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DETERMINANTS OF GREEN PURCHASE BEHAVIOUR OF UNIVERSITY STUDENTS IN SOUTH AFRICA

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ABSTRACT: The unsustainable level of consumption globally is one of the major causes of the environmental challenges that the world currently faces. The purchase of green products is one of the ways to promote environmental sustainability globally. The study examines the determinants of green purchase behaviour of university students in South Africa. The study merges the Value-Attitude-Behaviour (VAB) theory and the Theory of Planned Behaviour (TPB) to develop a new theoretical model to predict GPB. The study uses a quantitative research design, and data is collected from students at two South African universities. The study adopts the Partial Least Square Structural Equation Modelling for data analysis. The findings support the applicability of the merged theories in predicting GPB. Recommendations to improve the GPB of students include the introduction of environmental education as a subject in universities.

KEYWORDS: green purchase behaviour, Value-Attitude-Behaviour Theory, Theory of Planned Behaviour, university students, South Africa

Introduction

The world faces serious environmental challenges such as loss of biodiversity, pollution, depletion of natural resources and global warming (Ghazali et al., 2019; Karimi & Mohammadimehr, 2022). The unsustainable level of consumption worldwide is one of the major causes of these environmental challenges (Jaiswal & Kant, 2018; Naz et al., 2020). The exploitation of natural resources positively impacts livelihood and economic development in South Africa (Arko-Achemfuor, 2017). However, resource consumption has exponentially increased in past years in South Africa, leading to environmental problems such as the depletion of natural resources (Nathaniel, 2021). South Africa's Environmental Performance score is 37.20, and the country ranks 116 out of 180 countries (Environmental Performance Index, 2022). The Environmental Performance Index (EPI) uses forty performance indicators and ranks the national efforts of 180 countries on environmental protection. A higher score depicts a better performance, and the EPI of 37.20 ranks in the bottom 25th percentile globally (Environmental Performance Index, 2022). South Africa envisions a green economy that addresses the interdependence of social protection, economic growth and environmental sustainability as a sustainable development path (Department of Forestry, Fisheries & the Environment, 2022). Addressing this problem of resource consumption is important to sustainability in South Africa and globally (Falayi et al., 2021).

The undesirable effect of resource consumption on the natural environment has popularised the concepts of green products and green purchases (Jaiswal & Kant, 2018; Soomro et al., 2020). The willingness of businesses and consumers to engage in environmental protection is one of the key drivers of green or sustainable production and consumption (Geng et al., 2017). Green purchase behaviour (GPB) describes the purchase of products that save resources and protect the environment (Joshi & Rahman, 2015; Zhang & Dong, 2020). The benefits of GPB include sustainable manufacturing, sustainable consumption and the achievement of national and global environmental goals (Hazaea et al., 2022). However, despite the awareness of the benefits of green consumption, the findings of empirical research increasingly suggest the existence of an intention-behaviour gap (Nguyen et al., 2018; Diddi et al., 2019). The intention of consumers to purchase green products is, at times, not reflected in their actual behaviour. The findings of studies on the relationship between intention and behaviour are inconclusive. While the findings of some studies support a significant positive relationship, the conclusion of other studies indicates an insignificant relationship (Nguyen et al., 2018; Diddi et al., 2019; El Haffar et al., 2020). Reducing the

"intention-action gap is important in improving the purchase of green products and ensuring a more sustainable planet" (White et al., 2019). Therefore, it is important to understand the determinants of GPB of consumers (Zhang & Dong, 2020).

The Theory of Planned Behaviour (TPB) by Ajzen (1991) is one of the prominent theories on behavioural decisions and has been used as the theoretical basis for studies on GPB (Yadav & Pathak, 2017; Ruangkanjanases et al., 2020)**.** However, the findings of these studies are often inconclusive and limited (Wang et al., 2022a). This is because while the TPB primarily takes into consideration normative influences, it fails to consider factors such as values that can also affect behavioural intention (Wang et al., 2022a). Values are an important factor in GPB (Zhuang et al., 2021). The Value-Attitude-Behaviour (VAB) theory proposes that attitude is influenced by values, and individual behaviour is influenced by attitude (Homer & Kahle, 1988). The personal values that can affect pro-environmental behaviour include biospheric, altruistic and egoistic (Stern & Dietz, 1994).

Young adults and university students tend to consider environmental implications, such as the preservation of the natural environment, in their purchasing decisions (Ndofirepi & Matema, 2019). In addition, approximately 63.3%, about 23.4 million of the population of South Africa, was made up of youths (15-34 age bracket) in 2019 (Youth Progress Index, 2021). Youths in South Africa have significant purchase power spending of about 303 billion Rand annually (Mu, 2023). South African youths, including university students, also tend to identify trends, endorse brands and have a big influence on the majority of household buying decisions (Azionya & Overton de Klerk, 2021). However, despite the environmental and consumption attributes of university students, studies that focus on the GPB of university students in South Africa are sparse. Therefore, it is important to understand the factors that can affect the GPB of university students.

This study aims to explore the drivers of GPB of university students in South Africa by merging the TPB and the VAB. The study will make the following contributions to research on green behaviour. First, consumer purchasing behaviour is a phenomenon that can be affected by many factors (Testa et al., 2020). Therefore, the use of an integrated model in this study addresses the shortcomings of using a single theory in explaining GPB (Ates, 2020). Studies that have integrated both the TPB and VAB in predicting the GPB of university students are sparse. Second, the study focuses on university students who can be classified as young consumers and are present and future consumers. Students of today will have a major impact on the future state of the environment (Naz et al., 2020). Third, research on green consumption and GPB has primarily focused on developed countries. There is limited research on the factors that drive customers to purchase environ-

mentally friendly products in developing countries (Jahanshahi & Jia, 2018; Anuar et al., 2020). However, the majority of the world's population lives in developing countries. The dream of global environmental protection and a green economy cannot be achieved without the participation of developing countries (Zhao et al., 2021; United Nations Conference on Trade and Development, 2022). Fourth, understanding the antecedents of GPB will help to reduce resource exploitation in South Africa. This will help to achieve the goal of environmental sustainability in South Africa as envisioned by the National Development Plan, 2030 (South African Government, 2012) and SDG 12 (United Nations, 2015).

An overview of the literature

Green purchase behaviour (GPB)

Green products are products whose production has a lower level of carbon footprint (Volschenk et al., 2022). The design of green products protects the environment through reduced energy use, elimination of toxic waste, and reduction of pollution. In comparison to traditional products, green products are renewable, decomposable and recyclable (Zhuang et al., 2021). Examples of green products include green cars, green dishwashers, energy-saving appliances, eco-friendly fashion accessories, sustainable supplies for homes and kitchens, sustainable technology devices, clean beauty and personal care, and Sustainable shopping bags (Wijekoon & Sabri, 2021). The green consumer is one who avoids the purchase of products that can harm the environment (Koloba, 2020). Green purchase behaviour (GPB) (also known as environmentally friendly or eco-friendly purchase behaviour) is the purchase of products that do minimal damage or protect the environment (Jaiswal & Kant, 2018; Soomro et al., 2020). GPB also describes the avoidance of products that can harm the environment and society in order to create a more sustainable world (Zhuang et al., 2021). GPB has been studied in the context of the purchase of specific green products such as electric vehicles, energy-efficient appliances and nature-based tourism (Nguyen et al., 2018; Fenitra et al., 2021; Bhutto et al., 2022; Wang et al., 2022). GPB has also been studied in the context of general green products (Paul et al., 2016; Yadak & Pathak, 2017). This study focuses on the purchase of general green products.

Theoretical background

The study is guided by two theories, namely the theory of planned behaviour (TPB) andthe Value-attitude behaviour theory (VAB). The TPB by Ajzen (1991) proposes that the intention to perform a behaviour is shaped by three

factors, namely attitude, subjective norms and perceived behavioural control. In addition, the intention is supposed to positively impact on behaviour. The TPB has been used as the theoretical basis for studies on GPB (Ruangkanjanases et al., 2020; Bhutto et al., 2022). However, the TPB has some inherent disadvantages in predicting GPB as it only focuses on normative influences (Wang et al., 2022a). The TPB is an expectancy model that focuses on rational reasoning. The TPB assumes that self-interest that focuses on the costs and benefits of alternatives (e.g. peer influence, time and money) are the primary reasons for individual behaviour (Wang et al., 2023). However, values are important in green behaviour. Therefore, the personal values of consumers should be considered when examining the factors that affect green consumption. Researchers that focus on self-interest motives mainly rely on rational choice models such as the TPB (Fauzi et al., 2022; Wang et al., 2023). The VAB theory depicts a cognitive hierarchy that shows the relationship between values, attitude and behaviour (Homer & Kahle, 1988). The model proposes a causal model of the relationship between the three constructs. Thus, the VAB is an integration of the three constructs into a single model (Homer & Kahle, 1988). The VAB model has been used as the theoretical underpinning of studies on green purchase behaviour by consumers (Jan et al., 2019; Wang et al., 2022b). This study merges the VAB and the TPB to develop a model to predict GPB. The integration of the TPB with the VAB will enable the consideration of both self-interest motives and pro-social motives in the context of GPB. The hypotheses that are proposed are based on the merged theories. First, the relationships between values, as represented by the three personal values (Stern et al., 1993) and three TPB constructs (Ajzen, 1991) are developed. This links values not only to attitude in line with the VAB (Homer & Kahle, 1988) but also to the two other constructs of the TPB (Ajzen, 1991). In addition, the relationships between attitude and intention and behaviour, as proposed by VAB (Homer & Kahle, 1988) and the relationships between the two other constructs of the TPB and intention and behaviour are linked (Ajzen, 1991).

Hypotheses

Biospheric values

Schwartz (1994) defines values as "a desirable trans-situational goal varying in importance, which serves as a guiding principle in the life of a person or other social entity". Stern et al. (1993) obtained three value components, namely biospheric values (BV), altruistic values (AV) and egoistic values (EV). These three values are obtained from the theory of basic values (Schwartz, 1994). These three values can be clearly differentiated empiri-

cally (De Groot & Steg, 2010). The findings of the study by De Groot and Steg (2007) reveal that BV depicts an explanation for environmental beliefs and environmental intentions by individuals. A person with a high biospheric value orientation is likely to be more interested in actions that will lead to environmental protection (Van der Werff et al., 2013). Therefore, a stronger BV will be positively associated with an attitude towards pro-environmental behaviour (Ates, 2020). Han et al. (2018), using the VAB model to explore the intention for eco-cruises, find that perceived environmental concern (a measure of BV) is positively associated with attitude. The study by Cheung and To (2019) focuses on the purchase behaviour of Chinese consumers. The findings indicate that BV (as depicted by individual environmental conscious-ness) has significant positive relationships with attitude. Nguyen et al. (2016) point out that the effect of BV on subjective norms has received sparse empir-ical attention despite its importance in determining pro-environmental behaviour. Individuals may develop perceived social norms in the context of environmentally friendly behaviour because they are concerned about nature. Thus, BV may motivate the social norms of consumers (Nguyen et al., 2016). According to Soyez (2012), ecocentric value orientation positively influences subjective norms in the context of the purchase of organic food. Paul et al. (2016) find that environmental concern by consumers positively affects subjective norms towards GPB.

BV can also affect perceived behavioural control with respect to pro-envi-ronmental behaviour. Research on GPB has operationalised perceived behav-iour control as the control beliefs of consumers about time, cost, availability and product labelling. These factors are considered as perceived barriers in the context of GBP (Nguyen et al., 2016). The study by Nguyen et al. (2016) finds that the BV has a negative effect on perceived inconvenience in the con-text of GPB. However, De Groot and Steg (2010) find that individuals with a biospheric value orientation tend to purchase pro-environmental products despite perceived barriers. Consumers with BV often prefer green products despite their high costs (Van der Werff et al., 2013). An individual with BV will not be influenced by the negative consequences of higher prices and extra effort involved in green purchases (Perlaviciute & Steg, 2015). It is hypothesised that:

- H1a: BV is positively associated with attitude towards green products.
- H1b: BV is positively associated with subjective norms in the context of green products.
- H1c: BV is positively associated with perceived behavioural control in the context of green products.

Altruistic values

Altruistic values (AV) focus on an individual's concern for other people (Stern et al., 1993). An individual with an altruistic value orientation can help other people because of the activation of their personal norms, particularly in situations where others are threatened (Hans et al., 2021). The findings of some empirical studies indicate a positive causative path from AV to attitude. The findings of the study by Wang et al. (2022b) show that the relationships between AV and attitude and intention are positive. Teng et al. (2013) find that the effect of altruism on attitude towards green hotels is positive. Prakash et al. (2019), in a study on eco-friendly packaged products in India, find that AV positively affects attitudes towards eco-friendly packaging. Obrenovic et al. (2020) reveal that individuals with altruistic traits are considerate, out-ward-oriented and interested in the needs of others. Waris et al. (2021), in a study that focuses on the purchase of energy-efficient appliances, find significant positive relationships between altruism and subjective norms and perceived behavioural control. Oh et al. (2021) find that AV positively affects family norms. Individuals tend to gravitate toward people with similar norms. Wang et al. (2022b) find that altruistic values positively affect subjective norms and perceived behavioural control. However, the effect of altruistic values on green purchase attitudes is insignificant. Teng et al. (2013) find that altruism positively affects perceived behaviour. Individuals with an altruistic value orientation tend to purchase GPB despite higher costs. It is hypothesised that:

- H2a: AV is positively related to attitude towards green products.
- H2b: AV is positively related to subjective norms.
- H2c: AV is positively related to perceived behavioural control.

Egoistic values

Egoistic values (EV) focus on the maximisation of individual outcomes (Stern et al., 1993). The benefits of self-egoistic values, such as better quality of life or good health, may be a motivation for an individual to behave pro environmentally (Prakash et al., 2019). Nguyen et al. (2016) and Prakash et al. (2019) find that health issues and safety concerns as measures of EV influence the attitude towards green products. However, the study by Prakash et al. (2019) focused on health-conscious consumers. Harjadi and Gunardi (2022) find that EV shave a positive influence on eco-friendly attitudes and subjective norms in the context of eco-friendly products. Oh et al. (2021) find that family egoistic value orientation positively affects the experience of nature through social norms. Individuals with high levels of EV have higher levels of social influence actions (Kis et al., 2020). Osburg et al. (2019), however, point out that EV focuses on the seeking of individual benefits. This is

less likely to lead to ethical choices compared to altruistic and biospheric values that focus on societal and environmental issues. High levels of EV lead to a decrease in self-determination and motivation towards pro-environmental behaviour by individuals (de Groot & Steg, 2010). However, the study by Groot and Steg (2010) suggests that EVs may positively influence pro-environmental behaviour. For instance, cost reduction is associated with energy saving. However, the major advantages of green products are not about individual benefits but environmental protection. De Groot and Steg (2010) indicate that the findings of empirical studies about the relationship between egoistic values and pro-environmental attitude, intention and behaviour are mostly negative. This is because pro-environmental behaviour tends to require individuals to reduce or refrain from egoistic tendencies. Consequently, it is hypothesised that:

- H3a: EV is negatively related to attitude towards green products.
- H3b: EV is negatively related to subjective norms.
- H3c**:** EV is negatively related to perceived behavioural control.

Attitude towards green products

Ajzen (1991) describes attitude as the favourable or unfavourable evaluation of a particular behaviour by an individual. According to the TPB by Ajzen (1991), attitude is one of the major predictors of intention. Attitude towards green products is the favourable or unfavourable evaluation of an individual on whether the product will help to protect the environment (Wang et al., 2022a). Attitude toward green products depicts the degree to which an individual negatively or positively values the act of buying a green product (Kamalanon et al., 2022). Green purchase intention is the possibility of purchasing environmentally friendly products by consumers (Zhuang et al., 2021). A positive attitude towards green products should lead to the intention to purchase green products. The positive relationship between attitude and intention in the context of the purchase of green products is supported by the literature (Verma & Chandra, 2018; do Paço et al., 2019; Woo & Kim, 2019). In addition, attitude can directly influence GPB. Nguyen et al. (2016) find that the attitude of consumers towards environmental protection is positively associated with intention and GPB. The findings of the study by Taufique and Vaithianathan (2020) reveal significant positive relationships between attitude and intention and ecologically conscious consumer behaviour. It is hypothesised that:

- H4a: Attitude toward green products is positively related to intention to purchase green products.
- H4b: Attitude toward green products is positively related to GPB.

Subjective norms

Subjective norms describe the belief that a person is an important person or group of people that are important will approve and support the behaviour of an individual (Ajzen, 1991). Subjective norms depict the perceived social pressure and measure the intensity of pressure that an individual faces regarding specific behaviours (Ajzen, 1991). In the context of the purchase of green products, subjective norms describe whether some important people, such as friends and relatives, will approve the purchase of such products (Kamalanon et al., 2022). The literature is inconclusive about the effect of subjective norms on the intention to purchase green products. Hasan et al. (2022) find that the effect of subjective norms on the intention to purchase green tea is insignificant. The findings of the study by Taufique and Vaithianathan (2020) also indicate that the relationship between subjective norms and intention is insignificant. However, the same study finds that subjective norms and ecologically conscious consumer behaviour are positively related. Xu et al. (2022), in a study that explored the effect of subjective norms on green purchase behaviour in China, found that both descriptive norms and injunctive norms positively affect the purchase of green products. The findings of the study by Alalel and Jan (2023) indicate that subjective norms positively influence the intention to purchase green products in Algeria. Hsu et al. (2017) and Pang et al. (2021) also find a significant positive relationship between subjective norms and intention to purchase green skin care products. It is hypothesised that:
- H5a: Subjective norms are positively related to the intention to purchase green products.
- H5b: Subjective norms are positively related to GPB.

Perceived behavioural control

Perceived behaviour control, as one of the constructs of the TPB, depicts the judgement of an individual about their ability to perform a specific behaviour (Ajzen, 1991). In the context of green products, perceived behavioural control depicts the judgment of an individual on being able to use such products (Sharma & Foropon, 2019). PBC is one of the most important predictors of intention to purchase green products (Jaiswal & Kant, 2018). Xu et al. (2022) find that perceived behavioural control significantly affects the intention to purchase green products. Zhuang et al. (2021), in a meta-analytic review, find that perceived behavioural control positively affects the intention of consumers to purchase green products. Zhang et al. (2020) find that perceived behavioural control is one of the predictors of intention to purchase electric cars by millennials in China. Ates (2020) remarks that although the major factors that prevent the purchase of green products are lower

availability and higher prices, perceived behaviour control allows people to manage such barriers and discomfort. The study by Ates (2020) finds that perceived behaviour control positively affects the intention to engage in pro-environmental behaviour. It is hypothesised that:

- H6a: Perceived behavioural control is positively related to the intention to purchase green products.
- H6b: Perceived behavioural control is positively related to GPB.

Intention and behaviour

Intention describes the willingness to perform a specific action or behaviour (Ajzen, 1991). Sousa et al. (2022) remark that intention is a central concept in the TPB. In the context of green products, intention refers to the possibility of consumers wishing to buy products that are environmentally friendly (Chen & Chang, 2012). Green purchase intention is a key variable to measure the current and future purchase decisions for green products by consumers (Sousa et al., 2022). Green purchase behaviour depicts the consumption of products that protect the environment (Kamalanon et al., 2022). According to Carrington et al. (2010), there is often an intention-behaviour gap in the purchase of products and intention may not lead to actual behaviour. Thus, the findings of empirical studies on the effect of intention on behaviour are inconclusive. Fontes et al. (2021), Alagarsamy et al. (2020) and Kamalanon et al. (2022) find a significant positive relationship between green purchase intention and GPB. It is hypothesised that:

- H7: Intention to purchase green products is positively related to GPB.

Indirect effects

Namazi and Namazi (2016) point out that mediation and moderation help to improve the theoretical and practical conclusions in research as they depict the effects of intervening variables. Research on green or environmentally friendly behaviour has recently moved to the investigation of the indirect effects of the TPB constructs (Ates, 2020). Zhang and Dong (2020) find that green purchase attitude indirectly affects the relationship between subjective norms and green purchase intention in China. The findings of the study by Taufique and Vaithianathan (2020) reveal that the relationships between attitude towards the environment and perceived customer effectiveness and ecologically conscious consumer behaviour are positively mediated by intention. However, the indirect effect of intention in the relationship between subjective norms and ecologically conscious consumer behaviour is insignificant. Ates (2020) finds that the indirect effect of intention in the relationship between perceived behavioural control and pro-environmental behaviour is insignificant. It is hypothesised that:

- H8a: Intention indirectly affects the relationship between attitude and GPB.
- H8b: Intention indirectly affects the relationship between subjective norms and GPB.
- H8c: Intention indirectly affects the relationship between perceived behavioural control and GPB.
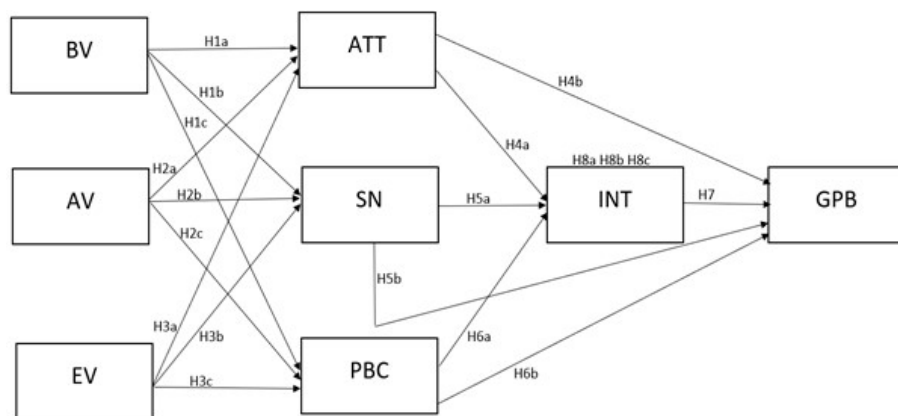 The research framework is depicted in Figure 1.

Figure 1. Research framework

*BV: Biospheric values; AV: Altruistic values; EV: Egoistic values; ATT: Attitude; SN: Subjective norms; PBC: Perceived behavioural control; INT: Intention; GPB: Green purchase behaviour

Methodology

Research design and context

The quantitative research design was used, and the research was conducted at two South African Universities. The first university is located in the Limpopo Province, while the second university is located in the Gauteng Province. The study focused on university students who are an important study unit in environmental research because, as young people, they bear the burden of past and current environmental negligence (Zhang & Dong, 2020). In addition, university students, as young consumers, tend to be more knowledgeable about environmental protection compared to older people. Thus, understanding the factors that motivate university students' green behavior is of practical importance in the movement to a more sustainable future (Shafiel & Maleksaeidi, 2020). The statistical population of the study is all undergraduate and postgraduate students of the two universities. The stu-

dents who participated in the cross-sectional survey were conveniently identified and selected. The ten times rule by Hair et al. (2019) was used to determine the minimum sample size. The PLS SEM was used for data analysis. PLS-SEM has been proven to be superior to covariance-based structural equation modelling. The PLS-SEM follows a stage process. First, the measurement model examines reliability and validity. Second, the structural model tests the hypotheses of the study (Hair et al., 2019).

Questionnaire design

The introduction section of the questionnaire addressed issues related to the purpose and significance of the study. The second part of the questionnaire focused on demographic information. The third part of the questionnaire focused on personal values, namely biospheric, altruistic and egoistic. The fourth part of the questionnaire focused on the TPB constructs. The constructs were measured as follows: Four items, each anchored on the five-point Likert scale (not at all important to important) and adapted from De Groot and Steg (2007), were used to measure biospheric, altruistic and egoistic values. The study by De Groot and Steg (2007) obtained the following Cronbach alpha coefficients (α) (biospheric, 0.86; altruistic, 0.73; and egoistic, 0.74) indicating the reliability of the scales. TPB constructs were measured using a five-point Likert scale (1 strongly disagree to 5 strongly agree), attitude (four items), subjective norms (three items), perceived behavioural control (three items and intention (three items). Five items were used to measure GPB. The scales used to measure the five TPB constructs were adapted from Ates (2020) study) that focused on pro-environmental behaviour. The study by Ates (2020) obtained the following Cronbach's alpha coefficients (Attitude, $\alpha=0.80$; Subjective norms, $\alpha=0.82$; perceived behavioural control, $\alpha=0.70$, intention, $\alpha= 0.70$; and behavior, $\alpha= 0.74$). Data was collected between July and November 2022 at the two universities. Students were approached and requested to participate in the survey and complete the questionnaire on the spot. Students who agreed to the request were given a questionnaire to complete. Appendix One depicts the measures of the constructs of the study.

Results of the research

Response rate and descriptive information of the respondents

Out of the 1200 students that were contacted, 550 students participated in the survey. The participant's average age was 22 years. The youngest participant was 18 years while the oldest participant was 37 years old. The gender of the respondents revealed that 268 males and 282 females participated

in the survey. The level of education showed that there were 412 undergraduates and 138 postgraduate students. 220 students were in Commerce, Economics and Law 142 students in Science and Agriculture, 140 students in Humanities and Education and 48 Health Science students.

Measurement model

The requirements by Hair et al. (2019) with respect to factor loading (≥0.7.18), composite reliability (≥0.7) and average variance (≥ 0.5) explained were followed. One item had a factor loading below 0.718 and was removed. Table 1 shows the results of the measurement model.

Table 1. Measurement model

Constructs	Construct	Loading	Cronbach's alpha	Composite reliability	AVE
Biospheric values BV (Mean 4.40; SD 0.91)	BV1	0.829	0.814	0.870	0.647
	BV2	0.782			
	BV3	0.746			
	BV4	0.808			
Altruistic values AV (Mean 4.18, 0.97)	AV1	0.769	0.816	0.866	0.618
	AV2	0.807			
	AV3	0.791			
	AV4	0.777			
Egoistic values (AV) (Mean 3.42, 1.04)	EV1	0.752	0.726	0.856	0.598
	EV2	0.738			
	EV3	0.483 d			
	EV4	0.801			
Attitude (ATT) (Mean 4.20; SD 0.91)	ATT1	0.816	0.809	0.865	0.616
	ATT2	0.752			
	ATT3	0.808			
	ATT4	0.761			
Subjective norms SN (Mean 3.15; SD 0.99)	SN1	0.764	0.802	0.840	0.636
	SN2	0.805			
	SN3	0.822			
Perceived behavioural control PBC. (Mean 4.04; SD 1.04)	PBC1	0.822	0.824	0.830	0.619
	PBC2	0.758			
	PBC3	0.779			

Constructs	Construct	Loading	Cronbach's alpha	Composite reliability	AVE
Intention INT. (Mean 4.28; SD 1,01)	INT1	0.835	0.858	0.843	0.644
	INT2	0.777			
	INT3	0.794			
Green purchase behaviour (GPB) Mean	GPB1	0.807	0.772	0.846	0.646
	GPB2	0.764			
	GPB3	0.839			

Table 2. HTMT

Construct	BV	AV	EV	ATT	SN	PBC	INT	GPB
BV								
AV	0.804							
EV	0.684	0.569						
ATT	0.590	0.608	0.633					
SN	0.608	0.539	0.651	0.657				
PBC	0.592	0.704	0.685	0.666	0.672			
INT	0.669	0.701	0.708	0.585	0.614	0.572		
BEV	0.557	0.639	0.692	0.685	0.666	0.619	0.539	

The results of the HTMT aredepicted by in Table 2. Henseler et al. (2015) argue for the use of the HTMT as a measure of discriminant validity because of its superiority to the Fornell Larcker criterion. The HTMT results shown in Table 2 confirm that the recommended threshold (below 0.85) is achieved (Henseler et al., 2015).

Structural model

The Harman one-factor test, in line with Podsakoff et al. (2012) and the variance inflation factor (VIF) as a full collinearity test in line with Kock (2015), were used to assess common method bias. Herman's one factor test shows that the single factor accounted for 41.409%, which is lower than the 50% threshold, suggesting the negligible effect of CMV. The VIFs of the constructs of the study (AV, 1.804; BV, 1.908; EV, 2.077; ATT, 2.400; SN, 1.373; PBC, 2.087; INT, 1.842 and GPB, 2, 266). All the VIF values are lower than 5. This indicates the absence of CMD. The bootstrapping method was used to assess the structural model. The path coefficients as measured by the T value

(expected to be above 1.96 at 5% level of significance two-tailed). In addition, (β) was evaluated. The greater the value of (β), the greater the effect on the endogenous variable. The R^2 is 0.652, Q^2 is 0.396, and the Goodness of fit (GOF) of 0.640 suggests the model's predictive power. The values of the effect sizes range from 0.236 to 0.287, and the standardised root mean square residual (SRMR) of 0.02 (less than 0.05) indicates a good model fit.

Table 3. Hypothesis testing

Path	Coefficient	T-statistics	Decision
H1a BV → ATT	0.194	5.399*	Supported
H1b BV-SN	0.294	7.095*	Supported
H1c BV-PBC	0.162	3.775**	Supported
H2a AV-ATT	0.186	11.633*	Supported
H2b AV-SN	0.206	7.994*	Supported
H2c AV-PBC	0.192	9.204*	Supported
H3a EV-ATT	0.071	1.441	Not supported
H3b EV- SN	0.127	-1.291	Not Supported
H3c EV-PBC	0.102	-1.308	Not supported
H4a ATT-INT	0.296	5.962*	Supported
H4b ATT-GPB	0.407	5.744*	Supported
H5a SN-INT	0.062	1,008	Not supported
H5b SN-GCB	0.102	1.473	Not supported
H6a PBC-INT	0.172	3.755**	Supported
H6b PBC-GPB	0.422	5.584*	Supported
H7 INT-GPB	0.201	3.840**	Supported

*$p<0.01$; ** <0.05

Table 3 depicts the results of the hypotheses testing. The results indicate that the relationships between BV and ATT, SN and PBC are significantly positive. Hypotheses H1a, H1b and H1c are supported. The results indicate that AV significant positive relationships between AV and ATT, SN and PBC. Hypotheses 2a, 2b and 2c are supported. The results indicate insignificant relationships between EV and AV and ATT, SN and PBC. Hypotheses 3a, 3b and 3c are rejected. The results show that attitude is significantly positively related to INT and GPB supporting hypotheses 4a and 4b. The results show that the effects of SN and INT on GPB are insignificant. Hypotheses 5a and 5b

are rejected. The results indicate significant positive relationships between PBC and INT and GPB supporting hypotheses 6a and 6b. The results show that INT and GPB are significantly positively related supporting hypothesis 7.

Indirect effects

Table 4. Mediation effects

Path	Indirect effects	Total effects with T-statistics	Confidence interval		VAF	Result
			LL	UL		
H8a ATT → INT → GPB	0.164*	0.229* (4.407)	0.065	0.266	71.62%	Accepted (partial mediation)
H8b SN → INT → GPB	0.092	0.164 (1.221)	0.046	0.201	-	No mediation)
H8c PBC → INT → GPB	0.150**	0.217** (6.331)	0.071	0.275	69.12%	Accepted (full mediation)

*P<0.01; ** <0.05

Table 4 shows the results of the mediation using the bootstrapping procedure. The value of Variance. Accounted For (VAF) depicts the strength of the mediation. Full mediation is depicted by a VAF value bigger than 80%. Partial mediation is depicted by a VAF value of between 20% and 80%. A VAF value below 20% depicts no mediation. The results of mediation. The results indicate that INT indirectly affects the relationship between ATT and GPB. Hypothesis 8a is supported. The results indicate an insignificant indirect effect of INT in the relationship between SN and GPB. Hypothesis 8b is rejected. The results indicate a significant indirect effect of INT in the relationship between positive relationship between PBC and GPB. Hypothesis 8c is supported.

Discussion

The world faces serious environmental challenges, and one of the ways to promote environmental sustainability is consumer GPB. The study examined the determinants of GPB of university students in South Africa by merging the TPB and the VAB models. The findings showed that the relationships between BV and ATT, SN and PBC are significantly positive. The results suggest that university students with BV are likely to develop a green purchase attitude. In addition, students with BV are likely to be influenced by other people to buy green products. Furthermore, university students with BV are likely to purchase green products despite their relatively higher costs com-

pared to conventional products. The findings are supported by prior empirical results. Cheung and To (2019) find that BV has a significant positive relationship with attitude towards environmental issues and attitude towards eco-social benefits. Wang et al. (2022b) find that BV is positively related to subjective norms and perceived behavioural in the context of the purchase of green cars. The findings showed that AV positively affects ATT, SN, and PBC are significantly positive. The findings are consistent with previous studies. Waris et al. (2021) find significant positive relationships between altruism and subjective norms and perceived behavioural control in the context of the intention to purchase energy-efficient appliances. The findings indicated that the effects of EV on ATT, SN and PBC are insignificant. The results suggest that university students with an egoistic value orientation are unlikely to develop a positive attitude towards green products. In addition, they are unlikely to be influenced by friends and family in the context of green products. Furthermore, they are unlikely to purchase green products because of perceived barriers related to availability and costs. The results show that attitude towards green products is significantly positively related to both intentions to purchase green products and GPB. The findings suggest that students who develop a positive attitude towards green products are likely to have the intention to purchase green products. The findings are consistent with the results of previous studies on the relationship between attitude and intention in the context of green products (Verma & Chandra, 2018; Taufique & Vaithianathan, 2020). The findings indicated an insignificant relationship between subjective norms and intention to purchase green products. The findings are supported by previous empirical results (Nguyen et al., 2016; Hasan et al., 2022). The findings indicate that perceived behavioural control and intention are positively related. The findings suggest that students may develop the intention to buy green products despite availability and cost issues.

Ates (2020) reached a similar empirical conclusion. The findings of the study indicated that the intention to purchase green products is positively related to GPB inline with the TPB by Ajzen (1991). The findings are supported by the result of previous empirical results on intention and FPB (Yadav & Pathak, 2017; Trivedi et al., 2018; Fontes et al., 2021; Alagarsamy et al., 2020). The findings indicated that the effects of attitude and perceived behaviour control on GPB are mediated by the intention to purchase green products. The findings of the study by Taufique and Vaithianathan (2020) also indicate that the relationships between attitude towards the environment and perceived customer effectiveness and ecologically conscious consumer behaviour are positively mediated by intention. However, the mediating effect of intention in the relationship between subjective norms and ecologically conscious consumer behaviour is insignificant. Ates (2020) finds

that the effects of attitude and perceived behavioural control on pro-environmental behaviour are mediated by intention.

Conclusion

Theoretical Contribution

The study investigated the factors that influence the GPB of university students in South Africa. To achieve this objective, the study merged the TPB and the VAB to develop a model to predict GPB. The integration of the TPB with the VAB enabled the study to explore self-interest motives and pro-social motives in the context of GPB. The findings of the study provided strong empirical support for the effects of two values constructs (biosphericand altruistic) on three TPB constructs (attitude, subjective norms, and perceived behavioural control). In addition, attitude and perceived behaviour control positively influence intention and GPB. The findings of the study also showed a significant positive relationship between intention and GPB. The findings of the study confirmed that the integrated model that includes the TPB and VAB is applicable in predicting the GPB of university students. The novelty of the study is the development of a theoretical model to understand the drivers of GPB by university students. To the best of the author's knowledge, this is the first study to link the three values constructs with the TPB to explain the drivers of GPB.

Practical implications

The findings of the study indicated that biospheric and altruistic values can positively influence attitude and perceived behavioural control in the context of GPB. To improve biospheric and altruistic values, it is important for firms that manufacture green products to highlight the importance of reducing the environmental degradation that the world currently faces. The environmental values of green products should be advertised in print and electronic media by firms. Improving awareness of the positive environmental effects of green products can help to develop biospheric and altruistic values that will help consumers feel that their purchases are helping to protect the environment, respecting the earth and working for the welfare of others. To improve attitudes towards green products, marketers and policymakers should use green communications to create awareness about the environmental challenges that the world faces and the benefits of green products. Collaboration between firms that manufacture green products and policymakers can help in providing information and educating consumers about the benefits of green products. Government agencies can put informa-

tion about the availability and benefits of green products on their websites and communicate such information to consumers and the public. Information on the items used to make green products, the cleaner production process and the benefits of green products in protecting the environment should be put on the websites of firms to stimulate consumer knowledge and interest. Videos of the benefits of green products can be put by firms and marketers on social media. This will help to improve consumer green product orientation and green product literacy. To improve behavioural control, it is important for firms to highlight the simplicity of use and safety of green products. In addition, information about the functional characteristics of green products and how they protect the environment should be provided on their label. Environmental education should be included in the curriculum of university students to improve attitude and perceived behavioural control. Although the effect of subjective norms on intention is weak, it is important for marketers of green products to understand the use of family, friends and social media in improving the purchase of green products. Advertisements showing the use of green products by students can help to improve public awareness of green products. To ensure that intention is transformed into actual purchase of green products by consumers, firms and policymakers must improve awareness of green product knowledge as this can help to reduce green product scepticism. The use of tax and other incentives by policymakers can help to reduce the cost of green products and make them less costly than conventional products. Regulatory authorities should put in place policies to reduce greenwashing and other false claims by firms and marketers about the environmental benefits of green products. This will help to improve consumer trust in green products.

Limitations and areas for future research

The study has the following limitations and areas for further research. Data was collected from students at only two South African universities. This may affect the generalisability of the findings. Therefore, other studies should include students from more universities locally and internationally, which will help in improving the generalisability of the empirical findings. The study used the cross-sectional survey method, and a longitudinal study can help to confirm cause and effect. The study did not include moderating variables. Other studies can include moderating factors such as price sensitivity and anticipated guilt in the relationship between intention and GPB. The study did not explore the indirect effects of TPB constructs in the relationship between personal values constructs and intention and GPB. This can be examined by other studies. The study focused on personal values. Other stud-

ies can focus on how perceived value dimensions (functional, social, and emotional) affect attitude and intention to purchase green products.

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Appendix one: Measures of constructs

Construct	items	Adapted from	Response category
Biospheric values	• Preventing pollution; protecting natural resources. • Respecting the earth: harmony with other species. • Unity with nature: fitting into nature. • Protecting the environment: preserving nature.	De Groot and Steg (2007)	1 – not at all important, 5 – very important
Altruistic values	• Equality: equal opportunity for all. • A world at peace: free of war and conflict. • Social justice: correcting injustice, care for the weak. • Helpful: working for the welfare of others.	De Groot and Steg (2007)	1 – not at all important, 5 – very important
Egoistic values	• Social power: control over others, dominance. • Wealth, money, material possession. • Authority: right to lead or command. • Influential: impact on people and events.	De Groot and Steg (2007)	1 – not at all important, 5 – very important
Attitude towards green products	• For me, purchasing a green product is – • Good • Desirable • Pleasant • Wise	Ates (2020)	1 strongly disagree to 5 strongly agree
Subjective norms	• My colleagues that that I should purchase green products. • My friends and family members think that I should purchase green products. • Other people that are important to me think that I should purchase green products.	Ates (2020)	1 strongly disagree to 5 strongly agree
Perceived behavioural control	• Whether or not I purchase green products is entirely up to me. • I am confident that if I want, I can purchase green products. • I have resources, time and opportunities to purchase green products.	Ates (2020)	1 strongly disagree to 5 strongly agree
Intention	• I will consider buying green products because they are less polluting in coming times. • I will consider switching to green products for ecological reasons. • I plan to spend more on green products rather than conventional products.	Ates (2020)	1 strongly disagree to 5 strongly agree
Green purchase behaviour	• I have been purchasing green products at regular basis. • I have green purchasing green products for my daily needs products. • I have exhibited green purchasing behavior over the past six months.	Ates (2020)	1 strongly disagree to 5 strongly agree