism and sustainability types?

Review of the relevant literature

Sustainability initiatives

The concept of sustainability has evolved, leading to diverse research perspectives. One stream of research links sustainability to organisations' environmental sustainability practices, focusing on companies' eco-friendly initiatives (e.g. [Lingnau et al., 2019](#); [Gerini et al., 2016](#); [Tanner and Wölfling Kast, 2003](#)). However, a growing body of research argues that both environmental and social sustainability practices are equally important (e.g. [Panda et al., 2020](#); [Sander et al., 2021](#)), asserting that a sustainable future needs a holistic perspective that addresses both ecological and societal challenges ([Peattie, 2001](#)). Despite this broader conceptualisation, understanding consumers' responses to different sustainability initiatives remains complex. While prior research demonstrates that consumers may respond differently to various sustainability initiatives (e.g. [Hosta and Zabkar, 2021](#); [Kong et al., 2021](#)), exploring how consumer responses may differ when directly comparing one sustainability initiative to another has remained limited. This research, therefore, investigates which type of sustainability initiative is more salient in eliciting consumers' favourable responses.

To understand how consumers react towards different sustainability initiatives, it is important to capture how businesses operationalise sustainability. Businesses can integrate sustainability into their operational activities from sourcing raw materials to delivering the finished products to consumers ([Seuring and Müller, 2008](#)). This research adopts a comprehensive approach by examining five key sustainability initiatives across major business functions: sustainable packaging, ingredients, logistics, manufacturing and corporate donations to sustainability causes. These initiatives were selected based on their visibility to consumers ([Seuring and Müller, 2008](#)) and consistent prior support as meaningful drivers of consumer behaviour (e.g. [Han et al., 2021](#); [Lindh et al., 2016](#)). This approach is also theoretically grounded in the literature on Sustainable Supply Chain Management (SSCM), which refers to the integration of sustainability across all operational areas, including purchase, product design, manufacturing, packaging, warehousing, transportation and end-of-life management ([Linton et al., 2007](#)).

Based on SSCM, sustainable packaging includes activities related to product design and packaging, such as using recyclable, compostable or reusable materials, which is a highly visible cue in consumers' purchasing decisions and has been shown to influence consumer behaviour ([Lindh et al., 2016](#)). Sustainable ingredients are another observable product feature that consumers can observe before purchasing. They refer to responsible purchasing and sourcing raw materials, such as organic, fair-trade or locally grown components

(Seo *et al.*, 2016). One step before purchasing, sustainability can also be integrated into products' logistics and transportation activities, where sustainability is reflected in practices, such as electric or hybrid vehicle use, fuel and energy efficiency and carbon emission reduction (Han *et al.*, 2021). Before delivering products to supermarkets, sustainability can be involved in the manufacturing processes of products (i.e. transforming raw materials into final products) through practices, such as zero-waste production, energy-efficient systems and circular economy activities (Viles *et al.*, 2021). Beyond internal practices, donation as a form of social sustainability or CSR also aligns with integrating community into sustainability practices, as suggested by Wong *et al.* (2015) to demonstrate companies' broader social commitments (Modak *et al.*, 2019; Xu *et al.*, 2022).

From a theoretical standpoint, selecting the type of sustainability initiatives in this research is grounded in the TBL theory, which postulates that businesses' sustainability initiatives address three interrelated pillars: environmental, social and economic (Caradonna, 2014). Environmental sustainability focuses on conserving natural resources and reducing emissions (Krishnan *et al.*, 2020), while social sustainability involves practices that support societal well-being (Nakamba *et al.*, 2017). In contrast, economic sustainability relates to maintaining business financial stability (Costanza and Patten, 1995), which is often more of a managerial concern than consumers (Catlin *et al.*, 2017). This research focuses on environmental and social sustainability initiatives due to their direct relevance to companies' operational and CSR-related activities. The economic pillar is indirectly addressed by examining consumers' WTPP, which indicates the economic value perceived by a business's sustainability effort.

Consumers' willingness to pay premiums for sustainable products

Research has conceptualised willingness to pay (WTP) as the maximum price that consumers are willing to spend on purchasing a conventional product or service (Katt and Meixner, 2020). When a product offers a premium feature compared to conventional ones for which an extra price must be paid, the maximum amount a consumer is willing to pay is termed willingness to pay premium (WTPP) (Bo and Yang, 2022). WTPP for sustainable products represents the extra amount a customer is prepared to spend for the perceived sustainability benefits offered by a product or service (González-Rodríguez *et al.*, 2020). WTPP presents consumers' sustainable purchasing intentions and strongly indicates their commitment to sustainability (González-Rodríguez *et al.*, 2020).

The provision of sustainability information has been shown to positively influence WTPP (e.g. Alfaro and Chankov, 2022; Duong *et al.*, 2022). A study by Motoshita *et al.* (2015) examined how information about carbon dioxide (CO₂) emissions influences Japanese consumers' food and drink choices. Based on their findings, Japanese consumers are willing to pay extra for products with lower greenhouse gas emissions. Research also concluded that factors related to consumers' mindsets motivate them to spend premium prices for sustainable products. Su and Li (2024) found that consumers' WTPP for eco-friendly hotels depends on how the sustainability message is framed (gain vs loss) and their mindset (fixed vs growth). Specifically, messages focused on loss work better on consumers with a fixed mindset, while gain-framed messages are more effective for those with a growth mindset.

This connection between consumer mindset and sustainable purchasing is particularly relevant when considering the gap between intentions and behaviours. Given the growing attention towards sustainability practices, consumers often desire sustainable products, but their actual purchases do not reflect their intentions (Huo *et al.*, 2023). White *et al.* (2019) revealed that 65% of consumers intended to purchase sustainable products, yet only 26% did so. One potential reason for this gap is the premium prices of sustainable products, which

prevent consumers from purchasing them as often or in the quantities they intend. This price barrier significantly impacts consumers' purchasing decisions (Huo *et al.*, 2023), highlighting the need to identify which sustainability initiatives implemented by businesses are most appealing to consumers and how underlying psychological and behavioural factors influence their WTPP for sustainable products.

As noted previously, sustainability initiatives can take many forms, from sourcing sustainable raw ingredients to donations to support sustainability causes. They can be reflective of both social and environmental sustainability types. Consumers may perceive different effectiveness from various sustainability initiatives (Seuring and Müller, 2008), which may occur due to the variation of sustainability initiatives and their immediate outcomes for consumers. Recent research has shown that consumers respond differently to the various ESG elements (environmental, social and governance strategies), suggesting that the way sustainability initiatives are presented influences consumers' perceived effectiveness of responding to such initiatives (Lee, 2024). For example, sustainability initiatives focused on tangible personal benefits like organic, locally produced products may lead to higher perceptions of efficacy. This difference in how consumers perceive efficacy from sustainability initiatives can be explained by how psychologically close those initiatives feel, drawn from construal level theory (Trope *et al.*, 2007). Lee (2024) reasoned that sustainability strategies associated with low-distance consumers focus on concrete, immediate benefits and thus lead to higher purchase intentions. Growing evidence shows that personal experience with climate change events increases concern and action on climate change (Akerlof *et al.*, 2013; Keller *et al.*, 2022; McDonald *et al.*, 2015; Spence *et al.*, 2011). However, the relationship is complex, and it is imperative to explore the mechanism through which this different perceived effectiveness translates into consumers' financial support, particularly WTPP for sustainable products.

Research suggests that products' packaging and ingredients are the primary touchpoints between consumers and products at the purchasing stage (Seo *et al.*, 2016), particularly because consumers can see, feel, touch and interact with them before purchasing and consuming a product. Hence, sustainability initiatives incorporated into a product's packaging (e.g. recyclable packaging) and ingredients (e.g. sustainably sourced ingredients) are more likely to be perceived as closer to consumers (Keller *et al.*, 2022). These tangible aspects make sustainability closer and more immediate to the consumer, thus establishing a more direct connection between actions (e.g. purchasing a brand with sustainability-sourced ingredients) and outcomes (e.g. a more sustainable future). This perception reduces the need for extensive thought and financial analysis before purchasing, which may increase consumers' WTPP for sustainable products (Catlin *et al.*, 2017). These findings strengthen the hypothesis that consumers positively evaluate the sustainability initiatives of products and are, in principle, more willing to pay premiums to purchase sustainable products (Richelli *et al.*, 2025). This WTPP may differ depending on the sustainability initiative incorporated into products. Thus, we propose that as consumers come into direct contact with the sustainable ingredients and packaging of products, these initiatives increase their motivations to take climate actions; subsequently, they are more willing to pay premiums for products with sustainable ingredients and packaging compared to products with other sustainability initiatives (sustainable manufacturing, logistics, donations). Therefore, it is hypothesised that:

- H1.* Consumers' WTPP differs across sustainability initiatives, such that highly tangible initiatives (e.g. packaging and ingredients) elicit higher WTPP than moderately

Protection motivation theory and the *role* of response efficacy on consumer WTPP

The Protection Motivation Theory (PMT) provides a robust foundation for understanding the psychological mechanisms influencing consumers' WTPP for sustainable products (Floyd *et al.*, 2000; Wei *et al.*, 2017). Based on PMT, consumers engage in protective behaviours, such as purchasing sustainable products, when they perceive a significant threat (threat appraisal) from unsustainable consumption and believe that their actions can effectively mitigate that threat (coping appraisal) (Rogers, 1975). This behavioural shift is driven by the perceived response efficacy, which refers to one's belief in the effectiveness of a desired behaviour in eliminating the adverse impacts of the current behaviour (Raine and Christensen, 2017). Other theories, such as self-determination theory (Deci and Ryan, 1985) and value-belief theory (Stern, 2000), also incorporate perceived efficacy as an integral construct to determine one's pro-environmental and pro-social tendencies, suggesting efficacy features in environmental psychology theories.

In the sustainability realm, response efficacy is translated into consumers' belief in the effectiveness of purchasing sustainable products in diminishing the negative effects of unsustainable purchasing (Bradley *et al.*, 2020). Research consistently demonstrates that factors related to efficacy significantly improve consumers' cognitive responses to purchasing sustainable products due to stimulating their sense of control over the adverse impacts of their consumption (Bradley *et al.*, 2020; Wesley *et al.*, 2012). The existing findings suggest that consumers' perceived response efficacy from messages containing sustainability-related information is positively linked to their WTPP for sustainable products (Meijers *et al.*, 2022). Thus, when consumers perceive sustainability initiatives embedded in sustainable products as effective in addressing environmental and social problems, they evaluate such initiatives more favourably and show greater WTPP (Raine and Christensen, 2017).

However, lower efficacy, which can result from intangibility or invisibility of the sustainability initiatives to consumers, may hinder their sustainable behaviours (Breves and Schramm, 2021). For instance, sustainability initiatives focusing on manufacturing or logistics are harder to detect (e.g. CO₂ reductions in transportation), and climate change consequences associated with them remain abstract (Meijers *et al.*, 2022). In addition, many consumers struggle to connect their personal behaviour with broader sustainability outcomes, further reducing response efficacy (Fauville *et al.*, 2020). As a result, consumers with lower perceived response efficacy are less likely to engage in climate change mitigation actions as they perceive those actions as ineffective in reducing climate issues (Xie *et al.*, 2019).

One practical way to increase consumers' perceived response efficacy is to understand which sustainability initiatives trigger higher response efficacy. Given that sustainability is operated across several business functions, from packaging a product with recyclable materials to reducing emissions of the product's delivery method, consumers are expected to indicate different levels of response efficacy when exposed to different sustainability initiatives. For example, given that consumers closely and directly interact with a product's packaging and ingredients (i.e. the product itself) at the purchasing point (Bouwman *et al.*, 2024; Catlin *et al.*, 2017; Seo *et al.*, 2016; Trope *et al.*, 2007), it is plausible that they perceive higher efficacy from purchasing products with sustainable packaging or ingredients. This heightened perceived response efficacy, in turn, motivates them to spend premiums on

sustainable products. While sustainability initiatives like donations are often less observable and their impacts may not be immediately visible, consumers are then expected to exhibit lower perceived response efficacy and, in turn, WTPP for products with such sustainability initiatives. Given the regulatory role of response efficacy on the relationship between sustainability initiatives and WTPP, we anticipate that it mediates this relationship. Hence, we propose that:

- H2. The relationship between sustainability initiatives and WTPP for sustainable goods is mediated by response efficacy.

Fatalism and consumer WTPP for sustainable products

Fatalism refers to the belief that events are predetermined and that individuals cannot change or avoid the outcomes (Norenzayan and Lee, 2010), viewing both positive and negative outcomes as inevitable (Chan *et al.*, 2009). Fatalistic individuals tend to accept adverse events as inevitable (Ngueutsa and Kouabenan, 2017), which fosters a passive attitude towards the possibility of changing a situation. A fatalistic person is, therefore, less likely to believe their actions, such as purchasing sustainable products, can effectively mitigate hazards or concerns like those related to unsustainable consumption (Maercker *et al.*, 2019).

Research across several contexts, including psychology (Pettersson *et al.*, 2025), health (Dayapoglu *et al.*, 2021) and organisational behaviour (Zhang *et al.*, 2022) consistently highlights the pivotal role of fatalism beliefs in reducing people's intentions to engage in protective behaviours (Ngien and Jiang, 2022). D'Orlando *et al.* (2011) found that individuals exhibiting higher degrees of fatalism tend to experience more psychological distress during times of unemployment compared to their less fatalistic counterparts. In a related vein, O'Connor and Kabadayi (2020) reported that people who associate life events with external forces like fate or luck often demonstrate reduced awareness of health insurance concepts. Another research found that fatalism can diminish people's motivations to change their living conditions in developing countries (Pajardi *et al.*, 2020). This trend is concerning as fatalism can undermine people's motivation for action (Ngien and Jiang, 2022).

In the context of sustainability disclosure, climate reports are increasingly emphasising the inevitable consequences of climate change. A content analysis by Merry and Mattingly (2024) found a modest but statistically significant rise in fatalistic language in newspaper reporting of IPCC (i.e. Intergovernmental Panel on Climate Change) assessments from 2013 to 2022. This shift in the media framing is also supported by sustainability research. A study by O'Neill and Nicholson-Cole (2009) demonstrated that exposure to catastrophic climate imagery diminishes people's engagement in protective actions. Another study encompassing 50,000 respondents from 48 countries revealed that highly fatalistic individuals resist behaviour change and are often unwilling to engage in pro-environmental actions (Mayer and Smith, 2019). Similarly, Mahmood *et al.* (2020) found that highly fatalistic farmers are less likely to adopt climate change measures for wheat production. Together, these findings suggest that fatalism is a crucial factor in undermining consumers' motivations to engage in sustainable behaviours, such as purchasing sustainable products.

This feeling of powerlessness can be associated with lower perceived efficacy from a protective behaviour (Simonet and Fatorić, 2016; Neff and Hoppe, 1993). In fact, people either feel that they have little control over the outcome (i.e. fatalism) (Mayer and Smith, 2019; Morris *et al.*, 2020), or they believe that their responses will have little impact on changing the situation (i.e. response efficacy) (Bandura and Walters, 1977). Research has shown response efficacy as a consistent predictor of consumers' engagement in sustainable

behaviours (Bradley *et al.*, 2020). Consumers who believe their consumption patterns can significantly boost climate issues or sustainability concerns are more likely to engage in sustainable consumption, even if it is personally costly (Mayer and Smith, 2019). However, fatalistic beliefs may hinder this effect. Consumers may believe that their sustainable behaviour (i.e. WTPP for a sustainable product) can significantly reduce the effect of unsustainable consumption (e.g. climate change, sustainability issues). However, that effect is inevitable; therefore, they will be less likely to engage in sustainable behaviour. As such, we expect that fatalism beliefs moderate the impact of sustainability initiatives on consumers' perceived response efficacy and, therefore, consumers with higher levels of fatalism are expected to indicate lower WTPP for sustainable products:

- H3. The relationship between sustainability initiatives and response efficacy is moderated by fatalism and, together, influences consumers' WTPP for sustainable goods.

The role of facial expressions and fatalism on consumer WTPP

Facial recognition technology has emerged as a valuable tool for studying consumers' emotional reactions to product attributes (Garaus *et al.*, 2021; Katare *et al.*, 2025), such as sustainability initiatives. Such emotional reactions are rooted in one's internal physiological states, which emerge spontaneously and are closely tied to subjective experiences and observable behaviours (Bagozzi *et al.*, 1999). Emotions are often defined as mental states that arise from cognitive appraisals of environmental cues and manifest physically through facial expressions and gestures (Bagozzi *et al.*, 1999). The core assumption underlying the analysis of emotions based on facial recognition is that a reliable relationship exists between one's implicit emotional state and facial expressions (Reisenzein *et al.*, 2013). As such, several authors suggest measuring consumers' implicit or unconscious responses, in addition to self-reported responses, to better understand the mechanisms underlying their behaviours (Beyts *et al.*, 2017).

Facial expression technology decodes consumers' positive and negative emotional responses, including joy, fear, anger, disgust and sadness, by analysing their facial muscle movements (Katare *et al.*, 2025). Negative emotions, such as fear, anger, sadness or disgust, are less likely to be activated when measuring drivers of consumers' WTPP for sustainability products. Fear is unlikely because most sustainability initiatives do not pose a direct threat or concern to consumers' personal well-being. Anger is likely to arise only when consumers perceive greenwashing in how brands present their sustainability initiatives. Sadness is more associated with exposure to environmental concerns, whereas sustainability initiatives provide solutions, thereby reducing the likelihood of sadness. Disgust may be activated in an unappealing situation, such as poorly designed packaging. In contrast, positive emotional reactions, such as joy, are more likely to be elicited when consumers are exposed to brands' sustainability initiatives, as these initiatives often signal positive contribution, reinforcing consumers' emotional motivation to support sustainability. In addition, joy reflects consumers' immediate, non-verbal sense of success and moral satisfaction, making it a more suitable biometric indicator of positive evaluations of sustainability initiatives than negative facial emotions, which are less informative in a solution-focused, sustainable consumption context (Fernández-Ferrín *et al.*, 2024; Sharma *et al.*, 2023). Furthermore, individuals who experience arousal and positive effects are more likely to recognise the ethical dilemma, which, in turn, leads to prescriptive judgement, ethical intention and ethical behaviour (Gaudine and Thorne, 2001).

Existing studies have also widely measured consumers' reactions to food product attributes by capturing their positive facial expressions (e.g. Bartkiene *et al.*, 2019; Cong *et al.*, 2023; Mehta *et al.*, 2021; Torrico *et al.*, 2018). Gonzalez Viejo *et al.* (2019) found that sweetness in beer evokes biometric joy, while bitterness was associated with negative facial reactions and lower product preferences. Similarly, White *et al.* (2019) highlighted the critical role of positive emotions, such as joy, in promoting pro-environmental behaviours. Le Goff and Delarue (2017) also reported less negative facial reactions to unconventional products, such as insect-based chips. In another study, Grunert *et al.* (2024) investigated the impact of sustainability information on consumers' WTP for two types of sustainable coffees. They found no significant difference between consumers' facial reactions, suggesting that not all sustainability initiatives evoke different emotional reactions. Rahmani *et al.* (2024) investigated the role of consumers' facial expressions towards wine products in their purchasing decisions. They found that positive emotions, such as joy and happiness, are critical for promoting wine purchases. Such findings support the role of consumers' positive facial reactions in understanding their responses towards sustainable products (de Wijk *et al.*, 2025).

Consumers' positive facial emotions, such as biometric joy, can be adversely affected by a sense of powerlessness or fatalism, which holds that events are controlled by external forces such as fate or luck (Seeman, 1972). Hayes and Clerk (2021) examined the role of fatalism messaging (fatalistic vs optimistic) in shaping individuals' fatalism, behavioural intentions and mental health outcomes. Their findings yielded that fatalism is negatively associated with mitigation efforts. It also increases depression while reducing the sense of fear and insecurity. A survey conducted by Pearce and Moscardo (2025) revealed a positive correlation between consumers' feelings of eco-fatigue (i.e. a negative feeling that decreases consumer interest in eco-labelled products) and fatalism, highlighting that higher fatalism levels can foster consumers' negative emotions, specifically eco-fatigue. Similar findings indicate that consumers with higher levels of fatalism are less likely to engage with sustainable products due to less positive emotional reactions, reducing protective behaviours (McNeish, 2017; Ngien and Jiang, 2022). Given the growing emphasis on exploring the impact of consumer fatalism on consumers' emotional reactions towards sustainable products, it is imperative to investigate how this mechanism may influence their WTPP for sustainable products, with a focus on different sustainability initiatives.

Therefore, this research poses the following exploratory question to understand the role of biometric joy in shaping consumers' WTPP and how concepts such as fatalism and sustainability types may influence this relationship:

- RQ4. How does biometric joy explain the relationship between sustainability initiatives and WTPP for sustainable goods, and what are the roles of consumer fatalism and sustainability types?

Research method

This research uses quantitative methodology across three experimental studies to test the proposed hypotheses. Study 1 used a 2×5 experimental design to examine consumers' WTPP for different sustainability initiatives (i.e. addressing RQ1 and H1). This study also examined how sustainability types (i.e. environmental vs social) (i.e. addressing RQ2) and perceived response efficacy (i.e. addressing RQ3 and H2) help explain consumers' WTPP for sustainable products. Study 2 used a 2×3 experimental design to examine the moderating impact of fatalism on the indirect relationship between sustainability initiatives and consumers' WTPP via perceived response efficacy (i.e. addresses RQ3 and H3). Study 3

contained a pre-test and the main study. The pre-test examines the robustness of the manipulation of fatalism. The main study used a 2×3 experimental design to examine the moderating impact of fatalism manipulation (positive vs negative) on the indirect relationship between sustainability initiatives and consumers' WTPP via perceived response efficacy (i.e. further addressing RQ3 and H3). This study also collected biometric data via facial expressions technology to explore the impact of consumers' experience of biometric joy from sustainability initiatives on their WTPP for sustainable products (i.e. addressing RQ4).

While focused on the food industry, this research's insights are anticipated to be broadly applied across various sectors. To further enhance the generalisability of the findings on effective sustainability initiatives, products from different food categories were used as stimuli. The stimulus materials contain consistent product information, including brand name, product name, raw food details and weight. A sustainability message was added to the product's packaging that indicated the sustainability initiative (i.e. packaging, ingredients, logistics, manufacturing or donation) and the type of initiative (i.e. environmental or social) that was implemented by the producer (see Table A1 in the Appendix for details). Data collection for all three studies was conducted through the Prolific consumer panel based on three inclusion criteria:

- (1) respondents aged above 18;
- (2) having purchased groceries at least once in the past three months to ensure that they were decision-makers for the relevant products used as stimuli; and
- (3) having no special dietary restrictions to avoid certain biases in food choices and consumption.

The next sections detail the methodological approach used in each study.

Study 1

Method

The products studied in this research offer sustainability features in different forms. Hence, consumers' maximum WTP for these products with premium features is measured as WTPP. Specifically, this study aims to measure how response efficacy and sustainability type shape consumers' WTPP for products with sustainability initiatives. The study follows a 2×5 experimental design. Sustainability was manipulated across five functional business areas: packaging, ingredients, logistics, manufacturing and donations. It was also manipulated in environmental and social terms through a product packaging message. This study used a Salmon product as a stimulus (see Figure 1 and Table A1 in the Appendix for manipulation details).

Participants initially read the research information sheet and consented to participate in this study. Then, each participant was randomly assigned to one experimental condition. After displaying the stimulus materials, participants were asked to respond to questions regarding the manipulation of environmental vs social sustainability, WTPP for the product and response efficacy (see Table 1 for details of measurement scales and Figure 2 for the conceptual model). Finally, they provided their demographic information, including age, gender, income and education.

A total of 326 fair individuals participated in this study, with 64 participants excluded due to failing attention checks to incomplete responses, leading to 262 responses for analysis. Cohen's f^2 ($f^2 = \frac{R^2_{Full} - R^2_{Reduced}}{1 - R^2_{Full}}$) was calculated based on the difference in R^2 between the full model (includes only X) and the reduced model (includes X, M and/or W) (Cohen, 1988) to



Figure 1. Stimuli materials – Study 1

examine the significance of the models in explaining variances in consumers' WTPP for sustainable products. The R^2 for the full model was obtained from the PROCESS output, where the DV (Y) is WTPP. The R^2 for the reduced model was calculated by running a linear regression between X and Y. The results indicated that the inclusion of response efficacy as a mediator accounted for f^2 of 0.042 ($f^2 = \frac{0.082 - 0.043}{1 - 0.082} = 0.042$), suggesting a small effect size based on Cohen's guideline: small effect: $f^2 = 0.02$, medium effect: $f^2 = 0.15$, large effect: $f^2 = 0.35$ (Cohen, 1988).

Given the detected small to moderate effect size, we conducted a post hoc sample size analysis in G*Power with the moderate effect size ($f^2 = 0.15$) (Cohen, 1988) and the standard α of 0.05, as suggested by previous research (Weber *et al.*, 2021). The results yielded that there is a strong power for regression analysis in this study ($1 - \beta = 0.99$), suggesting that increasing the sample size would not improve the results as the power exceeds the threshold of 0.80 (Cohen, 1988). Hence, if there is a significant relationship between the research constructs, this study can detect it.

The sample analysis results demonstrated that the sample was relatively balanced in gender (i.e. 50.8% were male). Furthermore, 35.6% of participants were aged 35–44, followed by 31.7% aged 25–34 ($M = 39.60$, $SD = 10.53$). Moreover, 50.8% of the participants reported having bachelor's degrees. In addition, approximately 35% of participants reported a AU\$60,000–AU\$99,999 annual income, followed by 21.2% with a AU\$100,000–AU\$149,999 annual income.

Table 1. Measurement constructs and scale items

Constructs and scale items	Cronbach's alpha Study 1	Cronbach's alpha Study 2	Cronbach's alpha pre-test	Cronbach's alpha Study 3	Reference(s)
Environmental sustainability PES1: The brand uses green technology PES2: The brand invests in the environment PES3: The brand produces eco-friendly products PES4: The brand achieves environmental innovativeness PES5: The brand recycles/encourages recycling	0.90	0.83	Not included	0.91	Adopted from Kim <i>et al.</i> (2015)
Social sustainability PSS1: The brand serves social responsibility PSS2: The brand cares about human rights PSS3: The brand makes social contributions PSS4: The brand provides social activities for local communities PSS5: The brand hires local people PSS6: The brand donates and offers volunteer work	0.90	0.84	Not included	0.94	Adopted from Kim <i>et al.</i> (2015)
Willingness to pay premiums Please indicate the maximum price you will pay to purchase this product Response efficacy RE1: I am sure that purchasing this product is effective in preventing damage to the environment or society RE2: I am sure that purchasing this product will help prevent sustainability issues RE3: I am sure that purchasing this product will help prevent threats to a sustainable future	Single item 0.93	Single item 0.93	Not included Not included	Single item 0.93	Adopted from Rossi and Rivetti (2020) Adopted from Ibrahim and Al- Ajlouni (2018)
Fatalism F1: It seems like everything causes environmental and/or social issues	Not included	0.70	0.54	0.52	Adopted from Niederdeppe and Levy (2007) (continued)

Table 1. Continued

Constructs and scale items	Cronbach's alpha Study 1	Cronbach's alpha Study 2	Cronbach's alpha pre-test	Cronbach's alpha Study 3	Reference(s)
F2: There is not much a person can do to lower the environmental and/or social impacts of their consumption					
F3: There are so many recommendations about preserving the environment and society, it's hard to know which ones to follow					
Pessimism					
PES1: It is best not to get your hopes too high since you will probably be disappointed	Not included	Not included	0.95	Not included	Adopted from Sadiq <i>et al.</i> (2020)
PES2: Rarely do I expect good things to happen					
PES3: If something can go wrong for me, it will					
PES4: I hardly ever expect things to go my way					
PES5: Things never work out the way I want them to					
PES6: If I make a decision on my own, I can pretty much count on the fact that it will turn out to be a poor one					
PES7: I rarely count on good things happening to me					
PES8: Better to expect defeat: then it doesn't hit so hard when it comes					
PES9: Give me 50/50 odds, and I will choose the wrong answer every time					
Optimism					
OPT1: In uncertain times, I usually expect the best	Not included	Not included	0.87	Not included	Adopted from Sadiq <i>et al.</i> (2020)
OPT2: I always look on the bright side of things					
OPT3: I'm always optimistic about my future					
OPT4: When I undertake something new, I expect to succeed					
OPT5: Where there's a will, there's a way					
OPT6: In general, things turn out all right in the end					

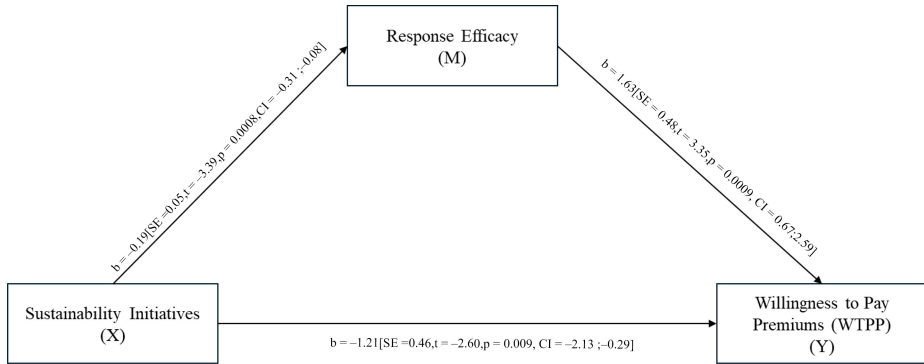


Figure 2. Conceptual model – Study 1

Results and discussion

Manipulation check. A 2×5 between-subject analysis of variance (ANOVA) was conducted to test the effectiveness of manipulating sustainability across two types and five initiatives. The findings indicate that the manipulation of sustainability types significantly influenced participants' perceptions of environmental sustainability [$F(1, 254) = 4.26, p = 0.04$], with higher ratings for environmental sustainability ($M = 4.75, SD = 1.07$) compared to social sustainability ($M = 4.38, SD = 1.32$). The effect of manipulation of sustainability initiatives on participants' perceptions of environmental sustainability was also significant [$F(4, 254) = 3.40, p = 0.01$], with participants perceiving higher environmental sustainability for sustainable ingredients ($M = 4.84, SD = 1.35$) ($t_{\text{ingredients vs donation}} = 3.54, p_{\text{ingredients vs donation}} = 0.005$) and packaging ($M = 4.79, SD = 0.98$) ($t_{\text{packaging vs donation}} = 3.21, p_{\text{packaging vs donation}} = 0.01$) compared to donations ($M = 4.05, SD = 1.37$). The interaction effect between sustainability types and initiatives on environmental sustainability perceptions was non-significant [$F(4, 254) = 1.97, p = 0.09$].

Similarly, the manipulation of sustainability types significantly influenced consumers' perceptions of social sustainability [$F(1, 253) = 4.13, p = 0.04$], with higher ratings for social sustainability ($M = 3.83, SD = 1.08$) than environmental sustainability ($M = 3.55, SD = 1.20$). The effect of sustainability initiatives on social sustainability was also significant [$F(4, 253) = 3.34, p = 0.01$], with donations perceived as more socially sustainable ($M = 4.03, SD = 1.09$) than sustainable logistics ($M = 3.33, SD = 1.01$) ($t_{\text{logistics vs donation}} = -3.33, p_{\text{logistics vs donation}} = 0.01$). The interaction effect of sustainability types and initiatives on social sustainability was non-significant [$F(4, 253) = 0.54, p = 0.70$]. Overall, the results confirmed that participants effectively distinguished between environmental and social sustainability and among the different sustainability initiatives, suggesting robust manipulation.

Hypotheses testing. ANOVA analysis was conducted as a pre-check to test the relationship between the constructs before conducting PROCESS analysis. A 2×5 between-subject ANOVA was conducted to test the effect of manipulation of the sustainability initiatives and sustainability types on participants' perceived response efficacy. Results demonstrate a significant impact of sustainability initiatives on response efficacy [$F(4, 252) = 3.75, p = 0.005$, partial eta squared = 0.05]. Specifically, significant pairwise differences were obtained between packaging ($M = 4.26, SD = 1.03$) and donations ($M = 3.51, SD = 1.42$) ($t_{\text{packaging vs donation}} = 2.84, p_{\text{packaging vs donation}} = 0.04$), as well as

between ingredients ($M = 4.46$, $SD = 1.44$) and donations ($t_{\text{ingredients vs donation}} = 3.74$, $p_{\text{ingredients vs donation}} = 0.002$). These findings indicate that packaging and ingredient-related initiatives were perceived as having higher response efficacy than donation-based initiatives. The results revealed no significant differences among the remaining pairwise comparisons, such as logistics and manufacturing. Refer to Table 2 for detailed findings.

The impact of sustainability types [$F(1, 252) = 0.03$, $p = 0.85$, partial eta squared = 0.00] on response efficacy and the interaction effect of sustainability types and sustainability initiatives on response efficacy [$F(4, 252) = 1.20$, $p = 0.31$, partial eta squared = 0.01] were non-significant. Furthermore, the results suggest that consumers' WTPP differs depending on the sustainability initiative incorporated into a product [$F(4, 259) = 3.53$, $p = 0.008$, partial eta squared = 0.05]. Specifically, significant differences were found between WTPP for packaging ($M = 18.55$, $SD = 12.53$) and donations ($M = 11.48$, $SD = 8.08$) ($t_{\text{packaging vs donation}} = 3.38$, $p_{\text{packaging vs donation}} = 0.008$) and between WTPP for ingredients ($M = 17.18$, $SD = 11.76$) and donations ($t_{\text{ingredients vs donation}} = 2.85$, $p_{\text{ingredients vs donation}} = 0.03$), suggesting higher WTPP for packaging and ingredients compared to other sustainability initiatives. The results did not reveal any significant findings for other pairwise comparisons. These findings address RQ1. How is consumers' WTPP for sustainable goods influenced by the nature of sustainability initiatives incorporated in goods? and support H1 by indicating how consumers' WTPP differs depending on the sustainability initiative embedded in sustainable products (refer to Table 3 for detailed findings).

Building on observed differences in consumers' WTPP based on the level of tangibility of sustainability initiatives, the initiatives are classified into three categories: high-tangible, moderate-tangible and low-tangible initiatives. Initiatives related to packaging and

Table 2. ANOVA output – post hoc test results – response efficacy

Sustainability initiative (i)	Sustainability initiative (ii)	Mean difference	Std. error	Sig.	95% confidence interval	
					Lower bound	Upper bound
Packaging	Ingredients	-0.20	0.26	0.94	-0.93	0.53
	Logistics	0.30	0.26	0.77	-0.42	1.02
	Manufacturing	0.16	0.26	0.97	-0.56	0.88
	Donation	0.75	0.26	0.04	0.02	1.47
Ingredients	Packaging	0.20	0.26	0.94	-0.53	0.93
	Logistics	0.50	0.25	0.26	-0.19	1.19
	Manufacturing	0.36	0.25	0.60	-0.33	1.06
	Donation	0.95	0.25	0.002	0.25	1.65
Logistics	Packaging	-0.30	0.26	0.77	-1.02	0.42
	Ingredients	-0.50	0.25	0.26	-1.19	0.19
	Manufacturing	-0.14	0.24	0.98	-0.82	0.54
	Donation	0.45	0.24	0.37	-0.23	1.13
Manufacturing	Packaging	-0.16	0.26	0.97	-0.88	0.56
	Ingredients	-0.36	0.25	0.60	-1.06	0.33
	Logistics	0.14	0.24	0.98	-0.54	0.82
	Donation	0.59	0.25	0.13	-0.10	1.28
Donation	Packaging	-0.75	0.26	0.04	-1.47	-0.02
	Ingredients	-0.95	0.25	0.002	-1.65	-0.25
	Logistics	-0.45	0.24	0.37	-1.13	0.23
	Manufacturing	-0.59	0.25	0.13	-1.28	0.10

Table 3. ANOVA output – post hoc test results – WTPP

Sustainability initiative (i)	Sustainability initiative (ii)	Mean difference	Std. error	Sig.	95% confidence interval	
					Lower bound	Upper bound
Packaging	Ingredients	1.37	2.11	0.96	-4.42	7.15
	Logistics	4.35	2.06	0.22	-1.32	10.02
	Manufacturing	3.07	2.10	0.58	-2.68	8.83
Ingredients	Donation	7.07	2.10	0.008	1.32	12.83
	Packaging	-1.37	2.11	0.96	-7.15	4.42
	Logistics	2.98	1.97	0.55	-2.44	8.40
	Manufacturing	1.71	2.01	0.91	-3.81	7.22
Logistics	Donation	5.70	2.01	0.03	0.19	11.22
	Packaging	-4.35	2.06	0.22	-10.02	1.32
	Ingredients	-2.98	1.97	0.55	-8.40	2.44
	Manufacturing	-1.27	1.96	0.96	-6.67	4.12
Manufacturing	Donation	2.73	1.96	0.63	-2.67	8.12
	Packaging	-3.07	2.10	0.58	-8.83	2.68
	Ingredients	-1.71	2.01	0.91	-7.22	3.81
	Logistics	1.27	1.96	0.96	-4.12	6.67
Donation	Donation	4.00	2.00	0.26	-1.49	9.49
	Packaging	-7.07	2.10	0.008	-12.83	-1.32
	Ingredients	-5.70	2.01	0.03	-11.22	-0.19
	Logistics	-2.73	1.96	0.63	-8.12	2.67
	Manufacturing	-4.00	2.00	0.26	-9.49	1.49

ingredients are highly tangible, as they are immediately visible to consumers at the point of purchase, require minimal cognitive effort and, in turn, lead to higher WTPP. Manufacturing is classified as moderately tangible because it refers to production activities outside consumers’ tangible experience; however, these activities can still be communicated through product packaging. In contrast, logistics and donations are classified as low-tangible initiatives, as they are largely invisible to consumers and outside of their direct purchasing experience. This classification is consistent with consumers’ exhibited WTPP, with higher mean WTPP scores for high-tangibility initiatives, and it decreases progressively as tangibility declines (i.e. packaging $M = 18.55$, ingredients $M = 17.18$, manufacturing $M = 15.48$, logistics $M = 14.20$, donation $M = 11.48$).

Mediation analysis. PROCESS Model 4 with a bias-corrected 95% confidence interval (bootstrapping $n = 10,000$) was conducted in SPSS (version 27) to test the mediation effect of response efficacy on the relationship between manipulation of sustainability initiatives and WTPP (i.e. addressing $H2$). The manipulation of the sustainability initiative as an independent variable was considered multi-categorical with an indicator coding system to compare different sustainability initiatives. Results demonstrate that response efficacy varies significantly across sustainability initiatives. Specifically, significant differences were found between packaging and donation, ingredients and donation, ingredients and logistics, logistics and donation (marginally significant) and manufacturing and donation. This perceived response efficacy then significantly impacts consumers’ WTPP for sustainable products ($b = 1.43$, $SE = 0.49$, $t = 2.92$, $p = 0.00$, $CI = 0.47, 2.40$). Furthermore, the findings revealed a significant difference in consumers’ WTPP for pairwise comparisons between donation and packaging, donation and ingredients and a marginal difference between logistics and packaging (see [Table 4](#) for details).

Table 4. Process Model 4 output: coefficients for mediation analysis

Path	Effect (B)	SE	t	p	LLCI	ULCI
Ingredients – Packaging → Response efficacy	0.20	0.26	0.76	0.44	–0.32	0.72
Logistics – Packaging → Response efficacy	–0.30	0.26	–1.15	0.25	–0.81	0.21
Manufacturing – Packaging → Response efficacy	–0.16	0.26	–0.6	0.54	–0.67	0.35
Donation – Packaging → Response efficacy	–0.74	0.26	–2.83	0.005	–1.26	–0.22
Logistics – Ingredients → Response efficacy	–0.5	0.25	–2	0.04	–0.99	–0.009
Manufacturing – Ingredients → Response efficacy	–0.36	0.25	–1.4	0.15	–0.86	0.13
Donation – Ingredients → Response efficacy	–0.94	0.25	–3.74	0.0002	–1.44	–0.44
Manufacturing – Logistics → Response efficacy	0.13	0.24	0.56	0.57	–0.34	0.62
Donation – Logistics → Response efficacy	–0.44	0.24	–1.8	0.07	–0.93	0.04
Donation – Manufacturing → Response efficacy	–0.58	0.25	–2.33	0.02	–1.08	–0.09
Ingredients – Packaging → WTPP	–1.59	2.09	–0.76	0.44	–5.71	2.52
Logistics – Packaging → WTPP	–3.87	2.05	–1.88	0.06	–7.92	0.16
Manufacturing – Packaging → WTPP	–2.84	2.07	–1.37	0.17	–6.93	1.24
Donation – Packaging → WTPP	–6.00	2.10	–2.85	0.004	–10.14	–1.85
Logistics – Ingredients → WTPP	–2.28	1.98	–1.15	0.25	–6.19	1.62
Manufacturing – Ingredients → WTPP	–1.24	2.00	–0.62	0.53	–5.19	2.69
Donation – Ingredients → WTPP	–4.40	2.04	–2.15	0.03	–8.44	–0.37
Manufacturing – Logistics → WTPP	1.03	1.95	0.53	0.59	–2.80	4.87
Donation – Logistics → WTPP	–2.12	1.96	–1.08	0.28	–5.98	1.74
Donation – Manufacturing → WTPP	–3.15	1.99	–1.58	0.11	–7.09	0.77

In addition, the results demonstrate that manipulating the sustainability initiatives has a significant overall effect on WTPP. Specifically, pairwise comparisons demonstrate that packaging and ingredients lead to significantly higher WTPP than other sustainability initiatives, such as logistics, manufacturing or donation. The indirect effect of manipulating the sustainability initiatives on WTPP through response efficacy was significant for the pairwise comparisons between donation and packaging, logistics and ingredients, donation and ingredients and donation and manufacturing. Refer [Table 5](#) for detailed findings.

These findings address *RQ3* (How do response efficacy and fatalism explain the mechanisms underlay consumers' WTPP for sustainable goods?) and support *H2* by demonstrating that response efficacy is a key psychological mechanism through which sustainability initiatives lead to WTPP, with higher perceived response efficacy and, in turn, WTPP for high-tangible initiatives, such as packaging and ingredients, compared to moderate tangible initiatives, such as manufacturing, and low-tangible initiatives, such as logistics and donation (refer [Table 5](#)).

Moderated mediation analysis. [Hayes's \(2017\)](#) PROCESS macro, Model 7, in SPSS (version 27), with a bias-corrected 95% confidence interval (bootstrapping $n = 10,000$), was conducted to test the impact of sustainability types (i.e. moderator) on the indirect effect of the manipulation of the sustainability initiatives (i.e. independent variable) on WTPP (i.e. dependent variable) through response efficacy (i.e. mediator). Independent variable (i.e. the manipulation of the sustainability initiatives) was treated as a multi-categorical variable with an indicator coding system.

The results demonstrate a significant difference between the pairwise comparisons of donation and packaging, logistics and ingredients, donation and ingredients, manufacturing and logistics and donation and manufacturing in terms of consumers' perceived response efficacy, highlighting the higher perceived response efficacy from more tangible sustainability initiatives like packaging and ingredients compared to other initiatives. Results

Table 5. Process Model 4 output: total and indirect effects

Path	Total effect of X on Y				Indirect effect of X on Y through M (response efficacy)					
	Effect (B)	SE	t	p	LLCI	ULCI	Effect (B)	SE	LLCI	ULCI
Ingredients – packaging → WTPP	-1.3	2.12	-0.61	0.53	-5.48	2.87	0.29	0.38	-0.49	1.11
Logistics – packaging → WTPP	-4.3	2.07	-2.07	0.03	-8.4	-0.21	-0.43	0.36	-1.29	0.13
Manufacturing – packaging → WTPP	-3.07	2.1	-1.46	0.14	-7.21	1.06	-0.23	0.39	-1.11	0.46
Donation – packaging → WTPP	-7.07	2.1	-3.36	0.0009	-11.21	-2.93	-1.07	0.56	-2.39	-0.21
Logistics – ingredients → WTPP	-3	1.99	-1.5	0.13	-6.94	0.93	-0.72	0.44	-1.74	-0.006
Manufacturing – ingredients → WTPP	-1.76	2.02	-2.84	0.004	-9.75	-1.78	-0.52	0.46	-1.55	0.29
Donation – ingredients → WTPP	-5.76	2.02	-2.84	0.004	-9.75	-1.78	-1.36	0.65	-2.83	-0.3
Manufacturing – logistics → WTPP	1.23	1.97	0.62	0.53	-2.66	5.13	0.2	0.37	-0.51	1.02
Donation – logistics → WTPP	-2.76	1.97	-1.39	0.16	-6.66	1.13	-0.64	0.42	-1.62	0.01
Donation – manufacturing → WTPP	-4	2.005	-1.99	0.04	-7.95	-0.05	-0.84	0.53	-2.07	-0.02

also demonstrated that response efficacy significantly influences WTPP for sustainable products ($b = 1.43$, $SE = 0.49$, $t = 2.92$, $p = 0.003$, $CI = 0.47, 2.40$). Furthermore, the outcomes indicate significant differences between logistics and packaging, donation and packaging and donation and ingredients regarding consumers' WTPP, suggesting higher WTPP for packaging and ingredients than donation and logistics (refer Table 6 for details). The overall impact of sustainability types on response efficacy is non-significant ($b = -0.23$, $SE = 0.19$, $t = -1.20$, $p = 0.22$, $CI = -0.61, 0.14$).

For the social vs environmental sustainability type comparisons, the index of moderated mediation is significant only for the donation–packaging pairwise (see Table 7 for details). However, in the social sustainability category, the indirect effects of pairwise comparisons between logistics and packaging, logistics and ingredients, logistics and manufacturing, donation and packaging and donation and manufacturing on WTPP through response efficacy are significant (see Table 7 for details). These results partially address RQ2: How do sustainability types (i.e. environmental vs social) explain the relationship between sustainability initiatives and consumers' WTPP for sustainable goods?

Refer Table 7 for detailed findings.

Overall, the findings of Study 2 address RQ1–RQ3 and provide support for H1 and H2. The results reveal that consumers are more willing to pay a premium for highly tangible sustainability initiatives, such as packaging and ingredients, compared to moderate tangible initiatives, such as manufacturing, or low-tangible initiatives, such as logistics and donation (Tables 2 and 3). This pattern appears to be driven by underlying psychological and behavioural mechanisms, particularly lower perceived response efficacy associated with moderate or low-tangible initiatives (Tables 4 and 5). Importantly, the advantage of high tangibility in enhancing response efficacy and WTPP was consistent across environmental and social initiatives. However, within the social domain, consumers distinguish more clearly between initiatives, suggesting higher WTPP for more tangible social initiatives than

Table 6. Process Model 7 output: coefficients for moderated mediation analysis

Path	Effect (B)	SE	t	p	LLCI	ULCI
Ingredients – Packaging → Response efficacy	0.20	0.26	0.78	0.43	-0.31	0.73
Logistics – Packaging → Response efficacy	-0.30	0.26	-1.16	0.24	-0.81	0.20
Manufacturing – Packaging → Response efficacy	-0.16	0.26	-0.62	0.53	-0.68	0.35
Donation – Packaging → Response efficacy	-0.72	0.26	-2.73	0.006	-1.24	-0.20
Logistics – Ingredients → Response efficacy	-0.51	0.25	-2.03	0.04	-1.005	-0.01
Manufacturing – Ingredients → Response efficacy	-0.37	0.25	-1.46	0.14	-0.87	0.12
Donation – Ingredients → Response efficacy	-0.93	0.25	-3.65	0.0003	-1.43	-0.42
Manufacturing – Logistics → Response efficacy	-0.55	0.25	-2.20	0.02	-1.05	-0.06
Donation – Logistics → Response efficacy	0.16	0.26	0.62	0.53	-0.35	0.68
Donation – Manufacturing → Response efficacy	0.55	0.25	2.20	0.02	0.06	1.05
Ingredients – Packaging → WTPP	-1.59	2.09	-0.76	0.44	-5.71	2.52
Logistics – Packaging → WTPP	-3.87	2.05	-1.88	0.06	-7.92	0.16
Manufacturing – Packaging → WTPP	-2.84	2.07	-1.37	0.17	-6.93	1.24
Donation – Packaging → WTPP	-6.00	2.10	-2.85	0.004	-10.14	-1.85
Logistics – Ingredients → WTPP	-2.28	1.98	-1.15	0.25	-6.19	1.62
Manufacturing – Ingredients → WTPP	-1.24	2.003	-0.62	0.53	-5.19	2.69
Donation – Ingredients → WTPP	-4.40	2.04	-2.15	0.03	-8.44	-0.37
Manufacturing – Logistics → WTPP	-3.15	1.99	-1.58	0.11	-7.09	0.77
Donation – Logistics → WTPP	2.84	2.07	1.37	0.17	-1.24	6.93
Donation – Manufacturing → WTPP	3.15	1.99	1.58	0.11	-0.77	7.09

Table 7. Process Model 7 outcome: conditional indirect effects

Path	Social sustainability (W)				Environmental sustainability (W)				Index			
	Effect (B)	SE	LLCI	ULCI	Effect (B)	SE	LLCI	ULCI	Effect (B)	SE	LLCI	ULCI
Ingredients – Packaging → Response efficacy → WTPP	0.15	0.50	-0.85	1.23	0.43	0.56	-0.74	1.65	0.27	0.75	-1.25	1.80
Logistics – Packaging → Response efficacy → WTPP	-0.93	0.59	-2.28	-0.006	0.06	0.42	-0.86	0.88	0.99	0.71	-0.17	2.61
Manufacturing – Packaging → Response efficacy → WTPP	-0.46	0.59	-1.77	0.61	-0.006	0.50	-1.11	0.94	0.43	0.76	-1.05	2.05
Donation – Packaging → Response efficacy → WTPP	-1.75	0.81	-3.58	-0.42	-0.32	0.61	-1.69	0.76	1.43	0.91	0.01	3.52
Logistics – Ingredients → Response efficacy → WTPP	-1.09	0.63	-2.56	-0.10	-0.37	0.56	-1.56	0.71	0.71	0.80	-0.61	2.58
Manufacturing – Ingredients → Response efficacy → WTPP	-0.62	0.63	-2.02	0.46	-0.44	0.63	-1.82	0.78	0.18	0.86	-1.53	1.99
Donation – Ingredients → Response efficacy → WTPP	-1.91	0.86	-3.83	-0.49	-0.75	0.73	-2.35	0.56	1.15	0.98	-0.35	3.43
Manufacturing – Logistics → Response efficacy → WTPP	0.46	0.59	-0.57	1.80	-0.06	0.48	-1.08	0.90	-0.52	0.76	-2.30	0.86
Donation – Logistics → Response efficacy → WTPP	-0.82	0.55	-2.12	0.04	-0.38	0.59	-1.67	0.73	0.44	0.75	-0.93	2.07
Donation – Manufacturing → Response efficacy → WTPP	-1.28	0.76	-3.02	-0.11	-0.31	0.64	-1.73	0.92	0.96	0.94	-0.60	3.12

for less tangible ones (Tables 6 and 7). Together, these findings underscore the role of initiative tangibility, response efficacy and sustainability types in shaping consumers' WTPP.

Study 2

Method

This study replicates Study 1 by examining the role of sustainability types on consumers' WTPP for sustainable products to ensure the robustness of the findings. It also extends Study 1 by measuring the moderating role of fatalism on the relationship between sustainability initiatives and response efficacy. The study follows a 2×3 experimental design informed by the significant findings of Study 1. Sustainability was manipulated based on two types, environmental and social, while sustainability initiatives were manipulated across three sustainability initiatives: packaging, logistics and donations. These initiatives were selected as suggested in Study 1. This study examines two distinct sustainable products (i.e. salmon and beef) as research stimulus materials to strengthen the validity and generalisability of the findings (see Figures 3 and 4 for stimuli). Each experimental condition:

The procedure of Study 2 follows Study 1 with only one exception. After displaying the experimental stimulus, participants completed additional measures relating to fatalism (see Table 1 for measurement scales and Figure 5 for the conceptual model).

A total of 253 participants participated in this study, with 51 excluded due to failing the attention checks, leaving 202 valid responses for analysis. Cohen's $f^2 = \frac{R^2_{Full} - R^2_{Reduced}}{1 - R^2_{Full}}$ was calculated to evaluate the model's ability to explain variance in WTPP (Cohen, 1988). The results ($f^2 = \frac{0.095 - 0.002}{1 - 0.095} = 0.103$) indicated that the effect size has been improved more towards the moderate effect size based on Cohen's benchmarks: small = 0.02, medium = 0.15, large = 0.35 (Cohen, 1988). This suggests that including M and W in the model helped explain variance in WTPP more effectively. Given that the effect size is approaching moderate, the post hoc power analysis in G*Power ($f^2 = 0.15$, $\alpha = 0.05$) was conducted to test the suitability of the sample size for analysis. The results indicated strong power ($1 - \beta = 0.99$) (Cohen, 1988), suggesting a sufficient sample size to detect significant relationships.

The sample analysis result demonstrated that the samples are balanced, with 57.4% of male participants, 33.7% aged 35–44 and 32.7% aged 25–34 ($M = 39.31$, $SD = 10.14$). In addition, approximately 42% of participants reported an annual income of AU\$60,000–AU\$99,999 and 47.5% reported having a bachelor's degree.

Results and discussion

Manipulation check. A 2×3 between-subject ANOVA was conducted to test the effects of manipulations of sustainability types and sustainability initiatives on participants' perceptions of environmental and social sustainability of the products. The results demonstrate that the effect of sustainability types on participants' perceptions of environmental sustainability was significant [$F(1, 196) = 10.6$, $p = 0.001$, partial eta squared = 0.05]. Specifically, participants stated higher perceived environmental sustainability ($M = 4.46$, $SD = 0.96$) than social sustainability ($M = 3.90$, $SD = 1.17$) when the stimulus displayed environmental sustainability practices. Furthermore, the main effect of sustainability types on participants' perceptions of the social sustainability of the products was statistically significant [$F(1, 196) = 5.58$, $p = 0.01$, partial eta squared = 0.02]. In particular, participants reported higher perceived social sustainability ($M = 3.69$, $SD = 0.96$) than environmental sustainability ($M = 3.36$, $SD = 0.98$) when the stimulus displayed social sustainability. The results of manipulation checks suggest that consumers adequately



Figure 3. Stimuli materials – salmon – Study 2

distinguished different types of sustainability (i.e. environmental and social), confirming the robustness of the manipulation.

Hypotheses testing. ANOVA analysis was conducted as a preliminary check to examine the relationship among the research constructs before testing the hypotheses using PROCESS models. A 2×3 between-subject ANOVA was conducted to test the effects of sustainability initiatives manipulation and sustainability types on perceived response efficacy. The findings demonstrate that the sustainability initiatives manipulation significantly affects perceived response efficacy [$F(2, 196) = 3.30, p = 0.03$, partial eta squared = 0.03]. Specifically, a significant difference was found between packaging ($M = 4.06, SD = 1.16$) and donation ($M = 3.50, SD = 1.20$) ($t_{\text{packaging vs donation}} = 2.71$,



Figure 4. Stimuli materials – Beef – Study 2

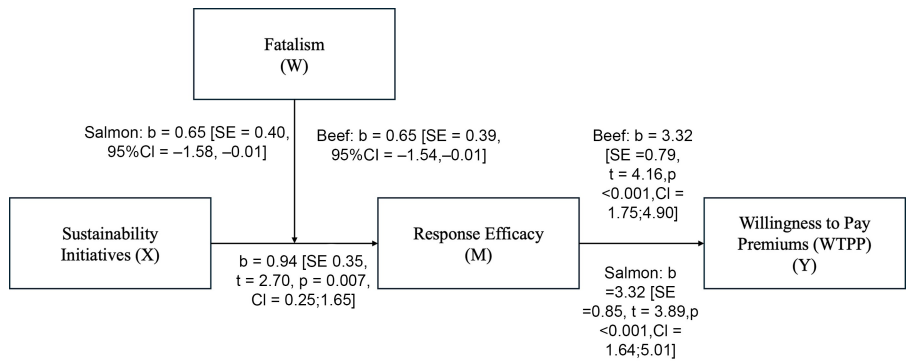


Figure 5. Conceptual model – Study 2

$p_{\text{packaging vs donation}} = 0.02$), suggesting higher perceived response efficacy from sustainable packaging.

In addition, the sustainability type had a significant main effect on response efficacy [$F(1, 196) = 4.47$, $p = 0.03$, partial eta squared = 0.02]. Specifically, the mean score of response efficacy for environmental sustainability ($M = 3.99$, $SD = 1.223$) was higher than for social sustainability ($M = 3.58$, $SD = 1.229$). The interaction effect of sustainability initiatives manipulation and sustainability types on response efficacy was non-significant.

Given that participants' level of fatalism (high versus low) was not under the experimental control of this research, an additional 2×3 between-subject ANOVA was conducted to further examine the effects of manipulating sustainability initiatives and

sustainability types on response efficacy, which varied across the low-fatalism and high-fatalism groups. The results demonstrate that the significant effect of sustainability type on response efficacy was driven primarily by participants with low levels of fatalism, whereas no significant effects were observed among those with high levels of fatalism. The results reveal no significant findings regarding the impact of sustainability initiative manipulation and the interaction between this variable and sustainability types on response efficacy. Refer [Table 8](#) for detailed findings.

These results suggest that consumers’ perceived response efficacy differs as a function of both sustainability initiative manipulation and sustainability type, with these effects also being evident in the low-fatalism condition. The next section details the results of PROCESS analysis for hypothesis testing.

Moderated mediation analysis. [Hayes’ \(2017\)](#) PROCESS macro, Model 7 was used in SPSS (version 27), with a bias-corrected 95% confidence interval and 10,000 bootstrap samples to examine the moderating role of sustainability types (i.e. environmental vs social) on the indirect relationship between the manipulation of the sustainability initiatives (i.e. treated as multi-categorical) and WTPP through response efficacy (i.e. observed in Study 1).

While the results reveal no significant direct relationship between manipulating sustainability initiatives and WTPP across all pairwise comparisons, the impact of manipulating sustainability initiatives in the packaging–donation pairwise on response efficacy was significant, consistent with the results of Study 1. While the findings of Study 1 demonstrated a significant difference between packaging and logistics in influencing response efficacy and WTPP, Study 2 did not replicate this effect. This suggests that the robust difference between highly tangible initiatives, such as packaging, and low-tangible initiatives, such as logistics and donations, is consistently supported. Refer [Table 9](#) for detailed findings.

The results also reveal a significant impact of response efficacy on WTPP ($b = 3.34$, $SE = 0.74$, $t = 4.50$, $p = 0.00$, $CI = 1.88, 4.81$), while the impact of sustainability types on response efficacy was non-significant ($b = 0.36$, $SE = 0.28$, $t = 1.27$, $p = 0.20$, $CI = -0.19, 0.92$).

As shown in [Table 10](#), the results of moderated mediation analysis revealed that the index of moderated mediation was non-significant for all pairwise comparisons, indicating that the indirect effect of manipulating sustainability initiatives on WTPP through response efficacy

Table 8. ANOVA outcomes: tests of between-subject effects

Variables	Fatalism (Low: ≤4, High: >4)	df	Mean square	<i>F</i>	Sig.	Partial eta squared
Sustainability types	Low	1	6.31	4.00	0.04	0.03
	High	1	0.99	0.70	0.40	0.009
Sustainability initiatives	Low	2	3.36	2.12	0.12	0.03
	High	2	1.93	1.36	0.26	0.03
Sustainability types × sustainability initiatives	Low	2	0.12	0.07	0.92	0.001
	High	2	1.10	0.78	0.46	0.02
Error	Low	114	1.57			
	High	76	1.41			
Total	Low	120				
	High	82				
Corrected total	Low	119				
	High	81				

Table 9. Process Model 7 output: coefficients for moderated mediation analysis

Path	Effect (B)	SE	<i>t</i>	<i>p</i>	LLCI	ULCI
Logistics – Donation → Response efficacy	0.22	0.27	0.81	0.41	−0.32	0.78
Packaging – Donation → Response efficacy	0.64	0.30	2.10	0.03	0.03	1.24
Packaging – Logistics → Response efficacy	0.41	0.31	1.31	0.19	−0.20	1.03
Logistics – Donation → WTPP	−0.81	2.16	−0.37	0.70	−5.07	3.45
Packaging – Donation → WTPP	−3.34	2.27	−1.46	0.14	−7.84	1.14
Packaging – Logistics → WTPP	−2.53	2.28	−1.11	0.26	−7.03	1.96

was not moderated by sustainability types. However, the results of the conditional indirect effects indicated that the indirect effect for the packaging-donation pairwise was significant under the social sustainability type, consistent with the pattern observed in Study 1. The conditional indirect effect for the pairwise comparison between packaging and logistics was non-significant, consistent with the absence of a significant difference in their effects on response efficacy. Refer [Table 10](#) for detailed findings.

Hayes' (2017) PROCESS macro, Model 7, was conducted to test the moderating impact of fatalism on the indirect relationship between manipulation of sustainability initiatives and WTPP via response efficacy (i.e. addressing *H3*). Fatalism was analysed at three values of the moderator: low (Mean − 1 SD), Moderate (Mean) and High (Mean + 1 SD). This approach illustrated how the indirect impact becomes stronger or weaker depending on the moderator level. We treated the independent variable (i.e. the manipulation of sustainability initiatives) as a multi-categorical variable to compare across different sustainability initiatives.

The results of the moderated mediation analysis in [Table 11](#) indicate a significant difference between packaging and donation in consumers' perceived response efficacy, with packaging eliciting higher response efficacy than donation. The results demonstrate no significant differences in response efficacy for the pairwise comparisons between logistics and donation and between packaging and logistics. In addition, the results reveal no direct relationship between manipulating sustainability initiatives and WTPP for all pairwise comparisons, suggesting an indirect relationship between these constructs. Refer [Table 11](#) for detailed findings.

Furthermore, the results indicate that the impact of fatalism on response efficacy was non-significant ($b = 0.20$, $SE = 0.12$, $t = 1.56$, $p = 0.11$, $CI = -0.05, 0.45$). Meanwhile, response efficacy significantly influences WTPP ($b = 3.34$, $SE = 0.74$, $t = 4.50$, $p = 0.00$, $CI = 1.88, 4.81$).

In addition, the results indicate that the index of moderated mediation was non-significant for all pairwise comparisons, suggesting no significant difference in the indirect effects of manipulating sustainability initiatives on WTPP through response efficacy across different levels of fatalism. However, the results also demonstrate significant differences in the pairwise comparisons between packaging and donation at low and moderate levels of fatalism, underscoring that when fatalism is lower, highly tangible sustainability initiatives lead to higher response efficacy and WTPP than low-tangible ones. Refer [Table 12](#) for detailed findings.

Overall, the findings of Study 2 confirm Study 1's findings by demonstrating no significant moderating impact of sustainability types on the relationship between sustainability initiatives and WTPP. Importantly, Study 2 extends these findings by identifying fatalism as an additional boundary condition. Specifically, consumers with low

Table 10. Process Model 7 outcome: conditional indirect effects

Path	Social sustainability (W)				Environmental sustainability (W)				Index			
	Effect(B)	SE	LLCI	ULCI	Effect(B)	SE	LLCI	ULCI	Effect(B)	SE	LLCI	ULCI
Logistics – Donation → Response efficacy → WTPP	0.76	0.99	-1.25	2.75	1.47	1.11	-0.39	3.99	0.70	1.45	-1.83	3.94
Packaging – Donation → Response efficacy → WTPP	2.14	1.04	0.31	4.39	1.45	1.12	-0.49	3.94	-0.69	1.37	-3.44	2.13
Packaging – Logistics → Response efficacy → WTPP	1.38	1.08	-0.57	3.73	-0.01	1.03	-2.16	2.00	-1.39	1.52	-4.71	1.39

Table 11. Process Model 7 output: coefficients for moderated mediation analysis

Path	Effect (B)	SE	<i>t</i>	<i>p</i>	LLCI	ULCI
Logistics – Donation → Response efficacy	0.88	0.69	1.27	0.20	−0.48	2.25
Packaging – Donation → Response efficacy	1.53	0.77	1.97	0.05	0.0002	3.07
Packaging – Logistics → Response efficacy	0.64	0.79	0.81	0.41	−0.91	2.21
Logistics – Donation → WTPP	−0.81	2.16	−0.37	0.70	−5.07	3.45
Packaging – Donation → WTPP	−3.34	2.27	−1.46	0.14	−7.84	1.14
Packaging – Logistics → WTPP	−2.53	2.28	−1.11	0.26	−7.03	1.96

Table 12. Process Model 7 outcome: conditional indirect effects

Fatalism level	Path	Indirect effect of X on Y			
		Effect (B)	SE	LLCI	ULCI
Low	Logistics – Donation → Response efficacy → WTPP	1.57	1.23	−0.64	4.26
	Packaging – Donation → Response efficacy → WTPP	2.78	1.32	0.55	5.74
	Packaging – Logistics → Response efficacy → WTPP	1.21	1.41	−1.40	4.29
Moderate	Logistics – Donation → Response efficacy → WTPP	0.87	0.76	−0.58	2.42
	Packaging – Donation → Response efficacy → WTPP	1.60	0.82	0.13	3.36
	Packaging – Logistics → Response efficacy → WTPP	0.73	0.77	−0.70	2.40
High	Logistics – Donation → Response efficacy → WTPP	0.35	1.04	−1.80	2.37
	Packaging – Donation → Response efficacy → WTPP	0.72	1.14	−1.62	2.98
	Packaging – Logistics → Response efficacy → WTPP	0.37	1.04	−1.71	2.56
Index	Logistics – Donation → Response efficacy → WTPP	−0.52	0.72	−2.10	0.76
	Packaging – Donation → Response efficacy → WTPP	−0.88	0.78	−2.67	0.47
	Packaging – Logistics → Response efficacy → WTPP	−0.35	0.81	−2.13	1.18

fatalistic beliefs perceive greater response efficacy and report higher WTPP for high-tangible initiatives (e.g. packaging) than for low-tangible initiatives (e.g. logistics or donation). These findings respond to RQ3: How do response efficacy and fatalism explain the mechanisms underlay consumers' WTPP for sustainable goods and support H3.

Pre-test: manipulation of fatalism

A pre-test was conducted to assess the impact of manipulating fatalism with positive vs negative messages on consumers' perceived level of fatalism. The pre-test included measures of pessimism and optimism alongside fatalism to ensure the robustness of fatalism manipulation. It is important to distinguish between pessimism, which allows for the possibility of positive change (Morris *et al.*, 2020), and fatalism, which posits that outcomes are unchangeable (Shen *et al.*, 2009). By measuring pessimism, we aimed to accurately confirm that our manipulation effectively targeted fatalism without conflating it with general negativity.

Method

Sampling and inclusion criteria remained the same as in Study 1. A total of 92 individuals participated in this pre-test, with 11 excluded due to failing attention checks. It left 81 valid responses for analysis. The sample is relatively gender balanced, with 50.6% male. Furthermore, 35.7% of participants were aged 25–34 ($M = 36.95$, $SD = 12.54$).

Approximately one-third of participants reported AU\$60,000–AU\$99,999 annual income, and 35% reported having a bachelor's degree.

Fatalism was manipulated using an information panel from a fictitious sustainability advocacy group called “Go Green” (see Figure 6 for manipulation details). The general content and the picture on the information panel were identical for both positive and negative fatalism conditions. Negative fatalism focused on inevitability and catastrophe, while positive fatalism emphasised control and preservation actions, both adapted from prior studies (e.g. Bendell, 2018; Brooks, 2021; Heatley, 2017; Lenton *et al.*, 2019). Participants were randomly assigned to a condition (i.e. positive or negative fatalism) and asked to read the information panel. They then responded to questions regarding their perceived fatalism and optimistic and pessimistic tendencies (see Table 1 for measurement scales).

Results and discussion

The results of an independent sample *t*-test indicated a significant difference between participants' perceived level of fatalism in positive vs negative fatalism conditions. Respondents assigned to the negative fatalism condition reported significantly higher perceived levels of fatalism ($M = 4.48$, $SD = 1.12$) compared to those assigned to the positive fatalism condition [$M = 3.74$, $SD = 1.13$; $t(79) = 2.95$, $p = 0.004$]. Furthermore, no significant differences were found between participants' optimistic [$t(79) = 0.11$, $p = 0.90$] and pessimistic tendencies [$t(79) = -1.02$, $p = 0.30$] in positive vs negative fatalism conditions, highlighting the robustness of the manipulation.

Study 3

Method

Building upon the findings of Study 2, this study aimed to provide robust empirical support by including fatalism manipulation as a moderating variable. Furthermore, to mitigate the potential influence of social desirability bias inherent in self-reported data (Chao and Lam, 2011), this study employed an integrated methodological approach to combine self-reported



We are in a state of planetary emergency. Carbon emissions, deforestation, air pollution, and animal cruelty are only a few examples of our negative footprints on the environment and society. However, climate and society cannot be stopped from changing, and our preventive actions will not necessarily prevent environmental and social catastrophes in the future. Hence, we must begin to adapt to the new world with all its environmental and social issues as it is inevitable.



Negative Fatalism



We are in a state of planetary emergency. Carbon emissions, deforestation, air pollution, and animal cruelty are only a few examples of our negative footprints on the environment and society. However, the rate at which damages accumulated from our actions could still be under our control, and we must change our actions to prevent environmental and social catastrophes in the future. Hence, we can save our planet if we do not delay our preservation actions.



Positive Fatalism

Figure 6. Stimuli materials – pre-test

methods with biometric technology by using facial expressions. Facial expression was used as an objective measurement to examine consumers' positive responses, specifically biometric joy (Sun *et al.*, 2023). This study followed a 2×3×2 experimental design. Sustainability types were manipulated across two types: environmental and social, while sustainability initiatives were manipulated across three initiatives: packaging, ingredients and logistics. In this study, the sustainability initiative of donation was replaced with ingredients driven by findings from Study 1 and Study 2, which suggested a significant difference between consumers' perceived response efficacy from donation and more tangible initiatives like packaging and ingredients. Following the pre-test, fatalism was manipulated in positive vs negative conditions (see Figure 6). This study included a bundle of five sustainable products (i.e. toothfish, prawn, beef, milk and chocolate) from different food categories to improve the generalisability of the findings (see Figure 7 for stimuli).

Participants were randomly assigned to a fatalism condition (i.e. positive or negative). Then, they responded to questions related to fatalism before directing to an iMotion online biometric platform (iMotion v3.0, 2023). On the online biometric platform, participants enabled their video, selected their screen type and size (e.g. laptop 12-inch) and calibrated their eye gaze with a 13-point calibration, whereby participants were asked to fixate their eyes on the cross and follow it with their eyes. After completing the biometric section, participants were randomly assigned to one of the 3 (sustainability initiatives) × 2 (sustainability type) conditions. They were then given 15 s to look at the stimulus and read the message. Subsequently, a 13-point post-test calibration was conducted to ensure data quality. Participants were then returned to the survey to answer questions about response efficacy and environmental and social sustainability (see Table 1 for measurement scales).

We received 305 responses for this study, with 42 responses excluded due to failing the attention checks, leaving 263 valid responses for analysis. Cohen's $f^2 = \frac{R^2_{Full} - R^2_{Reduced}}{1 - R^2_{Full}}$ was computed to examine whether the model can effectively explain the variance in WTPP



Figure 7. Stimuli materials – Study 3

(Cohen, 1988). The result based on the $R^2_{\text{Full}} = 0.115$ and $R^2_{\text{Reduced}} = 0.014$ indicated a stronger effect size ($f^2 = 0.114$), further approaching the moderate range according to Cohen's guidelines (small = 0.02, medium = 0.15 and large = 0.35) (Cohen, 1988). This implies that including the mediator (M) and moderator (W) enhanced the model's explanatory power for WTPP. Building on this, post hoc analysis in G*Power with a moderate effect size of 0.15 and $\alpha = 0.05$ confirmed that if there is any significant relationship between the research constructs, this study has sufficient power to detect it ($1 - \beta = 0.99$) (Cohen, 1988).

The sample analysis results revealed that participants were gender balanced (55% male) and most were aged 25–34 ($M = 40.74$, $SD = 11.63$). Furthermore, almost 45% stated having a bachelor's degree, and approximately 30% reported an annual income of AU\$30,000–AU\$49,999.

Results and discussion

Manipulation check. A 2×3 between-subject ANOVA test was conducted to examine the effects of manipulation of sustainability types and sustainability initiatives on participants' perceptions of the environmental sustainability of the products. The findings suggest that the manipulation of sustainability types significantly affected participants' perceptions of the environmental sustainability of the products [$F(1, 257) = 4.69$, $p = 0.03$, partial eta squared = 0.01]. Specifically, participants demonstrated a higher perceived level of environmental sustainability ($M = 4.76$, $SD = 1.11$) than social sustainability ($M = 4.42$, $SD = 1.12$) when the message manipulated environmental sustainability. The effect of manipulation of fatalism on participants' perceived fatalism was marginally significant [$F(1, 261) = 3.83$, $p = 0.05$, partial eta squared = 0.01]. While the effect of manipulation of sustainability types on participants' perception of social sustainability was not statistically significant [$F(1, 257) = 0.39$, $p = 0.53$, partial eta squared = 0.002], consumers perceived higher social sustainability ($M = 3.95$, $SD = 1.20$) than environmental sustainability ($M = 3.90$, $SD = 1.23$) when exposed to the manipulation of social sustainability. Therefore, the manipulation check results indicate that consumers could accurately distinguish between environmental and social sustainability.

Hypotheses testing. A $3(\text{i.e. sustainability initiatives}) \times 2(\text{i.e. fatalism manipulation})$ between-subject ANOVA was conducted to examine the effect of manipulation of sustainability initiatives and manipulated fatalism on response efficacy. The results reveal that the manipulation of fatalism (i.e. positive vs negative messaging) significantly influences consumers' perceived response efficacy [$F(1) = 3.75$, $p = 0.05$, partial eta squared = 0.01]. Specifically, participants who were assigned to the positive fatalism condition exhibited a higher perceived response efficacy ($M = 4.61$, $SD = 1.04$) than those in the negative fatalism condition ($M = 4.31$, $SD = 1.30$). Furthermore, the results indicate that the manipulation of sustainability initiatives significantly impacts consumers' perceived response efficacy, suggesting significant differences between the sustainability initiatives [$F(2) = 3.14$, $p = 0.04$, partial eta squared = 0.02]. The interaction effect of manipulated fatalism and sustainability initiatives on response efficacy also yields statistical significance [$F(2) = 4.21$, $p = 0.01$, partial eta squared = 0.03]. Specifically, a significant difference in perceived response efficacy was observed between packaging ($M = 4.88$, $SD = 1.27$) and ingredients ($M = 3.99$, $SD = 1.19$) ($t_{\text{packaging vs ingredients}} = 2.41$, $p_{\text{packaging vs ingredients}} = 0.05$).

Given that fatalism levels were not experimentally controlled in this research, another 2×3 between-subject ANOVA was conducted to examine the effects of manipulating sustainability initiatives and sustainability types on response efficacy among low-fatalism and high-fatalism participants under positive versus negative fatalism message conditions.

The results suggest that, under a positive fatalism message, there is a significant difference in response efficacy among participants with low levels of fatalism. In addition, a significant difference in response efficacy was reported for sustainability initiatives manipulation under a positive fatalism message and for highly fatalistic participants (refer [Table 13](#) for details). The results support the findings in Study 1.

Moderated mediation analysis. Hayes' (2017) PROCESS macro, Model 9 in SPSS (version 27), with a bias-corrected 95% confidence interval and 10,000 bootstrapping samples, was conducted for a moderated parallel mediation analysis. This model examines whether the indirect relationship between the manipulations of the sustainability initiatives (X) (i.e. tested as a multi-categorical variable) and WTPP (Y) through response efficacy (M1) and biometric joy (M2) is moderated by the manipulation of fatalism (W) and sustainability types (Z). This model integrates all the mediators and moderators tested in this research to compare the cognitive and emotional mediators, while considering the impact of moderators.

The results of the moderated mediation analysis reveal no direct relationships between the manipulation of sustainability initiatives and response efficacy, and between the manipulation of sustainability initiatives and WTPP across all pairwise comparisons, suggesting an indirect relationship. However, significant differences in biometric joy were reported in pairwise comparisons between packaging and ingredients, and between logistics and packaging. This finding suggests the potential of biometric joy in mediating the relationship between the manipulation of sustainability initiatives and WTPP. Refer [Table 14](#) for detailed findings.

Furthermore, the results reveal no evidence of the relationship between biometric joy and WTPP ($b = -2.95$, $SE = 2.47$, $t = -1.19$, $p = 0.23$, $CI: -7.83, 1.92$), while response efficacy significantly influences WTPP ($b = 16.25$, $SE = 3.13$, $t = 5.18$, $p = 0.00$, $CI: 10.08, 22.43$).

As shown in [Table 15](#), the results of the conditional indirect effects indicate that when participants were manipulated with a positive fatalism message, response efficacy mediates the relationship between the manipulation of the sustainability initiatives and WTPP for the pairwise comparisons between logistics and packaging and between ingredients and packaging when the type of sustainability is environmental. While response efficacy significantly mediates the impact of the manipulation of the sustainability initiatives on WTPP for specific initiatives, it is a conscious response that can be impacted not only by social desirability but it is also time-consuming for marketers to collect such data from consumers.

An alternative emotional factor is biometric joy, which can be captured unconsciously, thereby reducing the risk of social desirability. The results in [Table 15](#) demonstrate that when the fatalism message is positive, biometric joy significantly mediates the relationship between the manipulation of the sustainability initiatives and WTPP, with significant differences observed between ingredients and logistics, packaging and logistics and between packaging and ingredients, when the type of sustainability is social. Interestingly, the results yield significant differences between logistics and packaging, and between packaging and ingredients under environmental sustainability conditions. Refer [Table 15](#) for details.

In support of these findings, the index of moderated mediation presented in [Table 16](#) indicates that response efficacy significantly mediates the relationship between manipulating sustainability initiatives and WTPP for the pairwise comparisons between packaging and logistics and between packaging and ingredients, under the moderating role of fatalism manipulation. Whereas biometric joy mediates the relationship between manipulating sustainability initiatives and WTPP in pairwise comparisons among packaging and logistics, packaging and ingredients and ingredients and logistics, under the fatalism manipulation

Table 13. ANOVA outcomes: tests of between-subject effects

Variables	Fatalism (Low: ≤4, High: >4)		Positive fatalism message					Negative fatalism message				
			df	Mean square	F	Sig.	Partial eta squared	df	Mean square	F	Sig.	Partial eta squared
Sustainability types	Low	High	1	6.96	5.57	0.02	0.07	1	0.02	0.02	0.88	0.00
	High	Low	1	0.92	0.51	0.47	0.01	1	0.27	0.26	0.61	0.007
Sustainability initiatives	Low	High	2	0.43	0.34	0.71	0.009	2	0.06	0.05	0.94	0.001
	High	Low	2	6.50	3.56	0.03	0.14	2	1.58	1.51	0.23	0.07
Sustainability types × sustainability initiatives	Low	High	2	2.08	1.66	0.19	0.04	2	0.55	0.47	0.62	0.01
	High	Low	2	0.15	0.08	0.91	0.004	2	1.14	1.09	0.34	0.05
Error	Low	High	72	1.24				84	1.15			
	High	Low	44	1.82				39	1.04			
Total	Low	High	78					90				
	High	Low	50					45				
Corrected total	Low	High	77					89				
	High	Low	49					44				

Table 14. Process Model 9 output: coefficients for moderated mediation analysis

Path	Effect (B)	SE	<i>t</i>	<i>p</i>	LLCI	ULCI
Ingredients – Logistics → Response Efficacy	−0.04	0.29	−0.14	0.88	−0.62	0.53
Packaging – Logistics → Response efficacy	0.53	0.33	1.61	0.10	−0.11	1.19
Ingredients – Packaging → Response efficacy	−0.58	0.33	−1.73	0.08	−1.24	0.07
Ingredients – Logistics → Biometric joy	−0.10	0.36	−0.29	0.77	−0.83	0.61
Packaging – Logistics → Biometric joy	0.98	0.41	2.35	0.01	0.16	1.80
Ingredients – Packaging → Biometric joy	−1.08	0.41	−2.60	0.009	−1.91	−0.26
Ingredients – Logistics → WTPP	2.52	8.85	0.28	0.77	−14.91	19.97
Packaging – Logistics → WTPP	16.82	9.35	1.79	0.07	−1.59	35.24
Ingredients – Packaging → WTPP	−14.29	9.28	−1.54	0.12	−32.57	3.98

moderation. For the pairwise comparison between packaging and logistics, this mediation effect is also significant under the sustainability type moderation. Refer [Table 16](#) for details.

Together, these findings suggest that biometric joy, as an unconscious emotional factor, is a stronger mediator between the manipulation of sustainability initiatives and WTPP than response efficacy. The findings provide empirical support for *H3* by testing the impact of manipulated fatalism and address the exploratory research question (*RQ4*) by indicating the strong mediating role of biometric joy. Furthermore, these results offer a more nuanced response to *RQ3* by demonstrating how response efficacy and the manipulation of fatalism operate together to explain the underlying mechanisms of consumer WTPP for sustainable products.

[Figure 8](#) presents a visual summary of the findings across the three studies, focusing on WTPP based on different sustainability initiatives:

- Study 1 revealed significant differences between packaging and donation, donation and ingredients, ingredients and logistics and manufacturing and donation.
- An additional significant result between packaging and logistics emerged from testing the moderating role of sustainability types in social condition, highlighting the effect of the moderator.
- Study 2 narrowed the focus to packaging, logistics and donation to test the moderating role of fatalism. The adverse impact of fatalism may lead to a reduced significance of the result between packaging and logistics in low and moderate conditions. This observation motivated testing the manipulated fatalism in Study 3.
- Study 3 results restored significance for packaging and logistics and introduced significance for packaging and ingredients in the positive fatalism message condition. However, it did not maintain the significance for ingredients and logistics as observed in Study 1. This motivated testing the impact of biometric joy.
- Study 3 results restored this significance. Taken together, the findings underscore packaging and ingredients as the most consistently valued sustainability initiatives by consumers.

[Table 17](#) summarises the findings regarding hypothesis testing and responses to the research hypotheses.

General discussion

Consumers indicate a growing interest in pursuing sustainable consumption; however, they remain reluctant to pay premiums for sustainability initiatives incorporated into products.

Table 15. Process Model 9 outcome: conditional indirect effects

Path	Sustainability type	Indirect effect of X on Y			Indirect effect of X on Y		
		Effect (B)	SE	LLCI	ULCI	Effect (B)	SE
Ingredients – Logistics → Response efficacy → WTPP	Social	-0.68	5.10	-10.45	9.62	-0.14	4.96
Packaging – Logistics → Response efficacy → WTPP	Environmental	-4.99	5.24	-15.51	5.34	-4.46	4.44
Ingredients – Packaging → Response efficacy → WTPP	Social	8.76	6.30	-3.19	21.79	-5.01	5.55
Ingredients – Packaging → Response efficacy → WTPP	Environmental	12.34	5.83	2.08	25.03	-1.43	4.78
Ingredients – Logistics → Biometric joy → WTPP	Social	-9.44	6.07	-21.94	2.46	4.86	5.22
Ingredients – Logistics → Biometric joy → WTPP	Environmental	-17.34	5.88	-29.78	-7.16	-3.02	4.24
Packaging – Logistics → Biometric joy → WTPP	Social	0.31	0.39	0.001	1.44	-0.34	0.41
Packaging – Logistics → Biometric joy → WTPP	Environmental	-0.20	0.42	-1.32	0.38	-0.85	1.15
Ingredients – Packaging → Biometric joy → WTPP	Social	-2.90	2.01	-8.31	-0.59	0.57	0.91
Ingredients – Packaging → Biometric joy → WTPP	Environmental	-5.05wee	2.92	-12.69	-1.18	-1.57	1.06
Ingredients – Packaging → Biometric joy → WTPP	Social	3.22	2.13	0.65	8.81	-0.91	0.97
Ingredients – Packaging → Biometric joy → WTPP	Environmental	4.85	2.87	1.08	12.31	0.71	1.38

Table 16. Process Model 9 outcome: index of moderated mediation

Path	Fatalism manipulation			Sustainability type				
	Index	SE	LLCI	ULCI	Index	SE	LLCI	ULCI
Ingredients – Logistics → Response efficacy → WTPP	0.53	5.68	−11.28	11.55	−4.31	5.68	−16.04	6.63
Packaging – Logistics → Response efficacy → WTPP	−13.77	6.84	−28.47	−1.81	3.57	6.41	−8.36	17.38
Ingredients – Packaging → Response efficacy → WTPP	14.31	6.25	3.09	27.55	−7.89	6.28	−21.17	3.60
Ingredients – Logistics → Biometric joy → WTPP	−0.65	0.79	−2.94	−0.005	−0.51	0.77	−2.65	0.22
Packaging – Logistics → Biometric joy → WTPP	3.48	2.36	0.46	9.61	−2.14	1.43	−5.65	−0.10
Ingredients – Packaging → Biometric joy → WTPP	−4.13	2.64	−10.92	−0.66	1.62	1.52	−1.21	5.05

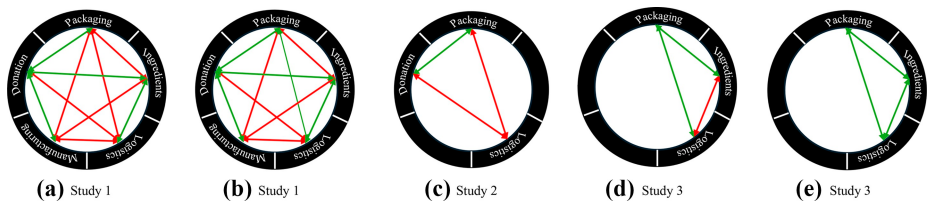


Figure 8. Visual summary of the findings

Table 17. Summary of findings

Study	Hypothesis/research question	Results
Study 1	<i>H1</i> . Consumers' WTPP differs across sustainability initiatives, such that highly tangible initiatives (e.g. packaging and ingredients) elicit higher WTPP than moderately tangible initiatives (e.g. manufacturing), which in turn elicit higher WTPP than low-tangible initiatives (e.g. logistics and donation)	Supported
Study 1	<i>H2</i> . The relationship between sustainability initiatives and WTPP for sustainable goods is mediated by response efficacy	Supported
Study 2 and Study 3	<i>H3</i> . The relationship between sustainability initiatives and response efficacy is moderated by fatalism and, together, influences consumers' WTPP for sustainable goods	Supported
Study 1	<i>RQ1</i> . How is consumers' WTPP for sustainable goods influenced by the nature of sustainability initiatives incorporated in goods?	Supported
Study 1 and Study 2	<i>RQ2</i> . How do sustainability types (i.e. environmental vs. social) explain the relationship between sustainability initiatives and consumers' WTPP for sustainable goods?	Partially supported
Study 1, Study 2 and Study 3	<i>RQ3</i> . How do factors like response efficacy and fatalism explain the mechanisms underlay consumers' WTPP for sustainable goods?	Supported
Study 3	<i>RQ4</i> . How does biometric joy explain the relationship between sustainability initiatives and WTPP for sustainable goods, and what are the roles of consumer fatalism and sustainability types?	Supported

This research determines which sustainability initiative is more effective in triggering consumers' WTPP for sustainable products and how the underlying psychological and emotional mechanisms explain this WTPP. Using both self-reported and biometric methods, the research found that higher perceived response efficacy and biometric joy, along with lower levels of fatalism, drive higher WTPP for sustainable products. The findings responded to the three research questions. *RQ1*: How is consumers' WTPP for sustainable

goods influenced by the nature of sustainability initiatives incorporated in goods? The findings of Study 1 provide evidence that the functional area of sustainability initiatives, whether focused on packaging, ingredients, logistics, manufacturing or donations, significantly impacts consumers' WTPP for sustainable products. The results directly address *RQ1* by illustrating that sustainability initiatives are different in driving consumers' WTPP for sustainable products. Specifically, the analysis yields that high-tangible initiatives, such as sustainable packaging and ingredients, lead to greater WTPP, while moderate tangible initiatives, such as manufacturing, or low-tangible initiatives, such as logistics, or donations, drive lower WTPP. This pattern is explained by the fact that consumers directly interact with products' packaging and ingredient components before purchasing decision, and, therefore, these initiatives are more tangible to consumers. These findings build on prior research by reinforcing the importance of consumer-facing sustainability initiatives as they are more likely to be associated with personal benefits, leading to greater WTPP (Gao *et al.*, 2023; Keller *et al.*, 2022). *RQ2*: How do sustainability types (i.e. environmental vs social) explain the relationship between sustainability initiatives and consumers' WTPP for sustainable goods? The findings of Study 1 demonstrate that the type of sustainability initiatives (i.e. environmental vs social) does not significantly alter consumers' WTPP for sustainable products. At a broad level, consumers responded similarly to both environmental and social sustainability initiatives in terms of how effective they are and their WTPP for them. Given that, sustainability types appear to be a less pivotal factor in explaining consumers' WTPP for sustainable products than initially expected. However, a more nuanced finding emerged when examining the mediating role of each sustainability type on the indirect relationship between sustainability initiatives and WTPP. Specifically, when the sustainability initiative is social, consumers demonstrate higher perceived response efficacy and, in turn, WTPP for products that integrate social sustainability in their packaging and ingredients compared to initiatives targeting socially responsible manufacturing, logistics or donations. This implies that not all socially sustainable initiatives trigger equal WTPP, and consumers evaluate them differently. These findings respond to *RQ2* by highlighting that while the overarching sustainability type (environmental vs social) may not be a key factor in differentiating between consumers' WTPP, the sustainability initiatives play a more decisive role, specifically when focusing on social sustainability. Moreover, this opens an avenue for future research to explore the differences between sustainability initiatives focusing on environmental sustainability. *RQ3*: How do factors like response efficacy and fatalism explain the mechanisms underlay consumers' WTPP for sustainable goods? The findings of Study 1 address *RQ3* by revealing that response efficacy mediates the relationship between sustainability initiatives and WTPP. Specifically, the analysis suggests that consumers' perceived response efficacy differs depending on the sustainability initiative incorporated into the product, and this mediates the effect of sustainability initiatives on WTPP. Sustainability initiatives focused on products' highly tangible components, such as packaging and ingredients, resulted in higher perceived response efficacy and, in turn, greater WTPP than initiatives focused on moderate or low-tangible components, such as manufacturing, logistics or donation. This finding explains how sustainability initiatives impact consumers' WTPP, highlighting that it is not merely the presence of a sustainability initiative that drives WTPP, but also through which consumers believe in the effectiveness of purchasing products with a specific sustainability initiative in contributing to sustainability efforts. This reinforces the theoretical importance of the response efficacy in explaining consumers' WTPP and highlights the need for marketers to prioritise more tangible sustainability initiatives and communicate them more effectively to drive higher perceived response efficacy and premium spending.

Study 2 builds on these findings by introducing fatalism as a moderator of the indirect relationship between sustainability initiatives and WTPP via response efficacy. The moderated mediation analysis revealed that the role of response efficacy is stronger for consumers with lower levels of fatalism. These consumers perceive more personal control over the consequences of their behaviours and are more likely to believe that sustainable choices can mitigate the negative outcomes of their unsustainable behaviours. In contrast, consumers with higher fatalism indicated a diminished motivation to engage in sustainable behaviour as they believe that the outcomes are predetermined. Study 3 further explored the role of fatalism by manipulating it through positive vs negative messaging. The findings yield that positive fatalism messaging can mitigate the negative effect of fatalism on consumers' perceived response efficacy and WTPP, even for highly fatalistic consumers. This finding contributes to responding to RQ3 and suggests that how fatalism is framed and communicated can significantly affect marketing efforts in triggering consumers' WTPP for sustainable products. RQ4: How does biometric joy explain the relationship between sustainability initiatives and WTPP for sustainable goods, and what are the roles of consumer fatalism and sustainability types? In addition to cognitive factors, Study 3 explored the emotional mechanisms underlying consumers' sustainable behaviours through measuring biometric joy in response to RQ4. The moderated mediation results indicate that biometric joy significantly mediates the relationship between the manipulation of sustainability initiatives and WTPP, with a higher intensity of joy under positive fatalism messaging than negative one. This relationship was also moderated by sustainability types. Furthermore, this moderating role is stronger when the sustainability initiative focuses on packaging than on ingredients and logistics. These findings reinforce that consumers' experience of biometric joy is a meaningful emotional factor in shaping consumers' WTPP for sustainable products, especially when paired with more tangible sustainability initiatives like packaging and positive fatalism messaging. In addition, these findings support previous studies on the importance of integrating self-reported responses with biometric reactions for a more nuanced understanding of consumer responses (Cacioppo *et al.*, 1986; Songa *et al.*, 2019).

Theoretical implications

The findings of this research demonstrate that consumers' WTPP for sustainable products depends strongly on the sustainability initiative embedded in the product. Specifically, the results extend the application of PMT by demonstrating the positive role of response efficacy in shaping consumers' WTPP for sustainable products. This finding is consistent with prior research on the impact of response efficacy on promoting sustainable behaviour (e.g. Bradley *et al.*, 2020; Kothe *et al.*, 2019; Meijers *et al.*, 2022). It also extends existing knowledge by demonstrating that, while all sustainability initiatives effectively drive response efficacy and WTPP, those focused on a product's packaging and ingredients achieve higher response efficacy and WTPP than those focused on logistics, manufacturing or donation. One potential explanation is that initiatives focused on packaging and ingredients often align with how consumers initially evaluate sustainable products, making it easier to integrate sustainability considerations into their purchasing decisions. While initiatives related to logistics, manufacturing or donations are harder for consumers to grasp their impacts, reducing WTPP. In addition, such initiatives impose a higher cognitive cost on consumers (Shugan, 1980), which may lead to lower WTPP or alternative purchasing. Furthermore, this finding offers an alternative way to frame and compare sustainability initiatives based on business functional areas to elicit positive consumer responses, extending upon the work of Suh and Yoo (2024), who focused on sustainability types and product attributes without comparing different sustainability initiatives. At a broader level, these findings advance SDG

12 (Responsible Consumption and Production) by suggesting that tangible sustainability initiatives, such as packaging and ingredients, can improve consumer support for sustainability and maintain producers' economic resilience, offering a practical and balanced approach to sustainable development (Bocean, 2024; Michel *et al.*, 2024).

Furthermore, the findings significantly contribute to theory by expanding knowledge of fatalism as a cultural and psychological barrier to consumers' sustainable behaviours. Previous studies on fatalism primarily focused on the context of health and psychology (O'Connor and Kabadayi, 2020), with limited insights into sustainability (Mayer and Smith, 2019). This study advances prior research (e.g. Vighnesh *et al.*, 2023; Pajardi *et al.*, 2020) by indicating how the interplay between fatalism, response efficacy and biometric joy influences consumers' WTPP for sustainable products. Importantly, the analysis shows that the impact of the manipulation of the sustainability initiatives on response efficacy and biometric joy and, in turn, on WTPP is stronger and positive for consumers experiencing lower levels of fatalism. In fact, as a culturally rooted belief (Vighnesh *et al.*, 2023), fatalism can decrease consumers' sense of having control over the sustainability concerns, extending their intention-behaviour gap. This research offers a novel insight by suggesting that fatalism can be manipulated through positive wording to reinforce the belief that consumers' actions will contribute to a more sustainable future and, in turn, make consumers willing to pay more premiums for sustainable products (Bo and Yang, 2022). This may also incentivise companies to incorporate sustainability throughout their operations, as the opportunity to recoup investments in this area may be enhanced.

In addition, integrating the self-reported method with biometric technology extends the current knowledge of consumers' WTPP for sustainable products, focusing on methodological innovation. Specifically, the findings illustrate how such integration helps explain the cognitive and emotional mechanisms that underlay consumers' WTPP for sustainable products. This finding aligns with previous observations, suggesting the connection between consumers' positive facial reactions and their WTPP for sustainable products (e.g. Chiang *et al.*, 2022; Tong *et al.*, 2020; Torrico, 2021), while extending the prior findings in several ways. Firstly, the findings suggest that consumers' positive facial reactions are not merely their immediate physiological responses but reflect deeper emotional engagement that influences their complex decision-making, such as WTPP for a sustainable product. According to the PRIME Theory of Motivation, consumers' actions are influenced by their emotional responses in a particular moment, rather than purely rational reasoning (Buck, 1985). Thus, understanding how consumers react to different sustainability initiatives emotionally and rationally extends the literature on developing effective sustainability strategies to trigger higher WTPP for sustainable products. Secondly, the results indicate how the interaction between consumers' experience of biometric joy and manipulated fatalism, as well as sustainability types, helped explain the differences between sustainability initiatives, including packaging, ingredients and logistics, regarding WTPP for sustainable products. This result offers a valuable contribution through which consumers can be engaged with sustainability initiatives even if they perceive limited personal control over the outcomes. It also supports the initial foundation of this research that consumers exhibit higher positive emotional reactions to sustainability initiatives perceived as closer and more tangible, such as packaging and ingredients. Future research could build on these findings by exploring consumers' negative facial expressions, such as sadness and anger, in responding to sustainability initiatives. Comparing positive vs negative emotional reactions will deepen the current understanding of consumers' emotional reactions towards sustainability initiatives by accounting for a broader spectrum of emotional responses.

Practical implications

Growing interest in engaging consumers in sustainable behaviours reflects consumers' pivotal role in driving sustainable development (White and Simpson, 2013). It is, therefore, important to identify which sustainability initiatives consumers perceive as more favourable and salient (Kronrod *et al.*, 2012). The findings of this research offer practical insights into sustainability communication by demonstrating that while all sustainability initiatives are important, consumers perceive more tangible and product-related initiatives, such as sustainable packaging or ingredients, as more effective in mitigating sustainability concerns. This finding suggests brands concentrate their sustainability communications on high-tangible initiatives to drive higher perceived response efficacy and WTPP for their sustainable products. Moderate or low-tangible sustainability initiatives, such as sustainable manufacturing, logistics and donating to a sustainability cause, can still meaningfully contribute to brands' sustainability strategy if communicated more tangibly and transparently to improve consumer support. One way to achieve this is through advertising or immersive communication tools, such as augmented reality, which help brands visually demonstrate the behind-the-scenes of their sustainability efforts (Breves and Schramm, 2021). In addition, providing transparent information about how integrating sustainability into brands' logistics and manufacturing processes helps reduce the environmental impacts can help improve consumers' perceived response efficacy. Infographics or short video stories indicating how brands reduce their carbon emissions, waste and energy use are examples of transparency in sustainability communication.

Fatalism also emerged as a critical factor in shaping consumers' sustainable behaviours and, therefore, should be considered when crafting brands' sustainability initiatives and marketing strategies. From a practical perspective, brands are encouraged to collect data on consumers' fatalism levels through surveys. This information can inform market segmentation and help craft more targeted messages that resonate with consumers' fatalism levels. For example, consumers with lower levels of fatalism may engage with messages highlighting individual responsibility in reducing environmental impacts. In contrast, highly fatalistic consumers may need more emotionally resonant messages to take action. Marketers can also manipulate fatalism through positive messaging in their marketing campaigns to promote more consumers' sustainable behaviour. For example, using positive language, such as "small actions, big difference", can help hinder fatalistic tendencies and enhance perceived response efficacy and WTPP. Marketers can also use different communication channels, such as social media or influencers, to convey their positive fatalism messages, as some consumers rely on such platforms to shape their understanding of a brand's sustainability initiatives. Future studies could investigate if the findings extend to other forms of marketing communication, such as information communicated via social media or advertisements. This is important, as sustainability information is often communicated through social platforms in today's media landscape. Furthermore, marketers operating in highly fatalistic contexts can benefit from the idea of "negotiable fate", which refers to the fact that while fatalism exists, consumers can still influence the outcomes, reducing a sense of guilt resulting from inaction (Becheur *et al.*, 2019). Overall, addressing fatalism offers a promising avenue for responsible consumption.

Biometric analysis highlights the crucial role of emotional engagement in driving consumers' rational decisions, such as premium spending. From a practical standpoint, this underscores the need for marketers to go beyond purely designing informational sustainability campaigns and focus on evoking consumers' emotional responses. For instance, brands can incorporate visual storytelling in their marketing campaigns or advertising to highlight how, for example, sourcing materials from local farms helps support

the community, reinforcing the emotional connection between consumers and brands' sustainability initiatives. Integrating emotional content with positive fatalism messaging in marketing campaigns can also help enhance consumers' emotional reactions while controlling their fatalistic beliefs, leading to greater WTPP.

Limitations and future research

The scope of this research is limited to the impact of response efficacy on consumers' WTPP for sustainable products. Drawn from PMT, efficacy responses include response efficacy and self-efficacy (Rogers *et al.*, 1997). When consumers know how likely an action will succeed (i.e. response efficacy), they also intend to know whether they are able to change the current action to the desired one (i.e. self-efficacy) (Han *et al.*, 2016). Therefore, future studies could shed light on whether response efficacy or self-efficacy is more impactful in promoting consumers' WTPP for sustainable products.

We manipulated sustainability initiatives in broad business function terms (sustainable packaging, ingredients, logistics, manufacturing and donations). Our manipulation was based on the social or environmental focus of the sustainability initiatives and their psychological distance from consumers. Each of the sustainability initiatives investigated in this research can be further explored through examining their sub-functions. For example, logistics involves a wide range of activities, including production logistics in manufacturing, sales and transportation logistics and reverse logistics of the final waste (He *et al.*, 2018). Future research may advance our findings by manipulating sustainability across the business sub-functions.

Consumers' WTPP for sustainable products was found to be more relevant to the functional focus of sustainability initiatives incorporated into the products than the type of sustainability (i.e. environmental or social). This suggests that consumers are taking a holistic view of sustainability with an emphasis on tangible sustainability initiatives. They are then less concerned about whether brands' sustainability initiatives improve environmental or social sustainability or value them equally. The type of sustainability should also align with the product attributes to influence consumers' responses to a sustainability initiative (Suh and Yoo, 2024). Future research should explore whether examining consumers' sustainability knowledge and familiarity with different sustainability types exhibits different behaviours.

The research implies that improving perceived response efficacy and mitigating fatalism tendencies provide opportunities to promote more sustainable consumption behaviours. While our pre-test examined fatalism and pessimism tendencies, further examining pessimism: one's negative expectations concerning the status of an event (Neff and Hoppe, 1993) was out of the scope of this research. While existing research suggests that the fatalism conceptually appears similar to pessimism, its impact on consumers' responses may differ from pessimism (Shen *et al.*, 2009). This insight should be further investigated in future studies to compare fatalistic consumers' responses vs pessimistic consumers' responses. Marketing practitioners may also better understand how to communicate sustainability messages based on the consumer's level of fatalism vs pessimism.

While facial expression technology is a valid and reliable method to capture behavioural attitudes (Songa *et al.*, 2019), future research should explore a broader spectrum of behavioural variables, such as consumers' attitudes or attention to sustainable products, using self-reported and biometric technologies. For example, using eye-tracking to capture consumers' attention towards sustainability-related messages on the product packaging can provide valuable insights into which sustainability initiatives they find more appealing.

Finally, we acknowledge that the sample size in the present study is relatively small. Although the observed effects were detectable, future research should conduct a power analysis using effect size estimates to determine appropriate sample sizes before data collection.

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Further reading

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Table A1. Sustainability messages used on the stimuli materials in each study

Studies	Condition	Sustainability type	Sustainability initiative	Sustainability message
Study 1	1	Environment	Packaging	We are committed to the environment by producing our products with carbon-neutral packaging
	2	Environment	Ingredients	We are committed to the environment by producing carbon-neutral products
	3	Environment	Logistics	We are committed to the environment by producing our products with carbon-neutral logistics
	4	Environment	Manufacturing	We are committed to the environment by producing our products with carbon-neutral manufacturing
	5	Environment	Donation	We are committed to creating a carbon-neutral environment through donations
	6	Social	Packaging	We are committed to the society by producing our products with fully ethical packaging
	7	Social	Ingredients	We are committed to the society by producing ethically sourced products
	8	Social	Logistics	We are committed to the society by producing our products with fully ethical logistics
	9	Social	Manufacturing	We are committed to the society by producing our products with fully ethical manufacturing
	10	Social	Donation	We are committed to creating a fully ethical society through donations
Study 2	1	Environment	Packaging	We are committed to the environment by producing our products with carbon-neutral packaging
	2	Environment	Logistics	We are committed to the environment by producing our products with carbon-neutral logistics
	3	Environment	Donation	We are committed to creating a carbon-neutral environment through donations
	4	Social	Packaging	We are committed to the society by producing our products with fully ethical packaging
	5	Social	Logistics	We are committed to the society by producing our products with fully ethical logistics
	6	Social	Donation	We are committed to creating a fully ethical society through donations

(continued)

Table A1. Continued

Studies	Condition	Sustainability type	Sustainability initiative	Sustainability message
Study 3	1	Environmental	Packaging	These products are certified to be environmentally sustainable for their carbon-neutral packaging. The suppliers have used recyclable packaging materials with minimal waste and carbon emissions
	2	Environmental	Ingredients	These products are certified to be environmentally sustainable for their carbon-neutral ingredients. The suppliers have sourced ingredients produced with minimal waste and carbon emissions
	3	Environmental	Logistics	These products are certified to be environmentally sustainable for their carbon-neutral logistics. The suppliers have used a logistic chain with minimal waste and carbon emissions in transporting these products
	4	Social	Packaging	These products are certified to be socially sustainable for their fully ethical packaging. The suppliers have used packaging materials manufactured with the highest standard of health, safety, well-being and fairness for workers
	5	Social	Ingredients	These products are certified to be socially sustainable for their fully ethical ingredients. The suppliers have sourced ingredients produced with the highest standard of health, safety, well-being and fairness for workers
	6	Social	Logistics	These products are certified to be socially sustainable for their fully ethical logistics. The suppliers have used a logistic chain to transport these products with the highest standard of health, safety, well-being and fairness for workers

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