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Examining consumers' response to plastic bag free shopping in an emerging market: a stimulus-organism-behaviour perspective

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Abstract: This study examines South African grocery shoppers' response to the practice of plastic bag free shopping using the stimulus-organism-behaviour model. A structured questionnaire was used to collect cross sectional data from 529 grocery shoppers. Structural equation modelling was used to conduct path analysis. Media influence and green advertising were found to be less effective in providing the stimuli necessary to encourage shoppers to embrace the concept of plastic bag free shopping. The results also showed that the promising strategy to promote plastic bag free shopping is through social norms when they are internalised as personal norms or assimilated in the form of green self-identity. The findings of this study underscore the importance of developing credible and informative green advertising messages to de-activate entrenched habits of using single-use plastic shopping bags. This study accentuates the importance of promoting normative self-regulated behaviour as a sustainable strategy for managing plastic shopping bag litter.

Keywords: plastic bag free shopping; stimulus-organism-response model; plastic bag free retail outlets; South Africa.

Reference to this paper should be made as follows: Muposhi, A. (2025) 'Examining consumers' response to plastic bag free shopping in an emerging market: a stimulus-organism-behaviour perspective', *Int. J. Environment and Waste Management*, Vol. 38, No. 3, pp.259–281.

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1 Introduction

Worldwide, there is an upsurge in interventions aimed at reducing litter from ultra-thin single-use plastic shopping bags (Poortinga and Whitaker, 2018; Scharpenberg et al., 2021). Interventions aimed at reducing plastic bag litter that have been introduced thus far include plastic bag bans, levies, taxes and voluntary initiatives by plastic bag

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manufacturers and retailers (Jory et al., 2019; Nielsen et al., 2019). The introduction of plastic bag free grocery retail outlets is one of the most recent voluntary initiative aimed at addressing plastic shopping bag litter (Fuentes et al., 2019; Tsai et al., 2020; Scharpenberg et al., 2021). As noted by Gustavo et al. (2018) as well as Fuentes et al. (2019), plastic bag free shopping disrupts the established shopping habits as shoppers were traditionally accustomed to carry merchandise using single-use plastic bags. This study therefore sets out to examine, using the stimulus-organism-behaviour model, consumers' response to plastic bag free policy in South Africa, an emerging market, where plastic free retail outlets were introduced as a form of plastic shopping bag governance.

Although the practice of plastic bag free shopping is growing, there remains a dearth of empirical studies on shoppers' response especially in the context of emerging markets such as South Africa. Such a study is particularly important in South Africa as it is confronted with more plastic waste due to higher consumption levels from the growing middle class, coupled with low recycling rates and inefficient plastic waste management infrastructure (O'Brien and Thondhlana, 2019; Bezerra et al., 2021). To date, the majority of studies (Beitzen-Heineke et al., 2017; Fuentes et al., 2019; Tsai et al., 2020; Scharpenberg et al., 2021) have been confined to developed markets and this study extends such a similar study to South Africa, which is an important market for the BRICS trading bloc. While previous studies offer valuable contributions on plastic bag free shopping, this study seeks to address three major research gaps. Firstly, we note that a study by Beitzen-Heineke et al. (2017) examined the prospects of plastic bag free shopping using a sample of retailer representatives. While the study managed to garner the views of retailers as critical stakeholders in the supply chain, a focus on the consumer perspective is needed in order to have a holistic view. This argument is supported by the assertion that the successful implementation of sustainable packaging practices depends on consumer acceptability (Adeyeye et al., 2017; Petersen and Brockhaus, 2017). This study therefore finds it pertinent to understand consumers' response to the plastic bag free policy given that other interventions such as plastic bag levies were characterised by consumer mistrust (Dauvergne, 2018; Jory et al., 2019; Wang and He, 2022). Secondly, another notable study by Fuentes et al. (2019) utilised a qualitative methodology which is known for being limited in terms of generalisability. This study seeks to address this gap by employing a quantitative research methodology. Thirdly, a more recent study by Louis et al. (2021) focused on plastic bag free shopping in the context of bulk purchases, which by nature are planned for. It therefore remains unknown how consumers would respond to the concept of plastic bag free shopping in the context of unplanned shopping of convenience grocery goods. This study also aims to contribute to efforts to address this research gap.

Based on previous studies on plastic bag free shopping reviewed (Beitzen-Heineke et al., 2017; Fuentes et al., 2019; Tsai et al., 2020; Scharpenberg et al., 2021), the following question arise: What is the response of shoppers to the practise of plastic bag free shopping? A detailed understanding of consumers' response to the plastic bag free policy would be instrumental in developing appropriate marketing stimuli that has the potential to elicit the desired behavioural outcomes. Considering the plastic bag free shops as a form of pro-environmental behaviour stimuli, the objectives of this study are three-fold:

1 to understand how the plastic bag free policy stimuli is constructed

2 to examine the extent to which marketing stimuli related to plastic free policy influences internal thought processes of shoppers

3 to understand the effect of openness to change, social norms, and green self-identity on green purchase behaviour.

Previous studies (Beitzen-Heineke et al., 2017; Fuentes et al., 2019; Louis et al., 2021) revealed that plastic bag free shopping is regarded as inconvenient and more demanding by consumers. The studies conducted by Fuentes et al. (2019) and Nguyen et al. (2020) also found that the actual behaviour of using environmentally friendly packaging remains low. Against this background, this study also examines factors that influence shoppers to buy at plastic free retail outlets herein referred to as green behaviour.

The novelty of this study is that, it is the first to apply the stimulus-organism-response (SOR) model in South Africa, to understand shoppers' response behaviour towards the concept of plastic bag free shopping. It is also a departure from previous studies on pro-environmental behaviour that have predominantly applied the theory of planned behaviour and value-belief norm theory which are known for failing to account for the attitude-behaviour and value action gaps (Gatersleben et al., 2014). It is also the first study in South Africa to propose variables such as media influence, green advertising and social norms as plastic bag free policy stimuli. This study further proposes openness to change, personal norm and green self-identity as shoppers' internal states (organism) that influence behavioural response to the plastic bag free policy. The behavioural response is measured by green purchase behaviour (buying from plastic bag free retail outlets). South Africa is one of the largest economies in Africa with a growing population, therefore sustainable packaging is of significant relevance. The results of this study are expected to provide input to retailers, and policymakers on how to embed the concept of plastic bag free shopping in South Africa. The remainder of this paper is structured as follows: The next section reviews literature on plastic bag free policy leading to hypotheses development. Thereafter, the research methodology is presented, followed by the presentation and discussion of results, study implications and conclusion.

2 Literature review

2.1 Emergence of plastic bag free shopping

Plastic bag free shopping involves the act of discouraging the use of single-use shopping bags, whilst promoting the use of environmentally friendly shopping bags, and in some instances, the sale of unpackaged products (Beitezen-Heinek et al., 2017; Louis et al., 2021). Plastic bag free retail outlets are part of retailers' corporate social responsibility aimed at enhancing environmental sustainability (Louis et al., 2021; Su et al., 2021). Plastic bag free shopping is a voluntary initiative by retailers premised on reducing pollution, and carbon dioxide emissions from improperly discarded plastic bags (Fuentes et al., 2019). Through this initiative, retailers also seek to complement anti-plastic bag ordinances such as bans and levies which have largely achieved mixed results in countries where they were implemented (Rapp et al., 2017; O'Brien and Thondhlana, 2019). For instance, in South Africa, plastic bag tax, which was introduced in 2003, is

regarded as less effective in addressing the problem of plastic bag litter (O'Brien and Thondhlana, 2019). Voluntary initiatives have the advantage of promoting self-regulated behaviour which lessons the burden of enforcement and monitoring associated with legislated interventions (Dauvergne, 2018). Voluntary retailer initiatives were successfully implemented in France, Finland and Luxembourg (Kasidoni et al., 2015).

There are variations in the implementation of the plastic bag free policy across the globe. For instance, Walmart's packaging neutral strategy is premised on the 3R approach of reusing, reducing and recycling plastic shopping bags (Walmart Inc., 2018). Starbucks' strategy takes the form of an incentive scheme for customers who use reusable coffee cups (Tsai et al., 2020). In South Africa, the context of this study, Woolworths introduced a plastic bag free policy with effect from 2018. Through this initiative, the shops that are designated as plastic bag free no longer offer single-use plastic bags but only dispense environmentally friendly reusable shopping bags. Shoppers are also encouraged to bring their own reusable shopping bags during their shopping trips. As of 2022, there were 452 plastic bag free shops in South Africa (Woolworths Holdings, 2022). The plastic bag free policy also takes the form of zero packaging, which involves the sale of unpackaged goods. This practise is common in developed countries such as Sweden (Fuentes et al., 2019), France (Louis et al., 2021) and Germany (Scharpenberg et al., 2021).

The mainstream transition to plastic bag free shopping is expected to change consumers' shopping experience. Previous studies (Beitzen-Heineke et al., 2017; Fuentes et al., 2019) found that plastic bag free shopping is regarded as inconvenient and demanding as shoppers need to plan their shopping trip and explore merchandise carrying options. It also involves behavioural change as shoppers are expected to do away with the entrenched habit of using single-use plastic shopping bags as well as learning the habitual practice of always carrying reusable bags for each shopping trip (Fuentes et al., 2019). It is for this reason that, Fuentes et al. (2019) argue that the success of plastic bag free shopping largely depends on how retailers develop appropriate marketing stimuli to entice shoppers to be open to change and embrace the new shopping norm. Consequently, a detailed understanding of consumers' response to the concept of plastic bag free shopping becomes important to retailers and policymakers.

2.2 Theoretical framework

The performance of any form of behaviour is an outcome of an organism and its environment (Huang, 2016). It is for this reason that this study applies the SOR model to understand consumers' response to the plastic bag free policy in the context of South Africa. The SOR model was developed by Mehrabian and Russell (1974). The SOR model posits that environmental elements act as stimuli that drive an individual's internal states (organism), which in turn influences behavioural response (Talwar et al., 2022). The utility of the SOR model was confirmed in previous studies on sustainability such food waste (Talwar et al., 2022), green buying behaviour (Dhir et al., 2021a; Han et al., 2022), organic food consumption, energy saving behaviour (Tang et al., 2019) and online retailing (Kimiagari and Malafe, 2021; Kumar and Shah, 2021). The SOR is also acclaimed for its flexibility as it permits the integration of multiple variables (Talwar et al., 2022). Moreover, the model allows for an examination of both favourable and unfavourable responses in the form of approach and avoidance behaviours (Mehrabian and Russell, 1974).

The SOR model was deemed appropriate for this study because it permits the development of a comprehensive and flexible framework that has the potential to assist in understanding consumers' response to the plastic bag free policy. The stimuli (S) refer to context specific factors that influence an individual's cognitive ad emotional states (Kimiagari and Malafe, 2021). In the context of this study, the plastic bag free policy is construed as a social-psychological stimulus that is disseminated to consumers through the news media, green advertising and social norms. The organism (O) captures an individual's internal states such as perceptions or emotions which are aroused after being exposed to the stimuli (Dhir et al., 2021b). In this study, plastic bag free shopping messages are expected to influence consumers' internal states which include personal norm, self-identity and openness to change. The response (R) refers to an individual's reaction to the stimuli and evoked internal states (Talwar et al., 2022). In this study, consumers' response assesses the influence of personal norm, self-identity and openness to change on plastic bag policy support (green purchase behaviour). The SOR model was deemed appropriate for this study because it provides a mechanism to understand how plastic bag free shopping (external stimuli) influence consumers' internal states and ultimately buying behaviour.

2.3 Hypotheses development

2.3.1 Media influence, green self-identity, openness to change and person norm

Media influence in this context refers to the effect of print, electronic and social media messages on the performance of environmental behaviour. Media messages are construed as a form of external stimuli that plays a critical role in influencing perceptions and attitudes towards environmental challenges (Stöckigta et al., 2018; Song et al., 2023). The media is also known for disseminating information on international environmental commitments such as the Paris Accord and Sustainable Development Goals (Huang, 2016; Junsheng et al., 2019). Documentaries such 'The day after tomorrow and an inconvenient truth' are acclaimed for generating awareness on the dangers of global warming in Europe (Arlt et al., 2011). In South Africa, the television program, 50–50, is also known for promoting environmental awareness. In a study on climate change, the media was found to be effective in generating environmental awareness, enhancing understanding of environmental challenges, and influencing attitudes (Junsheng et al., 2019). The media also plays a key role in disseminating environmental knowledge including enhancing the performance of environmental behaviour (Huang, 2016; Junsheng et al., 2019).

The media also acts as a socialisation and change agent because it assists in eliciting public concern related to environmental problems and policies (Huang, 2016; Trivedi et al., 2018). Sustainability oriented messages are only effective if they have enough clarity (Stöckigta et al., 2018) and when recipients are open to change and willing to assimilate them as part of their personal norms (Huang, 2016; Park and Kim, 2016). The knowledge of the adverse environmental effects of plastic shopping bags is expected to compel shoppers to change their single-use plastic bag consumption behaviour (Su et al., 2021). Previous studies (Lee, 2011; Huang, 2016; Trivedi et al., 2018; Junsheng et al., 2019) found that the media plays a critical role in influencing perceptions, norms and personal identities towards environmental issues. Based on the foregoing discussion, it is reasoned that when individuals are exposed to media messages on plastic bags, they are

more likely to embrace the new way of shopping and form new shopping norms. It is thus to hypothesised that:

H_{1a} Media influence has a positive effect on green-self-identity.

H_{1b} Media influence has a positive effect on personal norm.

H_{1c} Media influence has a positive effect on openness to change.

2.3.2 Green advertising, green self-identity, personal norm and openness to change

Green advertising or green communication refers to any paid form of communication that conveys messages on a company's environmentally friendly policies and products (Han et al., 2019; Sun et al., 2021; Tewari et al., 2022). Marketers utilise green advertising to communicate their environmental policies and green marketing messages to customers (Magnier and Crie, 2015; Meijers et al., 2019). Green advertising messages may be framed using rational or emotional appeals. Rational appeals provide information about environmental harm caused by unsustainable practices such as the use of SUPBs. The provision of such information is aimed at narrowing the environmental knowledge gap as well as enhancing environmental awareness in a manner that fosters the formation of pro-environmental attitudes and habits (Graham and Abramhamse, 2017; Sun et al., 2021). Green advertising plays a critical role in fostering and reinforcing a pro-environmental identity (Meijers et al., 2019; Sun et al., 2021). As a stimulus, green advertising was found to have a licensing effect that has the potential of moralising environmental behaviour by changing entrenched values, norms and beliefs (Han et al., 2019, Tewari et al., 2022). Based on the foregoing discussion, it is reasonable to suggest that consumers' favourable reception of green advertising messages may result in openness to change or the formation of pro-environmental identities. Thus, it is hypothesised that:

H_{2a} Green advertising has a positive effect on green self-identity.

H_{2b} Green advertising has a positive effect on personal norms.

H_{2c} Green advertising has a positive effect on openness to change.

2.3.3 Social norms, green self-identity, personal norm and openness to change

Social norms refer to a set of moral standards which guide or constrain an individual's behavioural performance (Borg et al., 2020). Social norms are regarded as more effective in promoting environmental behaviour because they are stable and driven by self-regulation (Culiberg and Elgaaied-Gambier, 2016; Kim and Seock, 2019). Social norms are regarded as one of the most effective tools of enhancing behavioural change (Tankard and Paluck, 2016; Yamin et al., 2019). The power of social norms in enhancing behaviour emanates from the desire by individuals to comply with the values and beliefs of an esteemed social group (Yamin et al., 2019). The majority of environmental problems emanate from the aggregate behavioural choices of individuals (Nielsen et al., 2019; Moshood et al., 2022). This explains why social norms are regarded as a key factor in addressing environmental problems (Kim and Seock, 2019; Talwar et al., 2022). In a study on energy saving behaviour conducted by Tang et al. (2019), social norms were

found to be instrumental in providing the stimulus related to energy saving intention. For instance, a study by Culiberg and Elgaaied-Gambier (2016) revealed that the desire to fit in a group of environmentally conscious motivate individuals to engage in pro-environmental behaviour. In this way, the burden of environmental law enforcement is avoided. In the context of this study, it is also expected that the social norms related to the support of the plastic shopping bag free policy will be influenced by the behaviour of other shoppers.

Social norms influence behaviour when they are internalised as personal norms (Klöckner, 2013; Kim and Seock, 2019; Talwar et al., 2022). The exposure to prevailing social norms was also found to play a central role in fostering behavioural change and construction of personal identities (Gatersleben et al., 2014; Kim and Seock, 2019). In a study on organic food conducted by Khare and Pandey (2017), social norms were found to be instrumental in the development of a green self-identity. Green self-identity and personal norms are identified as green morality motives (Berger, 2019; Shang and Wu, 2022). Behavioural change was also found to be enhanced when social norms related to the targeted behaviour are made more salient (de Groot et al., 2021). Thus, we argue that when social norms are triggered, it results in individuals to be more willing to change their behaviours as well as the formation of personal norms and green self-identity related to plastic bag free shopping. The following hypotheses are therefore proposed:

H_{3a} Social norms have a positive effect on green self-identity.

H_{3b} Social norms have a positive effect on personal norm.

H_{3c} Social norms have a positive effect on openness to change.

2.3.4 Green self-identity and green behaviour

Green self-identity refers to the extent to which individuals regard themselves as environmentally conscious (Whitmarsh and O'Neill, 2010). The growth in environmental concern among consumers is central to the adoption of pro-environmental lifestyles also known as green self-identity (Patel et al., 2020; Shang and Wu, 2022). A green self-identity is driven by the commitment to engage in behaviours that contribute to environmental well-being (Van der Werff et al., 2014; Patel et al., 2020). Green self-identity was found to significantly influence the performance of pro-environmental behaviours such as energy saving behaviour (purchase of green products (Patel et al., 2020; Su et al., 2021), consumption of organic food (Mancha and Yoder, 2015; Khare and Pandey, 2017), purchase of electric cars (Barbarossa and De Pelsmacker, 2016) and ecoshopping (van de Wal et al., 2016). In the context of eco-shopping, van de Wal et al. (2016) found that individuals who buy at upmarket retail outlets are more likely to display branded shopping bags to be seen by others and as a way of portraying a sense of environmental consciousness. Based on the foregoing discussion, it is hypothesised that:

H_4 Green self-identity has a positive effect on green purchase behaviour.

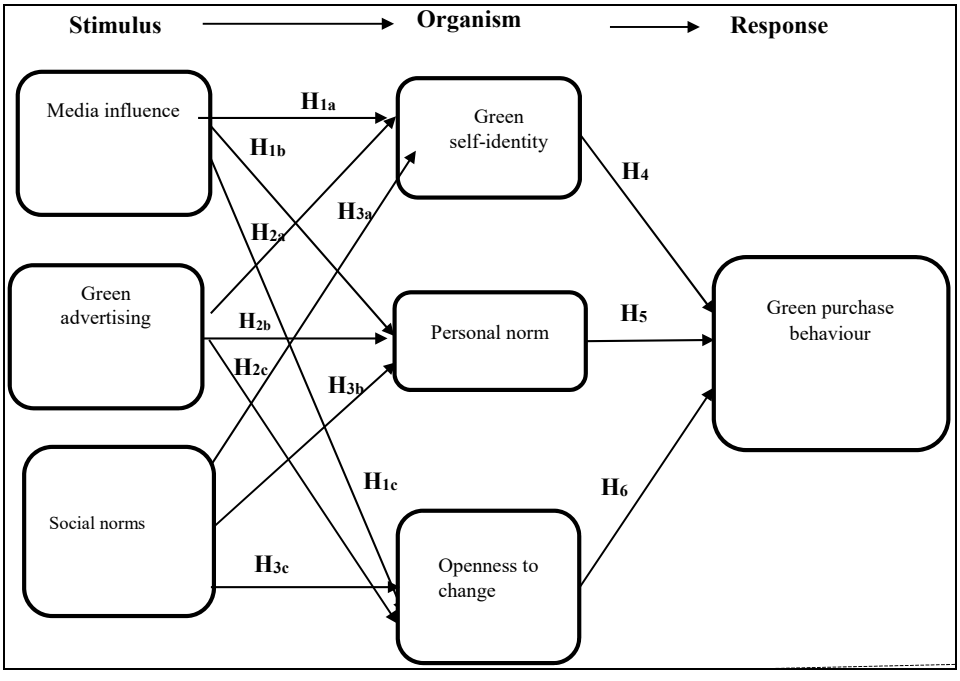
2.3.5 Personal norms and green purchase behaviour

Personal norms refer to internalised social norms that obligate an individual to perform or refrain from specific behavioural actions (Kim and Seock, 2019). Personal norms capture an individual's moral standards, beliefs and values that guide performance of pro-social

behaviours (Klöckner, 2013; Moser, 2016). Personal norms act as internal moral campus that directs individuals to perform pro-social behaviours (Onwezen et al., 2013). Strong personal norms increase the likelihood of behavioural performance (Moser, 2016). In the context of this study, personal norms denote an individual's moral obligation to patronise plastic bag free shops or use of reusable shopping bags. Personal norms were found to predict several forms of environmental behaviours such as environmentally friendly apparel (Kim and Seock, 2019), collaborative consumption (Shang and Wu, 2022) and use of reusable express packaging (Song et al., 2023). As individuals who espouse personal norms were found to be more inclined to engage in environmental behaviour (Onwezen et al., 2013), it is therefore posited that:

H_5 Personal norms have a positive effect on green purchase behaviour.

Figure 1 Research model



2.3.6 Openness to change and green purchase behaviour

The achievement of the goal of environmental sustainability demands the change of human behaviour (Graham and Abrahamse, 2017; Testa et al., 2021). This is only possible if individuals are open to change entrenched norms ad habits related to consumption behaviours (Beitzen-Heineke et al., 2019). Openness to change or readiness to change has been identified as an important value orientation that predisposes individuals to develop favourable feelings towards new stimuli (Gonzalez-Rodríguez et al., 2019). In the context of this study, openness to change refers to the willingness by shoppers to buy from plastic bag free retail outlets. Openness to change was found to favourably influence the performance of several pro-environmental behaviours such as sustainable meat consumption (Caracciolo et al., 2016) organic food consumption

(Nguyen et al., 2020; Talwar et al., 2021), use of sustainable packaging (Testa et al., 2021; Moshood et al., 2022) and purchase of environmentally friendly apparel (Tewari et al., 2022). The mainstream adoption of the plastic bag free shopping requires shoppers to change the habitual behaviour of using SUPBs and embrace new ways of shopping such as bringing own reusable bag. Individuals with the value orientation of openness to change are self-directed and show willingness to embrace change, break with established habits, including adopting new ways of doing things (Claudy et al., 2015). Plastic bag free shopping is regarded as a reinvention of the practice of shopping (Fuentes et al., 2019), hence it is, it is hypothesised that:

H_6 Openness to change has a positive effect on green purchase behaviour

Based on literature reviewed and the proposed propositions, the hypothesised model guiding this study is shown in Figure 1.

3 Research methodology

3.1 Research method and data collection

A quantitative research method was employed to test the hypothesised relationships between study constructs. A structured paper based questionnaire was used to collect cross-sectional data. The respondents were drawn from 452 Woolworths South Africa's plastic bag free supermarkets as of May 2022 (https://www.woolworths.co.za/corporate/cmp211887). A mall-intercept technique was utilised to collect data from plastic bag free supermarkets in South Africa's eight provinces. Shoppers were randomly intercepted as they were entering or leaving plastic bag free shops. To enhance the generalisability of the study findings in South Africa, data was collected from three plastic bag free shops in each of the eight provinces. Only shoppers who were aware of the concept of plastic bag free shops were considered for participation. Twenty-four students enrolled for a diploma in retail management were recruited and trained to distribute the questionnaires in plastic bag free shops precincts. Data were collected over a period of four months from May–August 2022.

Measurement scale items were adapted from validated scales used in previous related studies. A seven-point Likert scale was used. Media influence was measured using a four-item scale which was adapted from Huang (2016). A five-item scale item was adapted from do Paço et al. (2019) was used to measure green advertising. Green behaviour was operationalised using a four-item scale adapted from Sun et al. (2021). A four-item scale adapted from Van der Werff et al. (2014) was used to measure green self-identity. Openness to change was operationalised using a three-item scale adapted from Claudy et al. (2015). A five-item scale adapted from Lam and Chen (2006) was used to measure personal norm, while social norm was measured using a 3item scale adapted from Park and Ha (2014). The questionnaire was pre-tested with a sample of 80 respondents and it returned acceptable Cronbach alpha coefficients. Minor adjustments were done to enhance the readability of scale items. Out of the 800 questionnaires distributed, 529 questionnaires were valid for analysis. Table 1 provides the sample profile.

Table 1 Sample profile

Demographic variable	*Indicator*	*Frequency (%)*
Gender	Male	223 (44.1%)
	Female	283 (55.9%)
Ethnicity	Black Africans	269(53.2%)
	White	162(32%)
	Asian	75 (14.8%)
Education level	Matric certificate	154 (30.4%)
	Diploma	252 (49.8%)
	Degree	75 (14.8%)
	Higher degree	25 (5.0%)
Age	18–25 years	53 (10.5%)
	26–30 years	57 (11.3%)
	31–35 years	104 (20.6%)
	36–40 years	109(21.5%)
	41–45 years	137 (27.1%)
	46–50 years	40 (7.9%)
	Above 51 years	6 (1.2%)
Monthly income	Less than ZAR 15,000	71 (14.0)
	ZAR 15,001–30,000	107 (21.1%)
	ZAR 30,001–45,000	167 (33.0%)
	Above ZAR 45,001	161 (31.8%)

Note: ZAR1 = US$17.50.

4 Data analysis

Data analysis was performed using SPSS 26.0 and AMOS 26.0. First, preliminary analysis was done to evaluate the data for normality, multi-colinearity and common method bias (CMB). Correlation coefficients were computed to assess the degree of association between study constructs. The reliability and validity of measurement scales and the fitness of the measurement model were established by conducting confirmatory factor analysis. Posited hypotheses were tested using structural equation modelling.

5 Results

5.1 Data normality, multi-collinearity and CMB

An inspection of the dataset indicated that there were no incidences of unengaged responses or missing data, thus the problem of non-response bias was not an issue. The skewness and kurtosis values were all within the prescribed threshold values of |3| and |10| (Hair et al., 2014), confirming data normality. Multi-collinearity was assessed using the tolerance values and variance inflation factor. The tolerance values were all less than

|1| and the variance inflation factor values were all below |10| (Hair et al., 2014), indicating the absence of multi-collinearity. CMB was assessed using Harman's single factor test. The test results showed the maximum variance explained of 33.5%, which is below the recommended upper limit of 50%, confirming that CMB was not a problem.

5.2 Reliability, validity and measurement model assessment

The reliability of measurement scale items was established by computing the Cronbach's alpha and composite reliability values. As shown in Table 2, Cronbach's alpha and composite reliability values for all measurement scales were above 0.7 confirming scale reliability (Hair et al., 2014). Content validity, convergent and discriminant validity were examined. Content validity was ensured by relying on validated measurement scale items that were drawn from similar studies in pro-environmental behaviour. Convergent validity was evident as the values of factor loadings for all scale items and average variance extracted (AVE) were all greater than 0.5 (Bagozzi and Yi, 2012). As shown in Table 3, discriminant validity was attained as the correlations among study constructs were less than 0.8 and were smaller than the square root of the AVE values (Fornell and Larcker, 1981). The measurement model fitted well with the data as model fit indices were all within the recommended thresholds: $X^2/df = 2.450$, GFI = 0.894, CFI = 0.963, TLI = 0.957, and RMSEA = 0.054 (Bagozzi and Yi, 2012). Table 2 provides reliability and validity indicators.

Table 2 Reliability and validity measures

Constructs	*Measurement items*	*FL*	*CA*	*CR*	*AVE*
Media influence (Huang, 2016)	Television messages assist me to understand problems of plastic bag litter	0.820	0.920	0.920	0.750
	Print media messages assist me to understand problems of plastic bag litter	0.877			
	Social media messages assist me to understand problems of plastic bag litter	0.872			
	The media influences my environmental concern	0.894			
Openness to change (Claudy et al., 2015)	I am open to plastic bag free shopping experience	0.811	0.857	0.860	0.670
	I am willing to embrace plastic bag free shopping	0.812			
	I always look for new shopping adventures	0.825			
Green self-identity (Van deer Werff, 2014)	Buying at a plastic free shop suits my life style	0.944	0.967	0.970	0.850
	Buying at a plastic free shop suits my values	0.928			
	Buying at a plastic free shop enhances my image	0.902			
	Buying at a plastic free shop is part of my identity	0.929			
	I see myself as a person who cares for the environment	0.917			

Notes: FL = factor loadings, CA = Cronbach alpha, CR = composite reliability, AVE = average variance extracted.

Table 2 Reliability and validity measures (continued)

Constructs	*Measurement items*	*FL*	*CA*	*CR*	*AVE*
Green behaviour (Su et al., 2021)	I support the idea of plastic bag free shopping	0.838	0.967	0.890	0.680
	I regularly shop from plastic free retail outlets	0.766			
	I am willing to pay a higher price to support plastic free retail outlets	0.845			
	I recommend my peers to buy at plastic free retail outlets	0.847			
Green advertising (do Paço et al., 2019)	Advertising messages persuade me to buy at plastic free shops	0.875	0.914	0.930	0.720
	Advertising messages assist me to understand the problem of plastic bag litter	0.835			
	I trust adverting messages related to plastic bag litter	0.864			
	Advertising stimulate my desire to use reusable shopping bags	0.836			
	Advertising messages make me to support plastic bag policies	0.840			
Personal norm (Lam and Chen, 2006)	I am personally obliged to shop at a plastic free retail outlet	0.855	0.880	0.930	0.730
	Every citizen has an obligation to stop using single use plastic shopping bags	0.885			
	I feel obliged to comply with plastic bag policies	0.804			
	I would feel guilty if I do not buy at a plastic free shop	0.877			
	I put an extra effort to buy at a plastic bag free shop	0.852			
Social norm (Park and Ha, 2014)	People who are important to me think that I should buy at plastic bag free shops	0.868	0.895	0.900	0.740
	People who are important to me think that I should always carry my reusable bag	0.836			
	Most people who are important to me approve when I buy at plastic free retail outlets	0.877			

Notes: FL = factor loadings, CA = Cronbach alpha, CR = composite reliability, AVE = average variance extracted.

5.3 Correlation analysis

The bivariate relationships between study constructs were established using the Pearson Product Moment as shown in Table 3.

Table 3 Inter-correlation matrix

Constructs	*MI*	*OTC*	*GSI*	*GA*	*PN*	*SN*	*GPB*
MI	*0.866*						
OTC	0.198**	*0.818*					
GSI	–0.040	0.146**	*0.922*				
GA	0.311**	–0.387**	–0.440**	*0.825*			
PN	0.123*	–0.499**	–0.393**	–0.581**	*0.849*		
SN	–0.584**	–0.600**	0.449**	–0.487**	0.606**	*0.854*	
GPB	–0.472**	0.049	0.550**	–0.337**	0.413**	0.567**	*0.860*

Notes: MI = media influence; OTC = openness to change; GSI = green self-identity; GA = green advertising; PN = personal norm; SN = social norm; GPB = green purchase behaviour; **p < 0.001; *p < 0.05; italic diagonal values denotes the square root of AVEs.

5.4 Structural model and hypotheses testing results

Prior to hypotheses testing, the structural model was validated and it returned good model fit indices (X^2/df = 2.920, GFI = 0.875, CFI = 0.949, TLI = 0.944, RMSEA = 0.049) (Bagozzi and Yi, 2012). Media influence was found to have no association with green self-identity (H_{1a}: $\beta = 0.902$, $p > 0.05$), personal norm (H_{1b}: $\beta = 0.078$, $p > 0.05$) and openness to change (H_{1a}: $\beta = 0.054$, $p > 0.05$). Thus, H_{1a}, H_{1b} and H_{1c} were not supported. H_{2a}, H_{2b} and H_{2c} were not supported as green advertising was found to have a negative association with green self-identity (H_{2a}: $\beta = 0.133$, $p < 0.05$), personal norm (H_{1a}: $\beta = 0.102$, $p < 0.05$) and openness to change (H_{1a}: $\beta = 0.141$, $p < 0.05$). The study results supported hypotheses that social norm has a significant positive effect on green self-identity (H_{3a}: $\beta = 0.459$; $p < 0.001$), personal norm (H_{3b}: $\beta = 0.358$; $p < 0.001$) and openness to change (H_{3b}: $\beta = 0.448$; $p < 0.001$). H_4 was supported as green self-identity was found to have a positive significant on green behaviour (H_4: $\beta = 0.154$; $p < 0.001$). H_5 was also supported as personal norm was found to have a significant positive effect on green behaviour (H_5: $\beta = 0.185$; $p < 0.001$). However, H_6 which predicted a positive effect of openness to change on green behaviour was not supported (H_6: $\beta = –0.026$; $p > 0.05$). Table 4 summaries hypotheses testing results.

6 Discussion of results

Media influence was found to have an insignificant effect on green self-identity, personal norm and openness to change. This result suggests that the South African mass media is failing in its role of raising awareness and eliciting favourable perceptions towards the practise of plastic bag free shopping. This result is not consistent with previous studies (Huang, 2016; Trivedi et al., 2018; Junsheng et al., 2019) which found the positive influence of the media in fostering environmental values, norms and beliefs. This finding may also suggest that mass media messages related to management of plastic bag litter are not being appropriately framed. For instance, Junsheng et al. (2019) note that communicators are often confronted with cognitive challenges when framing environmental messages. For instance, the mass media has also been criticised for

focusing more on scientific and political debates on environmental challenges with less effort being directed towards promoting pro-environmental behaviour among individuals (Graham and Abramhamse, 2017). This challenge is attributed to the variation of worldviews related to how environmental challenges are socially constructed (Huang, 2016). For example, individuals who do not support an eco-centric worldview perceive that environmental challenges are being overestimated (Junsheng et al., 2019). Due to lack of consensus on the magnitude of environmental challenges and underlying causes, perspectives on appropriate intervention strategies vary and this tend to also apply to the management of plastic bag litter.

Table 4 Hypotheses testing results

Hypotheses	*Path*	*B*	*p-value*	*Decision*
H_{1a}	MI-GSI	0.0902	>0.05	Not supported
H_{1b}	MI-PN	0.078	>0.05	Not supported
H_{1c}	MI-OTC	0.054	>0.05	Not supported
H_{2a}	GA-GSI	0.013	<0.05	Not supported
H_{2b}	GA-PN	0.102	>0.05	Not supported
H_{2c}	GA-OTC	0.141	>0.05	Not supported
H_{3a}	SN-GSI	0.459	<0.001	Supported
H_{3b}	SN-PN	0.319	<0.001	Supported
H_{3c}	SN-OTC	0.448	<0.001	Supported
H_4	GSI-GB	0.154	<0.001	Supported
H_5	PN-GB	0.185	<0.001	Supported
H_6	OTC-GB	0.026	>0.05	Not supported

Notes: MI = media influence; OTC = openness to change; GSI = green self-identity; GA = green advertising; PN = personal norm; SN = social norm; GB = green behaviour.

Green advertising was found to have an insignificant effect on green self-identity, personal norm and openness to change. This result suggests that consumers are not receptive to green advertising messages. These finding points to the potential existence of green washing perceptions directed towards green advertising. This result is consistent with previous studies (Parguel et al., 2015; Schmuck et al., 2018; Sun et al., 2020). For instance, Sun et al. (2020) note the prevalence of the trust and credibility deficit associated with green advertising. In the same vein, Schmuck et al. (2018) found that the practice of green washing epitomised by the use of unsubstantiated environmental claims dilute the credibility of green advertising. The influence of green advertising as a source of information was also found to be affected by how the message is framed and the degree of the targeted audiences' involvement with the issue under investigation (Schmuck et al., 2018; Nicolau et al., 2022). For instance, Nicolau et al. (2022) note that if green advertising messages are perceived as too scientific or technical, it has the effect of discouraging consumers' efforts to understand it. A study by Schmuck et al. (2018) also revealed that if the target audience of green advertising messages are less involved with environmental issues, they are more likely to develop ambivalent feelings.

Social norms were found to have a significant positive effect on green self-identity, personal norm and openness to change. This result suggests that consumers' response to

plastic bag policy is significantly influenced by the behaviour of other shoppers. This result gains theoretical support from the norm-activation-model (Schwartz, 1977) and previous studies (Berger, 2019; Tang et al., 2019; Shang and Wu, 2022) which confirmed the role of social norms in the formation of personal norms. In a study conducted by Tang et al. (2019), social norms were found to be effective as a form of external stimuli to promote energy efficient behaviours. A study by Berger (2019) also revealed that social norms are more influential in influencing behaviours that are performed in a social context. This is the case with the plastic bag free policy which is operationalised in a retail environment characterised by regular interaction of shoppers. Social norms were also found to have positive and significant effect on the development of green self-identity. This result confirms the findings of past studies (Griskevicius et al., 2010; Whitmarsh and O'Neil, 2010; Berger, 2019). For example, in a study conducted by Whitmarsh and O'Neil (2010), the formation of a green self-identity was found to be influenced by the feelings of pride associated with the performance of pro-social behaviours. In this study, the desire to reduce pollution related to plastic shopping bag was also instrumental in the development of personal norms and green self-identity.

Personal norm was found to have a positive significant effect on green purchase behaviour. This finding suggests that shoppers surveyed perceived a moral obligation and an inner drive to adhere to buy at plastic bag free shops. The positive effect of personal norm on the performance of environmental behaviour is in line with previous pro-environmental studies (Kim and Seock, 2019; Shang and Wu, 2022; Song et al., 2023). Given the important role played by personal norms in promoting pro-environmental behaviour, Kim and Seock (2019) underscore the importance of activating them as they promote self-regulated behaviour. Another important result relates to the positive effect of green self-identity on green purchase behaviour. This result is consistent with the stream of research that regard the performance of environmental behaviour as a status signalling cue (Griskevicius et al., 2010; van de Wal et al., 2016; Berger, 2019). Buying from plastic bag free shops is visible behaviour and van de Wal et al. (2016) found that reusable branded plastic from reputable retail outlets bags are often construed by shoppers as a green status enhancing tools. Similarly, a study by Berger (2019) showed that individuals seek to enhance their personal images by engaging in green purchase behaviours as a way of signalling their altruistic motives and willingness to pay a premium for promoting environmental well-being. This may be the case in this study as Woolworths is positioned as an upmarket retailer in South Africa.

Finally, openness to change was found to have an insignificant effect on green purchase behaviour. This result suggests that shoppers surveyed are still reluctant to embrace the use of reusable shopping bags and the practice of bringing own reusable shopping bags. This finding further suggests that shoppers are yet to ready to break from the entrenched habit of using single-use plastic shopping bags. This result supports previous studies (Miao and Wei, 2016; Nicolau et al., 2022) that found a negative effect of openness to change on pro-environmental behaviour. Hotel guests were found to be reluctant to switch to green hotels (Miao and Wei, 2016), whilst coffee consumers regarded the use of reusable coffee cups inconvenient (Nicolau et al., 2022). In a study contacted by Gorgievski et al. (2018), openness to change was also found to be mediated by perceived behavioural control. Thus, there is a possibility that there are prevailing situational factors that compel shoppers in this study not to embrace the concept of plastic bag free shopping. In this regard, Nielsen et al. (2019) identified the inconvenience of

always carrying reusable shopping bags and the cost of environmentally friendly bags as some of the constraining factors.

7 Conclusions, contributions and limitations

The present study sets out to examine using the SOR model, grocery shoppers' response towards the plastic bag free policy in South Africa. The study results showed that the mainstream adoption of the plastic bag free policy is likely to be a gradual process. Environmental messages from the mass media and green advertising were found to be less effective in influencing shoppers to embrace the new way of shopping in the form of using reusable shopping bags. The study results also showed that the promising route to promote the plastic bag policy is through social norms when internalised as personal norms and green self-identity. The study results underscore the importance of developing credible and informative green advertising messages to enhance behavioural change. Attitude change strategies are recommended in order to address the entrenched habitual behaviour of using single use plastic bags.

7.1 Theoretical contributions

The first contribution of this study is to show, using the SOR model, that consumers' response to plastic bag free shopping is a two-staged process. The initial stage involves being exposed to external stimuli, and second, influencing internal states. This was achieved by investigating external drivers, and intrinsic motivations that influence consumer response to the practise of plastic bag free shopping. By so doing, this study offers a new perspective in green retailing as it diverts from the traditional approach of using rational and valued based theories such as the theory of planned behaviour and value-belief-norm theory. This study also considers the influence of the value of openness to change which remains under researched in green retailing literature as the focus has been on the effect of egoistic and altruistic values. By examining the influence of openness to change, this study managed to shed more light on the need to change the entrenched habits as a way of enhancing the mainstream adoption of plastic bag free shopping.

Secondly, this study contributes to the body of knowledge by revealing that the promising route to promote the plastic bag free shopping is through personal level psychosocial factors such as personal norms and green self-identity. This study also contributes to literature by showing the inadequacy of mass media and green advertising as sources of environmental information. This finding challenges environmental communicators to revisit how messages are framed and conveyed. This may also encompass the need to reconsider the predominate use of guilt and fear appeals as a way of eliciting behavioural change. Thirdly, this study provides a snapshot of the response of South African grocery shoppers' response in terms of plastic shopping bag governance. South Africa is an important emerging market due to its membership to the BRICS trading block. Thus, the results of this study contribute to efforts aimed at bridging the deficit in theoretical knowledge on the unique characteristics of South African shoppers and their responses to plastic bag ordinances.

7.2 Managerial contributions

This study provides three important implications for policymakers, retailers and researchers. First, the findings of this study point to the need to enhance the effectiveness of mass media and green advertising messages. Policymakers can do this by framing environmental pollution caused by discarded single-use plastic bags as a societal issue that requires a collective response from all stakeholders. Such environmental messages may be positively framed by emphasising the benefits of adopting a plastic bag free policy or negatively framed by focusing on the environmental harm caused by single-use plastic bags. Based on the argument by Huang (2016) that message framing is more effective when the information has a differential impact, media and green advertising messages should not only be limited to provision of information on the environmental harm caused by use of single-use plastic bags. Rather, drawing from Stöckigta et al. (2018) there is a need to provide scientific data that quantifies how daily choices of individuals contribute to environmental harm. This will go a long way in addressing the perceptions of green washing and the trust deficit associated with green adverting messages. Also, noted by Nicolau et al. (2022) effective framing of environmental messages has the ability to enhance environmental knowledge ad trigger the performance of pro-environmental behaviour.

Second, the results revealed that shoppers are reluctant to change their established habits of using single use plastic shopping bags. To promote the behaviour of using reusable shopping bags, policymakers may need to implement habit changing strategies and influence the formation of desired habits such as bringing own shopping bags. Changing the habitual behaviour of using single-use plastic bags is critical given that entrenched habits were found to have the effect of blocking the assimilation of pro-environment behaviour information (Graham and Abramhamse, 2017). To change and embed new habits, Kim and Seock (2019) recommended strategies that target prevailing social and personal norms. This may prove to be a potential strategy as social and personal norms were found to have a positive effect on the green purchase behaviour in this study. Policymakers may also need to change situational conditions associated with the use of reusable shopping bags by making them more affordable and accessible.

Third, one of the most encouraging result for policymakers that emerged from this study is the positive association between green self-identity and green purchase behaviour. This result provides a solid foundation to promote the ethos of a green self-identity which is intrinsically driven and embodying a pro-environmental behaviour ethic. From a policy perspective, this has the potential to promote self-regulated behaviour which reduce the burden of enforcing plastic bag laws such as taxes and bans. A green self-identity may be promoted by increasing environmental awareness through the use of opinion leaders as endorsers. Retailers promoting the plastic bag free policy may also consider branding their reusable shopping bags to position them as green status symbols whilst mindful of the cost in order to enhance uptake.

8 Limitations and future research

The findings of this study should be considered in view of four major limitations that provide avenues for further research. First, this study utilised self-reported data whose accuracy may have been limited by social desirability bias. Future studies may address

this limitation by employing more robust methods of data collection such as observations and field experiments. Second, the study was geographically confined to South Africa an emerging market thereby limiting the generalisability of study findings. Future studies may overcome this weakness by replicating this study in other emerging markets. Third, this study utilised cross sectional data which offers only a snapshot of consumers' responses to the plastic bag free policy. Future studies may address this limitation by conducting a longitudinal study to understand how consumers interact with the concept of plastic free bag policy as it evolves.

Lastly, the model tested in this study can still be improved by incorporating other variables. Consumers' responses are likely to be vary with the level of environmental concern. Future studies may explore this possibility by conducting a comparative study involving consumers with high and low levels of environmental concern. Grocery shopping is a form of routinised behaviour. Thus, future studies may need to explore the influence of habits on the practise of plastic bag free shopping. Social media is also growing in prominence as a communication tool. Future studies may also be interested in examining the extent to which online social media communities influence the practise of plastic bag free shopping.

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