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# When is sustainability an asset? The interaction effects between the green attributes and product category

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## Abstract

**Purpose** – Products that espouse environmental ethical principles have received increasing attention in recent years. However, one key barrier against sustainable consumption is that green attributes could result in consumer's expectation of decreased product physical performance. This study aims to investigate how green attributes existing in different product categories affect consumer purchase intention.

**Design/methodology/approach** – Two experimental studies were conducted to test the hypotheses. Study 1 provides initial evidence of the interaction effects between green attributes and product category on consumer purchase intention. Study 2 replicates the findings of Study 1 and further tests a benefits-based mechanism in the relationship between green attributes and consumer purchase intention.

**Findings** – The findings show that in the utilitarian product category, products with green peripheral attributes result in a higher purchase intention than those with green core attributes, whereas, in the hedonic product category, products with green core attributes result in a higher purchase intention than those with green peripheral attributes. Furthermore, the authors demonstrate that green attributes, as universal sustainability cues predominantly affect consumers' perceptions of utilitarian environmental benefits and self-expression benefits, which further enhance their purchase intention towards utilitarian products and hedonic products, respectively.

**Originality/value** – This study responds to the calls for more empirical studies into discussing the role of green attributes in consumer purchase intention. Furthermore, it uncovers a benefits-based mechanism that explains how green attributes existing in utilitarian product categories and hedonic product categories trigger consumers' analysis of benefits, leading to positive consumer purchase intention.

**Keywords** Green attributes, Product category, Consumer purchase intention, Utilitarian environmental benefits, Self-expression benefits

**Paper type** Research paper

## 1. Introduction

In compliance with global sustainable development trends, an environmental movement is underway in the current consumer market. There is an increase of conscious consumption, characterized by consumers who select products with environmentally friendly attributes (Driessen *et al.*, 2013; Yan *et al.*, 2019). According to a recent market research by Unilever, almost a third of global consumers claim to prefer green products. Corporations are also increasingly integrating sustainability into their goals, strategies and practices (Jurietti *et al.*, 2017). One important initiative of sustainable practice lies in launching green products to compete with non-green alternatives in the market (Raska and Shaw, 2012; Sheth *et al.*, 1991). Green products routinely feature environmental

attributes, which are beneficial to mankind and the planet (Carrington *et al.*, 2010; Usrey *et al.*, 2020). However, a vast group of consumers who show an explicit attitude towards green products rarely realize actual consumption behaviour (Janssen and Vanhamme, 2015), suggesting that the attitude-behaviour gap is still prevail in some consumer decisions.

As the discrepancy between attitude and actual purchase behaviour deserves serious attention, scholars have adopted various viewpoints to explain consumers' decision-making process towards green products, including the rational economic perspective and the environmental consciousness perspective (Bangsa and Schlegelmilch, 2020; Brough *et al.*, 2016; Driessen *et al.*, 2013; Goldstein *et al.*, 2008).

The literature suggests that consumer's decision-making towards products with green attributes is complex (Grolleau

*et al.*, 2019). Consumers may prefer sustainable products because they perceive products with green attributes to be more effective than conventional alternatives. However, they may also prefer less sustainable products as they perceive products with green attributes to have inferior performance. Such effects have been known as "sustainability asset effect" and "sustainability liability asset" (Luchs *et al.*, 2010). Given that the potential negative inference between sustainability and product performance is one important barrier against green consumption behaviour in real choice, knowledge about the impact of different types of product green attributes information on consumer decision-making is crucial to attenuate the liability effect and ultimately bridge the attitude-behaviour gap (Luchs and Kumar, 2017). Previous studies applied the notion of sustainability-quality trade-off to explain the potential effect of green attributes on product preference. For example, Lin and Chang (2012) demonstrated that products with green attributes are perceived as less efficient than regular products. Skard *et al.* (2020) further found that consumers infer lower product quality for the strength-related products when these products have green core attributes. Consumers infer higher product quality for the gentleness-related products when these products have green core attributes.

However, several research gaps remain in the understanding of the "sustainability asset/liability effect". Firstly, extant literature is insufficient in investigating the linkages between the utilitarian-hedonic product category and consumer green purchase decision. The utilitarian-hedonic typology of product reflects consumers' fundamental shopping motivation which leads to a particular consumption behaviour (Scarpi, 2012). For example, Kumar and Yadav (2021) suggested that consumers' hedonic shopping motivation leads to an increased green appeal purchase behaviour. Cheng *et al.* (2020) found that consumers under hedonic shopping orientation are more responsive to environmental issues and thus engage in green consumption. Furthermore, previous studies mainly focused on the mechanism of product quality by which green attributes exert positive or negative influence on consumer preference. However, consumers' judgements and evaluations of green attributes are also significantly affected by various social psychological factors especially the type of benefits sought from the sustainable consumption (Papista and Dimitriadis, 2019; Zhang *et al.*, 2021). Therefore, it is necessary to investigate the distinction between utilitarian products and hedonic products in a green decision-making context and establish an overarching theoretical paradigm to explain how green attributes information affect consumer actual purchase decision.

To respond the call for more studies to explore the effective strategies of how to bridge the attitude-behaviour inconsistency, the present study takes the product category as an important antecedent to examine the interaction effects between green attributes and product category on consumer response. Drawing upon the notion of zero-sum heuristic as well as green-is-virtuous intuition (Newman *et al.*, 2014; Spielmann, 2020), we suggest that the sustainability asset effect exists solely in utilitarian products with green peripheral attributes, while it exists in hedonic products with both green peripheral attributes and green core attributes. Furthermore,

this study proposes a benefit-based psychological mechanism that leads to consumer purchase intention towards different product categories. Specifically, we argue that upon encountering information regarding green attributes, consumers would generate specific perceptions of utilitarian environmental benefits or self-expression benefits, which in turn significantly affect their behavioural responses.

The remainder of this study is structured as follows. The hypotheses and conceptual framework and are discussed firstly. Next, the research design of the two experiments is illustrated. Specifically, Study 1 examines the interaction effects between the green attributes and product category on consumer purchase intention. Study 2 examines the mediating effect of utilitarian environmental benefits and self-expression benefits in the influence of green attributes on consumer purchase intention. This study concludes with theoretical contributions, practical implications and future research directions.

## 2. Theoretical background and hypothesis development

### 2.1 Green attributes

Green attributes are the attributes that reflect sustainable principles such as reusable, recyclable, biodegradable and less polluting (Bangsa and Schlegelmilch, 2020). Prior literature also used the term "ethical" or "sustainable" to refer to products with green attributes (Luchs *et al.*, 2010). Green attributes act as an essential element for consumers to distinguish the greenness of a product from its mainstream counterparts (Pancer *et al.*, 2017). There is evidence that consumers increasingly describe themselves as environmentalists or ones who dislike environmentally harmful products (Tezer and Bodur, 2020). One dominant way that corporations have adopted to respond to consumers' green preference is by introducing products that contain environmentally friendly components (Olsen *et al.*, 2014; Shin and Ki, 2019). A product can be environmentally friendly in several ways, for instance, the manufacturing process of a product is less polluting, or its physical attributes are made of sustainable materials. Regarding the latter, there exist distinctions between green core attributes and green peripheral attributes (Skard *et al.*, 2020). According to the notion of attribute centrality, core attributes occupy a larger proportion in defining the mental representation of a product compared with peripheral attributes (Sloman *et al.*, 2010). To be more detailed, core attributes often refer to product-related attributes such as ingredients or physical composition that are indispensable for the main function of a product, whereas peripheral attributes often refer to non-product-related attributes that exert an indirect or minor effect on the overall performance of the product (Keller, 1993). Applying the classification schemes of general attributes to green attributes, green attributes can act as either core attributes or peripheral attributes (Luchs *et al.*, 2010). Previous research suggests that environmental utility originating from the core attributes of a product will result in greater perception of greenness compared with the environmental utility originating from peripheral green attributes (Gershoff and Frels, 2015).

## 2.2 Product category

The literature on consumer psychology argues that consumers require different information focuses across product categories in the process of purchasing decision-making (Botti and McGill, 2011). There exist multiple criteria for classifying product categories, for example, low involvement products versus high involvement products according to the levels of cost time, energy and resource in purchasing process, search products versus experience products, according to the possibility to obtain an objective product quality information before purchasing process, hedonic products versus utilitarian products according to diverse shopping motivation (Botti and McGill, 2011; Nicolau, 2013; Park and Lee, 2009). Specifically, consumers are typically motivated by the desire for happiness, enjoyment or sensual pleasure when considering purchasing hedonic products (e.g. cosmetics, chocolate or game console), whereas they are motivated by functional needs or utility to choose utilitarian products (e.g. umbrella, notebook or mobile disk) (Ran and Zheng, 2017; Scarpi, 2021). However, it is noteworthy that hedonic dimension and utilitarian dimension are usually not mutually exclusive in a product (Batra and Ahtola, 1991). It is the relative salience of functional efficiency as well as the sensuality that defines a product category as hedonic or utilitarian (Chernev, 2004).

## 2.3 Consumer purchase intention towards green attributes

Given the increasing public interest in environmental sustainability in the past two decades, green products have been regarded as superior to their non-green alternatives in several aspects (i.e. lower carbon footprint and higher resource efficiency) (Schons *et al.*, 2018). Consumers are encountering a wide variety of green products in the marketplace today, ranging from organic food, eco-apparel to energy-saving appliances (Driessen *et al.*, 2013). Within the research on sustainable marketing, consumer's reaction towards products with green attributes has emerged as a focal topic (Banbury *et al.*, 2012). Due to the importance of green attributes in evaluating the overall performance of products, there exist numerous studies exploring the role of such attributes in affecting consumer preferences as well as purchase intention (Luchs and Kumar, 2015). However, previous studies showed inconsistent findings on the influence of green attributes on consumer reaction (Olson *et al.*, 2016; Skard *et al.*, 2020; Wood *et al.*, 2018). Some studies argue that consumers show favourable attitudes and even report willingness to pay a premium for environmentally friendly products since ethicality benefits every member of society (Berger, 2019; Bodur *et al.*, 2015; Sharma and Foropon, 2019). Other research streams document that consumers show variations in their actual acceptance of products with green attributes, despite embracing the values of sustainable consumerism (Carrington *et al.*, 2010). One key barrier against green consumption is from the trade-off evaluation between the sacrifice of quality and the benefits of sustainability (Luchs *et al.*, 2010; Skard *et al.*, 2020). Consumers are not willing to forego product efficacy for a product's green attributes (Olson, 2013). For example, Pancer *et al.* (2017) found that the presence of ethical attributes in a product result in consumer's perception of decreased product efficacy and purchase intention.

## 2.4 The interaction between green attributes and product category consumer purchase intention

Taking the notion of Zero-sum heuristic, consumers believe the resource invested in one product dimension is automatically compensated by the loss of resources in other dimensions (Chernev, 2007; Chernev and Carpenter, 2001). Regarding products with green attributes, consumers hold similar stereotypical views that devoting resources to achieve environmentally friendly goals implies that firms sacrifice other functional dimensions (Grolleau *et al.*, 2019; Newman *et al.*, 2014). Notably, for utilitarian products, consumers particularly value the tangible functional features pertaining to quality, durability as well as credibility, and typically evaluate product performance the efficiency-maximizing principle (Babin *et al.*, 1994). This suggests that a significant environmental enhancement of green core attributes is incongruent with consumers' dominant beliefs and expectations. Green peripheral attributes, on the other hand, are not directly associated with product instrumentality (Luchs *et al.*, 2010). Thus, there is a counterintuitive effect of the green core attributes, such that green core attributes of a utilitarian product may lead to a decrease in consumer purchase intention. On the contrary, those unsubstantial environmental enhancements of green peripheral attributes are less likely to cause a negative function inference but meet ethical consumerism. We expect there is a sustainability asset effect when green attributes only peripherally exist in utilitarian product categories. Based on the above arguments, we propose the following hypothesis:

*H1.* In the utilitarian product category, products with green peripheral attributes result in a higher purchase intention than those with green core attributes.

*H2.* In the utilitarian product category, the sustainability asset effect on consumer purchase intention only exists in green peripheral attributes.

Moreover, consumers may prefer green products even after contemplating a quality trade-off under some circumstances. This is mainly because choosing green alternatives is regarded as a benevolent and morally upright behaviour (Giebelhausen *et al.*, 2016; Luchs and Kumar, 2015). When hedonic products claim to be environmentally friendly, consumers perceive the purchasing behaviours as worthy endeavors because of the pleasure and personal internal contentment that engaging in such benevolent behaviour provides (Cheng *et al.*, 2020). Furthermore, previous studies suggest that hedonic consumption and utilitarian consumption are likened to relative vices and virtues respectively (Okada, 2005). This is mainly because consuming hedonic products meets consumers' "wants" rather than "shoulds", which may deplete their monetary resources that are essential for basic needs of life (Ran and Zheng, 2017). However, consuming green products becomes a representation of consumer beliefs regarding virtue, because it benefits the natural environment and contributes to long-term common societal goals (Elgaaied-Gambier *et al.*, 2018; Spielmann, 2020; Theotokis and Manganari, 2015). For hedonic products with green attributes, the green-is-virtuous intuition attenuates consumers' attribution of self-indulgence towards consuming hedonic products and further promotes

attraction and valuation of products (Huber *et al.*, 2018). Moreover, when green attributes are peripherally linked to key product functions, the assumed positive effect will be weaker compared to when green attributes are core. Therefore, we contend that both the green core attributes and green peripheral attributes are expected to generate positive spillover effect in hedonic products purchasing behaviour, and green core attributes are more salient than green peripheral attributes in accumulating sustainability asset. The following hypotheses are proposed:

*H3.* In the hedonic product category, products with green core attributes result in a higher purchase intention than those with green peripheral attributes.

*H4.* In the hedonic product category, the sustainability asset effect on consumer purchase intention exists in both green core attributes and green peripheral attributes.

### 2.5 Mediating role of utilitarian environmental benefits and self-expression benefits

According to Keller (1993), benefits refer to the value consumers attach to product attributes; that is what consumers believe the product can perform for them, which are distinguished into two basic categories: functional benefits and social benefits. Concerning green products, consumers are likely to depend on utilitarian environmental benefits and self-expression benefits to evaluate the considerable advantage (Papista and Krystallis, 2013; Lin *et al.*, 2017). Utilitarian environmental benefits reflect a product's capability to fulfill instrumentality and sustainability (Hartmann and Apaolaza-Ibanez, 2012). Self-expression benefits are regarded as symbolic benefits that contribute to construct aspirational social images and communicate a positive lifestyle to other social members (Brunner *et al.*, 2016; Davies *et al.*, 2018; Kim and Sherman, 2007). Taking the notion of egoism and utilitarianism, consumers' perceived benefits of green attributes build on the cumulative evaluation of their environmental utility and social value (Dhandra, 2019; Goldsmith *et al.*, 2016; Gummerus *et al.*, 2017; Hartmann and Apaolaza-Ibanez, 2012).

Prior research suggests that the utilitarian environmental benefits of green products are the key to making them attractive to broader consumer segments (Brunk, 2010; Vitell *et al.*, 2001). As regards utilitarian products, consumer evaluation is mainly based on the instrumental value of functional features (Voss *et al.*, 2003). Therefore, the utilitarian environmental benefits are necessary considerations in utilitarian product categories where green attributes are contained. Although several experimental studies show that sustainable attributes are likely to be regarded as negative cues in evaluating utilitarian product properties (Cervellon and Carey, 2014; Luchs *et al.*, 2010), we expect that green peripheral attributes are able to promote consumer's perceptions of utilitarian environmental benefits, which are positively associated with their purchase intention. The rationale for the expected positive effect of green peripheral attributes on consumer reaction lies in the evidence that green peripheral attributes offer significant environmental utility compared with those non-green alternatives without affecting products' functional quality.

Based on the above discussions, we propose that utilitarian environmental benefits are the mediator mechanism between green peripheral attributes and consumer purchase intention. Formally, it is posited

*H5.* In the utilitarian product category, the positive effect of green peripheral attributes on consumer purchase intention is mediated by utilitarian environmental benefits.

On the other hand, in the evaluation of hedonic products, consumers weigh more sensory gratification and affective experience (Batra and Ahtola, 1991; Dube *et al.*, 2003). From a conspicuous conservation perspective, some scholars address the fact that consuming products with significant green benefits is able to signal a consumer's altruistic traits and construct a prosocial reputation (Chan, 2020; Kohlová and Urban, 2020; Puska, 2018). Therefore, these social value from either green core attributes or green peripheral attributes tends to satisfy consumers' self-expression and social approval needs (Delgado *et al.*, 2015; Didonato and Jakubiak, 2016; Wallace *et al.*, 2014). Research also reports that the public display of green consumption behaviour increases the perceptions of his or her kindness, generosity and trustworthiness towards other social members, which are regarded as important components of self-expressive benefits (Ahmad and Thyagaraj, 2015; Policarpo and Aguiar, 2019) Complementing these points, it is reasonable to expect that perceived self-expression benefits, arising from consuming hedonic products with green attributes exert a positive influence on consumer purchase intention. The following hypothesis is proposed:

*H6.* In the hedonic product category, the positive effect of green core attributes and green peripheral attributes on consumer purchase intention is mediated by self-expression benefits.

In summary, we propose that sustainability is an asset when green attributes peripherally exist in the utilitarian product category. Whereas for the hedonic product category, the sustainability asset effect exists in both green core attributes and green peripheral attributes. Furthermore, we argue that the positive indirect effect of green attributes on consumer purchase intention towards utilitarian (hedonic) products is mediated by utilitarian environmental benefits and self-expression benefits respectively. The conceptual framework of this study is depicted in Figure 1.

## 3. Study 1

Study 1 aims to test the interaction effects between the green attributes and product category on consumer purchase intention.

### 3.1 Method

A 3 (green attributes: core vs peripheral vs none) ×2 (product category: utilitarian vs hedonic) between-subjects experiment was designed to examine *H1*, *H2*, *H3* and *H4*. To examine the sustainability asset effect, a non-green attribute baseline group was set to test whether the use of green core attributes or green peripheral attributes influences consumer purchase intention

**Figure 1** Conceptual framework
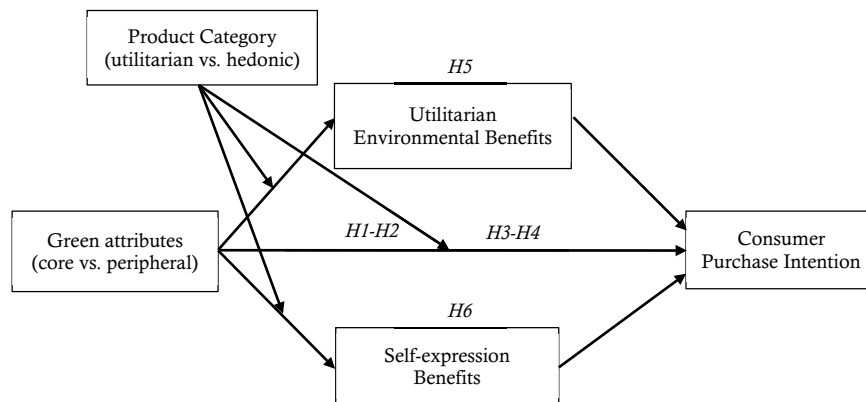


compared to an identical product with non-green attributes. Undergraduate students enrolled at a university in Southeast China were paid 10 RMB to participate in this study.

### 3.2 Experimental manipulation

Following the experiment procedure of Skard *et al.* (2020), green attributes were manipulated by describing the product as "made with 100% natural ingredients" (green core attributes) or "100% recycled packaging material" (green peripheral attributes). The non-green attributes condition shows some basic product information with no green cues and labels. The selection of products was based on an online anonymous questionnaire where 30 participants were asked to list utilitarian products as well as hedonic products pertaining to their daily consumption. Shampoo and body lotion were selected as the utilitarian product and the hedonic product, respectively, as they have been used in past research on green consumption behaviour.

The appropriateness of experimental manipulation of green attributes was through a pre-test ($N = 90$). Participants were firstly randomly exposed to one designed product description. Then they were asked to rate "how much green or environmentally friendly is the shampoo/body lotion?" on a seven-point scale (1 = not at all, 7 = extremely). Independent *t-test* results indicated participants exposed to the green core condition had significantly higher ratings on greenness than those exposed to the green peripheral condition ($M_{core} = 5.100$, SD = 0.923 vs. $M_{peripheral} = 3.830$, SD = 0.834; $t(58) = 5.578$, $p < 0.001$). Meanwhile, participants exposed to the green peripheral condition had significantly higher rating on greenness than those exposed to non-green attributes condition ($M_{peripheral} = 3.830$, SD = 0.834 vs. $M_{none} = 1.230$, SD = 0.430; $t(58) = 15.177$, $p < 0.001$).

The appropriateness of the product category experimental manipulation was examined through another pre-test ($N = 30$). Participants were asked to complete the manipulation check items on seven-point scales (1 = not at all, 7 = extremely), "the extent to which they regarded the shampoo/body lotion as a functional or necessary (experiential or pleasant) product (Strahilevitz, 1999)." The results of a paired *t-test* showed that participants perceived the shampoo to be more functional and necessary than the body lotion ($M_{utilitarian} = 4.917$, SD = 0.983 vs. $M_{hedonic} = 3.317$, SD = 0.866; $t(29) = 6.595$, $p < 0.001$)

while they perceived the body lotion to be more enjoyable and pleasant than the shampoo ($M_{hedonic} = 4.167$, SD = 0.562 vs. $M_{utilitarian} = 3.233$, SD = 0.838; $t(29) = -4.877$, $p < 0.001$.

### 3.3 Procedure and measures

Participants ($N = 288$; ages 18–23, $M_{age} = 20$; 46.5% female) were asked to imagine a scenario in which that they were considering purchasing a new shampoo/body lotion and browsing products in front of supermarket shelves. They were randomly presented with one of six designed product descriptions.

After they completed reading the product description, participants reported their purchase intention with the following items from the study of Gazley *et al.* (2015) and Newman *et al.* (2014):

- "If I were looking for shampoo (body lotion), my likelihood of purchasing this product would be high",
- "When I plan to purchase shampoo (body lotion), I would consider this product",
- "If I need a shampoo (body lotion), my willingness to purchase the product would be high".

Furthermore, considering the potential confounding effects due to participant's different level of environmental knowledge (EK) and environmental concern (EC), they were also asked to rate EK and EC on a series of seven-point scales (1 = strongly disagree; 7 = strongly agree) from the study of Dunlap *et al.* (2000) and Mostafa (2010). They were also asked to evaluate the greenness of the product with following two items on seven-point scales (1 = strongly disagree; 7 = strongly agree) from the study of Gershoff and Frels (2015): "This product deserves to be labelled as green product" and "A person who cares about natural environment would be likely to purchase this product". At the final stage, participants were told to answer several unrelated questions and provide demographic information.

### 3.4 Results

*3.4.1 Manipulation check of green attributes*
The scores of two green attributes manipulation check questions were averaged to form a greenness score ($\alpha = 0.867$). Independent *t-test* results showed that participants under the green core attributes condition reported higher

greenness than those under the green peripheral attributes condition ($M_{core}$ = 5.880, SD = 0.780 vs. $M_{peripheral}$ = 4.177, SD = 0.557; $t(190)$ = −17.401, $p < 0.001$). Meanwhile, participants under the green peripheral attributes condition reported higher greenness than those under the non-green attributes condition ($M_{peripheral}$ = 4.177, SD = 0.557 vs. $M_{none}$ = 1.500, SD = 0.523; $t(190)$ = 34.320, $p < 0.001$). Like the results of the pre-test, the effectiveness of the green attributes manipulation was supported. Additionally, participants' ratings of environmental knowledge and environmental concern were averaged ($\alpha$ = 0.877; $\alpha$ = 0.828). The result of a 3 × 2 ANOVA analysis showed that no significant difference was found in participants' ratings of EK and EC under different experimental conditions ($F(1, 282)$ = 0.022, $p > 0.1$; $F(1, 282)$ = 0.098, $p > 0.1$).

### 3.4.2 Test the interaction effects between green attributes and product categories

Participants' ratings of how much they would like to purchase the product were averaged to form a consumer purchase intention index ($\alpha$ = 0.920). Green attributes and product category were first dummy-coded (green peripheral attributes = 0, green core attributes = 1, non-green attributes = 2; utilitarian product = 0, hedonic product = 1). An ANOVA analysis revealed a significant interaction effect between green attributes and product category on consumer purchase intention ($F(1, 282)$ = 13.889, $p < 0.001$). (Figure 2). As predicted, a follow-up analysis showed that participants exposed to the utilitarian product with green peripheral attributes condition expressed higher purchase intention than those exposed to the utilitarian product with green core attributes ($M_{peripheral}$ = 5.417, SD = 1.244 vs $M_{core}$ = 4.521, SD = 1.468; $t(94)$ = 3.225, $p < 0.001$). However, participants exposed to the hedonic product with green core attributes condition expressed higher purchase intention than exposed to the hedonic product with green peripheral attributes ($M_{core}$ = 5.451, SD = 0.998 vs $M_{peripheral}$ = 4.618, SD = 1.134; $t(94)$ = −3.823, $p < 0.001$). Collectively, *H1* and *H3* are supported.
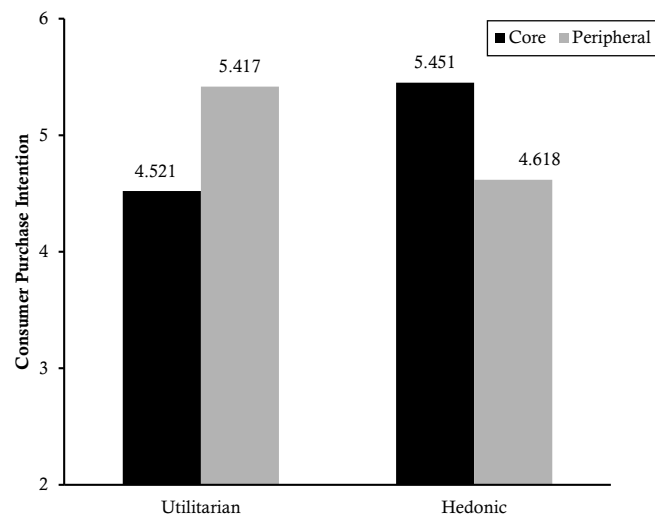
### 3.4.3 Test the sustainability asset effect in different product categories

In the utilitarian product category, an independent t-test result showed that no significant difference was found in consumer purchase intention between green core attributes condition and non-green attributes condition ($M_{core}$ = 4.521, SD = 1.468 vs $M_{none}$ = 4.160, SD = 1.052; $t(94)$ = 1.385, $p > 0.1$). Another independent t-test result showed that participants exposed to the green peripheral attributes condition expressed higher purchase intention than those exposed to the non-green attributes condition ($M_{peripheral}$ = 5.416, SD = 1.244 vs $M_{none}$ = 4.160, SD = 1.052; $t(94)$ = 5.345, $p < 0.001$). These results showed that only green peripheral attributes enhanced consumer purchase intention, lending support to sustainability asset effect (*H2*). To further demonstrate the sustainability asset effect, we calculated a difference score of consumer purchase intention for the non-green attributes compared to the two green attributes. The results showed that the positive difference between the green peripheral attributes and non-green attributes on consumer purchase intention was significantly greater than the difference between the green core attributes and non-green attributes ($M_{difference\ score\ for\ peripheral}$ = 1.257 vs $M_{difference\ score\ for\ core}$ = 0.361, $t(94)$ = −3.327, $p < 0.01$).

In the hedonic product category, an independent t-test result showed that participants exposed to the green core attributes condition also expressed higher purchase intention than exposed to the non-green attributes ($M_{core}$ = 5.451, SD = 0.998 vs. $M_{none}$ = 3.854, SD = 1.063; $t(94)$ = 7.591, $p < 0.001$). Another independent t-test result showed that participants exposed to the green peripheral attributes condition expressed higher purchase intention than those exposed to the non-green attributes condition ($M_{peripheral}$ = 4.618, SD = 1.134 vs. $M_{none}$ = 3.854, SD = 1.063; $t(94)$ = 3.405, $p < 0.01$). These results indicated that both green core attributes and green peripheral attributes enhanced consumer purchase intention, lending support to sustainability asset effect (*H4*). To further demonstrate the sustainability asset effect, we calculated a difference score of consumer purchase intention

**Figure 2** Interactions effect between green attributes and product category

for the non-green attributes compared to the two green attributes. The results further revealed that the difference between the green core attributes and non-green attributes on consumer purchase intention was significantly greater than the difference between green peripheral attributes and non-green attributes ($M_{\text{difference score for core}}$ = 1.597 vs. $M_{\text{difference score for peripheral}}$ = 0.764, $t(94)$ = 2.821, $p < 0.01$), which indicated that the sustainability asset effect on consumer purchase intention is stronger for green core attributes than green peripheral attributes.

## 4. Study 2

Study 2 aims to test the mediating effect of utilitarian environmental benefits and self-expression benefits in the relationship between green attributes and consumer purchase intention. Furthermore, different manipulations of green attributes and product category are applied in Study 2 to demonstrate the robustness of the interaction effect between green attributes and product category on consumer purchase intention.

### 4.1 Method

A 2 (green attributes: core vs peripheral) ×2 (product category: utilitarian vs hedonic) between-subjects experiment was designed to examine *H5* and *H6*. MBA members of business schools from a well-known university in Southeast China were rewarded extra course credit to participate in the experiment.

### 4.2 Experimental manipulation and material

We used the level of sustainability adapted from the experiment procedure of Luchs *et al.* (2010) to manipulate green attributes. A statement from a hypothetical independent agency named the "Green Product Council (GPC)" is used to show sustainability cues. The GPC "rates the extent to which environmentally friendly such as energy-saving, sensitivity to pollution, recycled material as well as limited resource usage are the components of the product." As Table 1 shows, the description of the size, uses and availability of the smartwatch remained constant, participants are told that two watches received different ratings of GPC (5 = "average" versus 10 = "superb"). Additionally, a smartwatch is chosen as the experiment product category as it contains both utilitarian features and hedonic features. Two purpose-designed

advertisements were developed to promote the smartwatch product. In the hedonic condition, the advertisement emphasized the stylish design of the product: "the smartwatch adds a fashion element to the new collection. The band crafted from a new textile is available in multiple designs, colours and leathers, which helps update your daily style." In the utilitarian condition, the advertisement emphasized the powerful features of the product:

> [...] the smart watch has new heights and depths. The expansive display makes you see more at a glance, while the advanced sensors track all you move, which helps you keep healthy and safe.

The appropriateness of the experimental manipulation was tested through a pre-test ($N$ = 120). Participants were randomly exposed to one of four designed conditions. They were asked to rate "how much environmentally friendly the smartwatch is?" on a seven-point scale (1 = not at all, 7 = extremely). They were also asked to complete the manipulation check item of the product category on a seven-point scale (1 = not at all; 7 = extremely likely): "the extent to which they believed that purchasing the smartwatch represented a functional-oriented activity or a pleasure-oriented activity" (Strahilevitz, 1999). The results of an ANOVA analysis revealed that participants exposed to the green core condition had significantly higher ratings on greenness than those exposed to the green peripheral condition ($M_{\text{core}}$ = 5.450, SD = 1.268 vs $M_{\text{peripheral}}$ = 3.967, SD = 0.882; $F (1, 118)$ = 55.326, $p < 0.001$). The results also showed that participants in the utilitarian condition perceived the smartwatch to be more functional-oriented ($M_{\text{utilitarian}}$ = 5.800, SD = 0.819 vs $M_{\text{hedonic}}$ = 3.800, SD = 1.005; $F(1, 118)$ = 142.742, $p < 0.001$), whereas participants in the hedonic condition perceived the smartwatch to be more pleasure-oriented ($M_{\text{hedonic}}$ = 4.750, SD = 0.895 vs $M_{\text{utilitarian}}$ = 3.800, SD = 0.777; $F(1, 118)$ = 38.562, $p < 0.001$). No other significant effects were found ($p$s > 0.10).

### 4.3 Procedure and measures

Participants ($N$ = 280; ages 29–49, $M_{\text{age}}$ = 37; 41.8% female) were asked to imagine a scenario in which they were browsing smartwatches on the online shopping platform and deciding whether to purchase a new smartwatch. Participants were randomly presented with designed product information and advertisements. After they completed reading the product description, participants evaluated the greenness of the product

**Table 1** Manipulation of green attributes

| Descriptions | Smartwatch | |
| --- | --- | --- |
| | **Green core attributes** | **Green peripheral attributes** |
| **Product size** | 44-mm case size | 44-mm case size |
| **Uses** | Digital time telling, | Digital time telling, |
| | Place and pick-up calls and messages, | Place and pick-up calls and messages, |
| | Play digital audio and video, | Play digital audio and video, |
| | Fitness monitoring | Fitness monitoring |
| **Availability** | Mass merchandisers, | Mass merchandisers, |
| | online store | online store |
| **GPC rating (see below)** | 10 (superb) | 5 (average) |

**Note:** The Green Product Council (GPC) rates products based on a variety of environmentally friendly factors such as energy efficiency, sensitivity to pollution, recycled materials and limited resource usage

and reported their purchase intention on the same seven-point scales used in Study 1. Then, participants exposed to the utilitarian condition were told to rate utilitarian environmental benefits on three-item scales adapted from the work of Lin *et al.* (2017):

- "This product respects natural environment";
- "This product helps to prevent global warming"; and
- "This product does not pollute the environment".

while those exposed to the hedonic condition were asked to rate self-expression benefits on three-item scales adapted from the work of and Hartmann and Apaolaza-Ibanez (2012):

- "With this product, I can express environmental concern";
- "With this product, I can demonstrate that I care about environmental protection"; and
- "With this product, my friends regard me to be concerned about the natural environment".

Additionally, to avoid the potential confounding effects caused by participant's different levels of EK and EC, participants were asked to evaluate the greenness of product and rate EK and EC on a series of seven-point scales, which are similar to Study 1. At the final stage, participants were asked told to complete unrelated research and provide demographic information.

### 4.4 Results

*4.4.1 Manipulation check of green attributes*
The scores of two green attributes manipulation check questions were averaged to form a greenness score ($\alpha = 0.797$). Independent *t-test* results showed that participants under the green core attributes condition reported higher greenness than those under the green peripheral attributes condition ($M_{core} = 5.221$, SD = 0.995 vs $M_{peripheral} = 3.932$, SD = 0.979; $t(278) = -10.931$, $p < 0.001$). Like the results of the pre-test, the effectiveness of the green attributes manipulation was supported. Furthermore, the results of a $2 \times 2$ ANOVA analysis show that no significant difference was found in participants' ratings of EK ($\alpha = 0.864$) and EC ($\alpha = 0.910$) under four different experimental conditions ($F(1, 276) = 0.013$, $p > 0.1$; $F(1, 276) = 0.042$, $p > 0.1$).

*4.4.2 Test the interaction effects between green attributes and product category*
Participants' ratings of how much they would likely to purchase the product were averaged to form a consumer purchase intention index ($\alpha = 0.762$). A $2 \times 2$ ANOVA analysis shows a significant interaction effect between green attributes and product category ($F(1, 276) = 60.562$, $p < 0.001$). Table 1 provides a summary of the results of the ANOVA analysis. A

follow-up analysis showed that participants exposed to the utilitarian product with green peripheral attributes condition expressed higher purchase intention than those exposed to the utilitarian product with green core attributes condition ($M_{peripheral} = 5.633$, SD = 0.780 vs $M_{core} = 4.824$, SD = 0.735; $t(138) = 6.318$, $p < 0.001$). However, participants exposed to the hedonic product with green core attributes condition expressed higher purchase intention than exposed to the hedonic product with green peripheral attributes condition ($M_{core} = 5.729$, SD = 0.962 vs $M_{peripheral} = 5.090$, SD = 0.590; $t(138) = -4.732$, $p < 0.001$) (Table 2).

*4.4.3 Mediation analysis*
The bootstrap method with 5,000 samples was performed by PROCESS macro of SPSS to estimate the mediating effect at the 95% confidence interval (Model 4; Hayes, 2013). When the confidence interval does not include zero, the mediating effect is statistically significant. Green attributes were firstly dummy coded as green peripheral attribute = 0, green core attribute = 1. Then, the utilitarian environmental benefits/self-expression benefits were entered as the mediator in the relationship between green attributes and consumer purchase intention. The results from above analyses showed that the mediation model was significant for consumer purchase intention towards the utilitarian product (Indirect effect$_{utilitarian\ environmental\ benefits}$ = $-0.383$). Meanwhile, the other mediation model was significant for consumer purchase intention towards the hedonic product (Indirect effect$_{self-expression\ benefits}$ = 0.345). The results of the mediation analyses are depicted in Figure 3, Figure 4 and Table 3. Collectively, the above results support *H5* and *H6*.

## 5. General discussion

Considering the widespread occurrences of confusion regarding green products among consumers, it is necessary to investigate how consumers regard green attributes and to uncover the mechanism in which green attributes lead to positive consumer response. Prior studies have demonstrated that the hedonic-utilitarian typology of products is fundamental in marketing segment and consumer research (Dhar and Wertenbroch, 2000). Thus, this study explores the interaction effects between green attributes and product category on consumer response. Specifically, Study 1 indicates that in utilitarian product categories, products with green peripheral attributes generates a higher purchase intention than those with green core attributes, whereas in hedonic product categories, consumers generate higher purchase intention towards products with green core attributes other than those with green peripheral attributes. In Study 2, we demonstrate that green attributes, as universal sustainability cues, are used

**Table 2** The interaction effects between green attributes and product category

| Variable | df | Mean square | F | Sig. |
|---|---|---|---|---|
| Green attributes | 1 | 0.514 | 0.849 | 0.358 |
| Product category | 1 | 2.292 | 3.785 | 0.053 |
| Green attributes × Product category | 1 | 36.673 | 60.562 | 0.000*** |
| Error | 276 | 0.606 | | |

**Note:** ***Deemed significant a 0.001 level

**Figure 3** Statistical mediation diagrams for the utilitarian product category
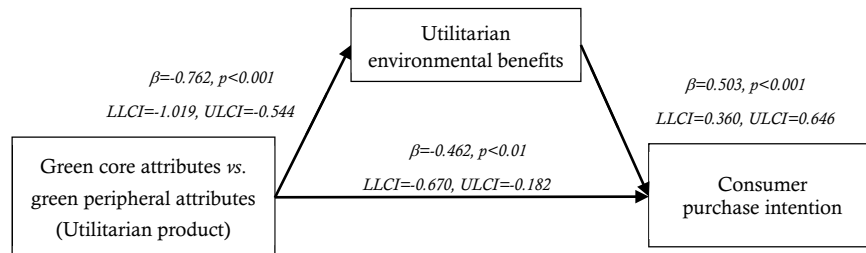


**Figure 4** Statistical mediation diagrams for the hedonic product category
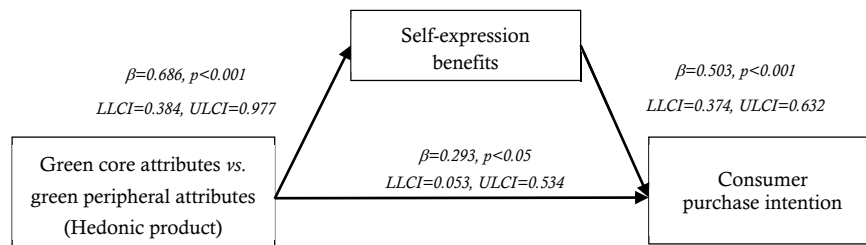


**Table 3** Mediation analyses of utilitarian environmental benefits and self-expression benefits

| Effect | Utilitarian product category | | | | Hedonic product category | | | |
|---|---|---|---|---|---|---|---|---|
| | *Coeff.* | *Boot SE* | *LLCI* | *ULCI* | *Coeff.* | *Boot SE* | *LLCI* | *ULCI* |
| **Direct** | −0.426 | 0.124 | −0.670 | −0.182 | 0.293 | 0.122 | 0.053 | 0.534 |
| **Indirect** | −0.383 | 0.882 | −0.585 | −0.239 | 0.345 | 0.943 | 0.181 | 0.581 |
| **Total** | −0.810 | 0.128 | −1.063 | −0.556 | 0.638 | 0.135 | 0.372 | 0.805 |

among consumers to form their perception of utilitarian environmental benefits as well as self-expression benefits, which further enhance consumer purchase intention.

### 5.1 Theoretical implications
This study provides theoretical contributions to green marketing literature in several important ways. First, this study responds to calls for more studies into the effectiveness of "going green" strategies in promote consumer purchase intention.

Although much research has discussed consumer preference for products or services with environmental attributes (Grolleau *et al.*, 2019; Lin and Chang, 2012), consumer preference for products with environmental attributes is equivocal. Our study advances the understanding of whether and when green attributes may serve as an asset and further provide empirical evidence to support the sustainability asset in different product categories.

Prior studies show conflicting findings as to the role of green attributes in encouraging green consumption, this study contributes to resolving the matter by demonstrating that whether green attributes are an asset depends on the effectiveness of environmental enhancement in different product categories. Although several studies found that green attributes positively influence consumer response in gentleness-dependent product categories, whereas it causes negative

quality inference in strength-dependent product categories (Skard *et al.*, 2020). A key contribution of this study lies in investigating the distinction between utilitarian products and hedonic products and further examining the interaction effects between green attributes and product category on consumer purchase intention. In particular, the empirical results from two experimental studies revealed that utilitarian products with green peripheral attributes result in a higher purchase intention, while for hedonic products this is achieved by green core attributes Consequently, this study identifies a new important boundary condition under which the effectiveness of green product strategies will not be undermined. These findings potentially help bridge the attitude-behaviour gap in sustainable consumption. That is, using a green peripheral attribute information strategy in isolation for utilitarian products and using a joint green information strategy (i.e. core and peripheral) for hedonic products would be effective to promote sustainable consumption behaviour.

Furthermore, this study uncovers a benefits-based mechanism that explains how green attributes in utilitarian and hedonic product categories trigger consumer benefits analysis in a green decision context, which in turn leads to positive purchase intention. With respect to the green consumption, previous studies have not identified the underlying mechanism by which green attributes exert positive influence on consumer purchase intention towards different types of products. Our

research bridges the aforementioned knowledge gaps by illustrating the process that consumers' purchase intention towards utilitarian products is stimulated by utilitarian environmental benefits, whereas consumers' purchase intention towards hedonic products is stimulated by self-expression benefits. The valuable insight from research findings also provides an explanatory account for other studies concerning consumer's perception and evaluation towards diverse corporate environmental claims.

### 5.2 Practical implications

The present work provides some insight for market managers of environmentally superior products. Foremost, our findings provide some guidance for companies that choose either to capitalize on green products already in their portfolios or to include green attributes in new products. Specifically, for the utilitarian products, in which instrumentality and efficiency are highly valued by consumers, companies should apply a green peripheral attribute labelling strategy to promote the prominent environmental enhancement and pay much attention to countering the association between sustainability and functional performance. For example, when developing a hybrid vehicle, companies could use an explicit signal approach to highlight performance-related characteristics (e.g. acceleration time, handling ability). For hedonic products, in which enjoyment and pleasure are greatly valued, marketing teams should provide sustainability features in describing the green enchantment of their products and apply joint a green labelling strategy (core and peripheral attribute claims) to achieve green market differentiation. For example, when promoting an environmentally friendly body lotion, marketers should emphasize both natural formula and packaging from recycled materials in advertising to encourage green consumption behaviour.

Moreover, to communicate desirable benefits from different product categories, practitioners should tailor the advertising strategies to meet target consumers' expected benefits (utilitarian environmental benefits or self-expression benefits) associated with different product categories. Specifically, the communication message of utilitarian products should underline the unique green utility in alleviating environmental issues compared with those non-green alternatives to further enhance consumers' perception of utilitarian environmental benefits. Green certification, eco-labels, and other convincing environmental-related information of a product's package or other non-product attributes should be supplied through appropriate advertisements. For hedonic products with green attributes, consumers tend to purchase this type of products when they perceive the self-expression benefits associated with green consumption. Therefore, marketing campaigns should add some social value to emphasize the green product's self-expression nature. For example, the marketing communications should associate pro-social reputation with green purchasing behaviour, suggesting that green consumers are well-liked, caring and altruistic. Meanwhile, purchasing hedonic products with sustainable attributes could also be positioned as a means for consumers to express their warm feelings of generosity and environmental concerns.

### 5.3 Limitations and future research directions

This research has some limitations that should be addressed in the future. Firstly, this study focuses on the role of utilitarian and hedonic product categories in the effect of green attributes on consumer purchase intention, consumer cognition structure as well as communication messages that might shape consumer perceptions of green products are not considered. Future developments should shed more light on the role of individual cognitive reasons (i.e. regulatory focus, thinking style, and construal level), communication message (i.e. message appeal and message source) in evaluating consumer purchase intention towards products with green attributes. In addition, the findings show that the asset effect on consumer purchase intention caused by green peripheral attributes exists in both hedonic products and utilitarian products. A comprehensive comparison of both asset effects should be further investigated in future study. The second limitation of the study lies in its reliance on the Chinese consumer samples, a replication of the study might not examine the effectiveness of green product strategies in other cultural regions. Future comparative studies between different sample populations will be valuable to further investigate the impact of cultural differences on the evaluation of green product strategies. Finally, this study used young student samples and measured the consumer purchase intention towards green products in hypothetical situations, which does not show the ecological validity of research findings by documenting how green attributes affect consumer purchase intention in an actual shopping context. Future studies should consider choosing participants from different ages and conducting the field study to measure the actual purchase decisions and further demonstrate the generalizability and robustness of sustainability asset effect in different product categories.

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