



ELSEVIER

Contents lists available at ScienceDirect

The Social Science Journal

journal homepage: www.elsevier.com/locate/soscij

Green purchase behavior of undergraduate students in Hong Kong



Carman K.M. Lai, Eddie W.L. Cheng*

Department of Social Sciences, The Hong Kong Institute of Education, Tai Po, Hong Kong

ARTICLE INFO

Article history:

Received 28 January 2015

Received in revised form

13 September 2015

Accepted 11 November 2015

Available online 28 November 2015

Keywords:

Green marketing practices

Attitudes toward the environment

Perceived environmental responsibility

Green products purchase willingness and behavior

ABSTRACT

This paper aims to examine the effect of undergraduate students' perceptions of green marketing practices on their attitudes toward the environment, their perceived environmental problem seriousness, and their environmental responsibility. Additionally, it examines whether their green products purchase willingness and behavior will eventually be affected. A sample of undergraduate students in Hong Kong is used. The measurement and structural models are examined with the partial least squares approach to structural equation modeling. The structural model is a good fit to the data. This research reflects a parsimonious picture about undergraduate students' expectations of green marketing practices, environmental perception, and purchasing behavior, and provides insights for green marketers to formulate strategies to encourage well-educated students to consume green products.

© 2015 Western Social Science Association. Published by Elsevier Inc. All rights reserved.

1. Introduction

Unsustainable consumption patterns worldwide lead to serious environmental issues, such as global warming and climate change, which drive people to change their conventional lifestyles. It is clear that the ways in which consumers choose goods and services have both direct and indirect effects on the environment and their collective well-being (Gruber & Schlegelmilch, 2014). When the business sector promotes effective green marketing concepts and sustainable marketing plans, consumers are likely to walk the extra mile and pay the premium price to behave in an eco-responsible manner and achieve green consumerism (Polonsky & Rosenberger, 2001).

Green consumerism refers to environmentally concerned consumption, including lower consumption, green purchasing, and less pollution (Hoffmann & Schlicht, 2013;

Lin & Hsu, 2015). In the eyes of environmentalists, such consumers possess the so called "pro-social" consumer behavior and are socially conscious of and responsible for environmental protection (Wells, Ponting, & Peattie, 2011). From the social marketing perspective, green consumerism reflects the motivational tendency of individual consumers (Moisander, 2007) and underscores a social dilemma, in which individual, societal, and environmental interests are at odds (Gupta & Ogden, 2009; Schuitema & de Groot, 2015). Research has further found that green consumers, compared with non-green consumers, have a higher intention to "go green" when they have a greater green marketing satisfaction (Park, Ko, & Kim, 2010).

Such a green consumerism concept has come in the Asian region (Gurāu & Ranchhod, 2005). As Asian consumers are increasingly aware of the pressing environmental problems in the fast-growing global economy (Li & Su, 2007), they are becoming a primary target for international green marketers. Elham and Wahid (2011) point out that exploring the influence of green marketing on purchasing behaviors in emerging Asian markets is considered to be timely and important.

* Corresponding author. Tel.: +852 29487302.

E-mail addresses: kmlai@ied.edu.hk (C.K.M. Lai), wcheng@ied.edu.hk (E.W.L. Cheng).

According to Lee (2009), green consumerism in Hong Kong is at the stage of emerging. Environmental issues in Hong Kong, particularly the solid waste problem, have drawn the public's awareness of protecting the environment in recent years. The consultation document of the Environmental Protection Department (EPD) (2012) indicates that Hong Kong residents (1.45 kg per capita) create more wastes than residents in Taipei, Tokyo, and Seoul (0.88, 1.03, and 1.08 kg per capita respectively). Regarding daily waste disposal, Hong Kong (0.87 kg per capita) ranks top, followed by Taipei, Tokyo, and Seoul (0.35, 0.41, and 0.79 kg per capita respectively). The document concludes that reducing waste generation and disposal in Hong Kong should be a prime concern.

Among different age groups, the younger generation is more ready to accept new and innovative ideas (Ottman, Stafford, & Hartman, 2006). Lee (2008, 2009) uses a very large sample of high school students to study young consumers' green purchasing behaviors. As these students' buying decisions may often be governed by their parents, the results may not be very useful for formulating business strategies. Vicente-Molina, Fernandez-Sainz, and Izagirre-Olaizola (2013) suggest that consumers, who tend to be aware of eco-friendly products and are knowledgeable about environment-related issues, are usually highly educated people. Students at the undergraduate level are referred to as young and highly educated. These young adults usually make their buying decisions without consulting their parents (Brougham, Jacobs-Lawson, Hershey, & Trujillo, 2011). As purchasing green products has become an effective solution for lessening the burden on the environment due to human activities in product production and consumption (Ho, Dickinson, & Chan, 2010), research investigating factors affecting undergraduate students' green purchase behaviors is worthy of pursuit. Because researchers have conducted little research in this area, the present study aims to explore how undergraduate students' perceptions of green marketing practices affect their willingness to purchase eco-friendly products and their subsequent purchasing behaviors.

According to the existing studies, people's perceptions of green products may affect their propensity to engage in green purchase behaviors, which stem from a future-oriented concern and are thus unlikely to deliver immediate personal gains (McCarty & Shrum, 2001), through other factors. Companies' green marketing strategies and purchasing practices may help to enhance consumers' attitudes toward the environment and their perceptions on environmental seriousness and environmental responsibility (Liu, Wang, & Shishime, 2012; Straughan & Roberts, 1999). Chamorro, Rubio, and Miranda (2009) further highlight the possible development in consumers' attitudes, intentions, and behaviors in new research.

This research paper first presents a review of the existing literature that helps develop the hypotheses. Next, it explains the adopted research method, particularly about how to conduct the statistical analysis, and presents the findings of the data analysis. In the discussion part, research and practical implications as well as conclusions wrap up the study.

2. Literature review

2.1. Green marketing strategy on green products

Green marketing refers to activities that are designed to generate and facilitate the exchange of environmentally friendly goods and services intended to satisfy human needs or wants (Polonsky, 2011). It is a system that promotes the green labeling and advertising of goods and services with the aim of either reducing or eliminating any detrimental effects on the environment. The way in which the products are promoted by green marketing varies in product functions, manufacturing processes, packaging and advertising, and along the supply chain (Cherian & Jacob, 2012; Polonsky, 2011). Additionally, companies with green marketing strategies would pay great attention to designing, promoting, pricing, and distributing the products in a manner promoting environmental protection (Polonsky, 2011).

Green marketing is significant in shaping consumers' attitudes, perceptions, and responsibility toward the present environmental situation and pressing environmental problems. Due to rising awareness among consumers about eco-friendly products, effective green brand management and appropriate marketing strategies can predict consumers' attitudes (Cherian & Jacob, 2012). Kang and James (2007) formulate a definition relevant to businesses in arousing public environmental consciousness of minimizing damages to the environment when producing products. Therefore, firms' marketing strategies of their eco-friendly products can enhance consumers' perceived seriousness of the environmental problems. Lai (2000) finds that Hong Kong people are more literate regarding environmental problems. The knowledge and awareness that they possess on environmental problems may make them more responsible toward the environment.

Overall, companies' efforts on green marketing practices that promote eco-friendly products do have the potential to alter consumers' attitudes, perceived seriousness, and perceived environmental responsibility pertaining to green products purchase behavior (Cherian & Jacob, 2012).

Hypothesis 1a. Consumers' perceptions about the importance of green marketing practices positively affect their attitudes toward the environment.

Hypothesis 1b. Consumers' perceptions about the importance of green marketing practices positively affect their perceived seriousness of environmental problems.

Hypothesis 1c. Consumers' perceptions about the importance of green marketing practices positively affect their perceived environmental responsibility.

2.2. Consumers' attitudes toward the environment

Environmental attitudes refer to the cognitive judgment toward environmental promotion and protection (Lee, 2009; Cherian & Jacob, 2012). According to the theory of reasoned action, "people consider the

implications of their actions before they decide to engage or not engage in a given behavior" (Ajzen & Fishbein, 1980, p. 5), meaning that people's intention to perform a behavior stems from their attitudes and perceptions. Moreover, Cherian and Jacob (2012) contend that companies involving active measures of effective green marketing are able to encourage consumers with environmentally responsible concepts to think of taking actions to live with a green lifestyle. The existing literature has noted that consumers' pro-environmental attitudes and willingness to pay more for environmentally friendly products can be translated into regular green buying behavior when the measure of the particular behavior is aimed at specific environmental issues (Heberlein & Black, 1976; Weigel, Vernon, & Tognacci, 1974). Research has found that the attitude toward buying a particular product predicts the intention to buy the product, including luxurious brands (Park et al., 2010), organic skin/hair care products (Kim & Chung, 2011), and organic vegetables (Zhou, Thøgersen, Ruan, & Huang, 2013). Cherian and Jacob (2012) further find that consumers' attitudes toward green marketing are associated with green marketing intentions. The present study proposes that if consumers are concerned more about the environment, they would be more willing to purchase green products.

Hypothesis 2. Consumers' attitudes toward the environment positively affect their willingness to purchase green products.

2.3. Perceived seriousness of environmental problems

The continuous exposure from the mass media on pressing environmental problems, namely air pollution, sewage treatment and water pollution, which are the most common serious environmental problems found, has aroused people's awareness of the seriousness of environmental problems. Research has explored how businesses should deal with this situation. For example, Lee (2008, 2009) finds that companies have tried to figure out consumers' environmental concerns and their reaction toward such problems so that green goods or services can be created as an alternative for consumers. Moreover, green marketing activities are used to make customers care about environmental and green problems by delivering environmentally sound goods or services to satisfy customers' and society's needs to draw people's attention to particular environmental issues and encourage them to solve some of the issues by green purchasing (Chen & Chai, 2010; Cherian & Jacob, 2012). Companies have also made good use of media to disseminate the message about the negative influences and outcomes of environmental issues through advertisements (Elham & Wahid, 2011). An environmental claim of a product, such as a green label approved by a reliable accreditation body indicating that a product causes relatively less damage to the environment compared with other similar products, can help enhance consumers' favorability toward the product (Steinhart, Ayalon, & Puterman, 2013). Once the awareness of environmental damages and protection has been built up, consumers will be more willing to participate in green purchasing activities.

Hypothesis 3. Consumers' perceived seriousness of environmental problems positively affects their willingness to purchase green products.

2.4. Perceived environmental responsibility

Although environmental responsibility is a commonly used concept for promoting sustainable consumer behaviors, consumers' environmental responsibility remains a relatively less researched and understood topic (Wells et al., 2011). Prior research has investigated the sense of environmental responsibility of Hong Kong people, including adults and teenagers (Lai, 2000; Lee, 2008, 2009). The findings indicate that these people's sense of individual responsibility toward environmental protection work is significantly weak. They generally expect the government to take actions to address local environmental concerns by implementing proper policies. They are not ready for and are hesitant to have individual sacrifices to coincide with the government's actions (Lai, 2000; Cherian & Jacob, 2012). However, Laroche, Bergeron, and Barbaro-Forle (2001) and Chan (2000) note that when consumers expect companies and organizations to take actions in an environmentally responsible manner, they tend to express their support for sustainability, particularly in the context of product purchasing. Therefore, consumers may consume green products if corporations can promote the products in an effective way.

Hypothesis 4. Consumers' perceived environmental responsibility positively affects their willingness to purchase green products.

2.5. Green products purchase willingness and behavior

According to Bagozzi, Yi, and Baumgartner (1990), willingness to purchase refers to the conscious intention to exert a certain level of effort needed to perform the purchasing behavior and is more effective than behavioral measures in capturing consumers' mind. Mostafa (2007) defined green purchasing behavior as the consumption of products that are beneficial to the environment and are recyclable and responsive to ecological concerns.

As previously mentioned, consumers' pro-environmental attitudes and willingness to pay more for environmentally friendly products are related to regular green buying behavior, though the actions to take in reality are debatable (Mendleson & Polonsky, 1995). Despite the great interest in green marketing by researchers and organizations, the demand for green products is actually not as high as expected (Bhatia & Jain, 2013). Researchers have suggested that there may be a significant gap between consumers' concern and actual green purchasing (Young, Hwang, McDonald, & Oates, 2010).

However, Angelovska, Sotiroska, and Angelovska (2012) suggest that there is a positive relationship between environmental concern and consumers' green purchase decision in the context of their general purchasing behavior. Moser (2015) finds a significant relationship between willingness to pay for green product attributes and actual

Table 1

Means, standard deviations, and inter-correlations of the latent variables.

Variables	M	SD	1	2	3	4	5	6
1. Perceptions	4.14	0.58	(0.763)					
2. Attitudes	4.23	0.54	0.639**	(0.780)				
3. Problems	4.07	0.58	0.140*	0.272**	(0.778)			
4. Responsibility	4.17	0.45	0.327**	0.379**	0.337**	(0.675)		
5. Willingness	3.96	0.49	0.211**	0.287**	0.088	0.499**	(0.729)	
6. Behavior	3.08	0.69	−0.024	0.072	−0.005	0.140*	0.393**	(0.743)

Notes: $N = 266$. Numbers in bracket are the square root of average variance extracted (AVE). M —mean; SD —standard deviation. Perceptions refer to consumers' perceptions about the importance of green marketing practices. Attitudes refer to consumers' attitudes toward the environment. Problems refer to perceived seriousness of environmental problems. Responsibility refers to perceived environmental responsibility. Willingness refers to Green products' purchase willingness. Behavior refers to Green products' purchase behavior.

* Denotes $p < 0.05$.

** Denotes $p < 0.01$.

green purchase behavior. Lee (2008, 2009) also notes that actual green purchases were rarely examined in Hong Kong. Therefore, a hypothesis is set for testing the relationship between consumers' green products purchasing willingness and their actual purchase practices.

Hypothesis 5. Consumers' willingness to purchase green products affects their green products' purchase behavior.

3. Research method

3.1. Date collection

A questionnaire was designed to measure the target variables and other background variables. To collect the primary data, the questionnaires were distributed to the sampling set.

The concept of green marketing and green product purchasing are still at the initial stage in Hong Kong (Lee, 2008, 2009). However, the younger generation is more ready to accept the new and innovative ideas (Ottman et al., 2006) because young people, especially highly educated young people, should be aware of eco-friendly products and are knowledgeable about environment-related issues (Chan, 2001) and should have a sense of responsibility for protecting the environment (Lee, 2008, 2009). Therefore, undergraduate students in Hong Kong are the target population for this research. Although they are financially supported by their parents, they are regarded as typical consumers for making purchasing decisions. Therefore, undergraduate students are one of the target groups for studying purchasing behaviors, such as online shopping (Lee, Shi, Cheung, Lim, & Sia, 2011) and luxury-brand purchase (Park et al., 2010). Given the difficulty in obtaining a large random sample, the non-probability snowball method is adopted because a small group of participants can help collect a larger sample through their well-established social networks. To further facilitate their completion of the questionnaire, an online survey was set up and distributed to a few target respondents through the social-networking website, such as Facebook and WhatsApp Messenger. They were informed to forward the online survey to other potential respondents in their universities to generate the snowball effect. The method is less time-consuming and is not expensive (Bryman & Bell, 2007).

Participants were told that the purpose of the survey is to examine local undergraduate students' behavior in purchasing eco-friendly or green products under the influence of green marketing. After removing several incomplete questionnaires, a sample of 100 useful responses was obtained. Due to the small sample, a second time of data collection using the snowball method was undertaken. This second wave attracted 166 completed questionnaires. Altogether, there were 266 useful responses.

3.2. Measures

A five-point, Likert-type scale, ranging from 1 (strongly disagree) to 5 (strongly agree), was used for all latent variables. Subjects were asked to indicate their responses to a set of statements related to each latent variable. The appendix lists the measures of the latent variables. Except for the measure of consumers' perceptions about the importance of green marketing practices, which was adopted from Bhatia and Jain (2013) with slight modification for some of the original statements, the measures of other variables were developed based on Lee (2008, 2009).

Except for consumers' attitudes toward the environment and perceived seriousness of environmental problems, other variables are formative in nature where the items measure different facets of their respective variable.

3.3. Data analytic strategy

Given the use of a non-random sample and formative latent variables, the partial least squares (PLS) approach to structural equation modeling (SEM) was employed. This non-parametric method is suitable for analyzing a model with data that violate multivariate normality (Hair, Hult, Ringle, & Sarstedt, 2014). The software tool used was Warp-PLS. Bootstrap samples were set at 100 (Kock, 2011). Similar to other SEM tools, both the measurement and structural models were examined with the PLS-SEM.

4. Results

4.1. Preliminary findings of the latent variables and the demographic profile

Table 1 lists the means and standard deviations of the latent variables and their inter-correlations. The

Table 2
Results summary for reflective measurement model testing.

	AVE	Composite reliability	Cronbach's alpha	Outer loadings
Perceptions	0.583	0.918	0.897	0.673 ↔ 0.805
Attitudes	0.609	0.861	0.782	0.678 ↔ 0.861
Problems	0.605	0.884	0.836	0.689 ↔ 0.813
Responsibility	0.456	0.833	0.759	0.595 ↔ 0.742
Willingness	0.531	0.870	0.818	0.553 ↔ 0.832
Behavior	0.553	0.896	0.864	0.651 ↔ 0.818

demographic profile of the respondents indicates that 22.6% are male, while 77.4% are female. Most of them are aged from 18 to 23 (96.3%), followed by “24 to 29” (3.4%) and “30 or above” (0.4%). The respondents are studying various programs, including education, social sciences, arts and humanities, science, engineering, business, and others, mainly in the eight public tertiary institutions in Hong Kong (96.6%). Regarding their year of study, 30.5% are Year 1 students, 28.6% are Year 2 students, 37.2% are Year 3 students, and 3.8% are Year 4 students.

4.2. Test of the measurement and structural models

As shown in Table 2, the composite reliability of the scales ranges from 0.833 to 0.918. As the values pass the threshold of 0.7 (Hair et al., 2014), indicating acceptable reliability of the measurement model.

Evidence supports that the latent variables have discriminant validity (Hair et al., 2014). First, the results shown in Table 1 indicate that for each latent variable, the square root of average variance extracted (AVE) is higher than the correlation of that latent variable with other latent variables. Second, the outer loading of each indicator on the corresponding latent variable is higher than those on other latent variables. Table 2 indicates the outer loading range of the items measuring each latent variable.

Convergent validity is checked with the AVE value of the latent variables. As shown in Table 2, except for perceived environmental responsibility (0.456), other variables are in the range between 0.531 and 0.609, being higher than the threshold of 0.5 (Hair et al., 2014), representing acceptable levels of convergent validity. Perceived

environmental responsibility is a formative variable, so the lower AVE value is acceptable as the measurable items are not expected to have high inter-item correlations.

As shown in Table 3, the variance inflation factor (VIF) of the predictor variables ranges from 1.000 to 1.586, within the acceptable range between 0.20 and 5 (Hair et al., 2014), showing that collinearity is not a problem in the structural model.

Moreover, for evaluating model fit, three indices are employed, which are average path coefficient (APC), average R-squared (ARS), and average variance inflation factor (AVIF) (Kock, 2011). The values for both APC and ARS should be under 2 (significant at the 0.05 level), while the AVIF value should be lower than 5 (Kock, 2011). The structural model has a good fit to the data, with APC=0.398 ($p < 0.001$), ARS=0.269 ($p < 0.001$) and AVIF=1.417. The AVIF value also implies low overall collinearity, thus indicating trivial method variance (Kock, 2011).

For supporting a hypothesis, the beta coefficient (β) of a relationship must be significant at 0.05 or below (Hair et al., 2014). Moreover, the adjusted R^2 of each equation indicates the explanatory power of the independent variable(s) on each dependent variable. As shown in Table 3, consumers' perceptions on the importance of green marketing practice are significantly related to the three dependent variables and explain 42.7% of the variance in consumers' environmental attitudes, 25.2% of the variance in perceived environmental responsibility, and 8.2% of the variance in perceived seriousness of environmental problems, thereby supporting Hypotheses 1a, 1b, and 1c.

With respect to the collective effect of the three variables, which are consumers' attitudes toward the

Table 3
PLS-SEM results.

Structural model	β	R^2	Adjusted R^2	VIF	APCR	H
DV: Attitudes		0.429**	0.427**			
Perceptions	0.655**			1.000	1.000	Hypothesis 1a
DV: Problems		0.085*	0.082*			
Perceptions	0.292**			1.000	1.000	Hypothesis 1b
DV: Responsibility		0.254**	0.252**			
Perceptions	0.504**			1.000	1.000	Hypothesis 1c
DV: Willingness		0.411**	0.405**			
Attitudes	0.319**			1.586	0.659	Hypothesis 2
Problems	(0.174**)			1.222	1.938	(Hypothesis 3)
Responsibility	0.434**			1.442	0.781	Hypothesis 4
DV: Behavior		0.164**	0.161**			
Willingness	0.405**			1.000	1.000	Hypothesis 5

Notes: β means beta coefficient. R^2 means coefficient of determination. DV, dependent variable; VIF, variance inflation factor; APCR, absolute path-correlation ratio; H, hypothesis. Absolute path-correlation ratios > 1 indicates statistical suppression; 1 < ratio \leq 1.3: weak suppression; 1.3 < ratio \leq 1.7: medium; and 1.7 < ratio: strong (Kock, 2013). Except for Hypothesis 3, all hypotheses are supported. The hypothesis in parenthesis (Hypothesis 3) is not supported due to a high value of the absolute path-correlation ratio.

** $p < 0.01$.

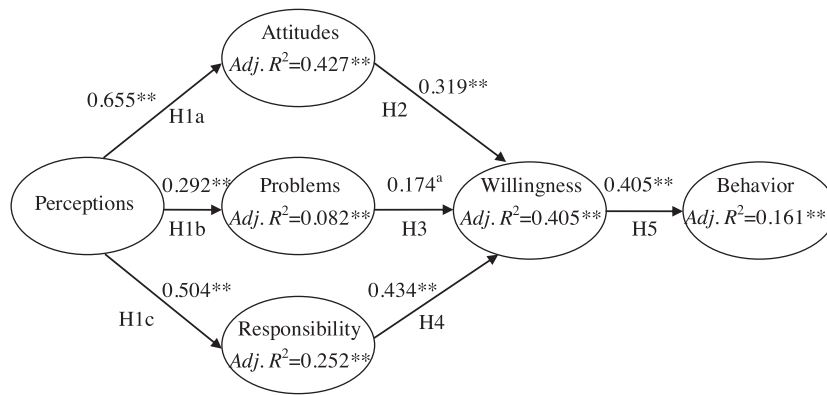


Fig. 1. The beta coefficients and regression coefficients of the structural model. *Notes:* Numbers on the arrows are beta coefficients. Numbers in the circles are adjusted R². ** denotes $p < 0.01$. ^a The significant relationship is caused by the suppression effect. *Source:* Drawn by authors.

environment, perceived seriousness of environmental problems, and perceived environmental responsibility, on consumers' green products purchase willingness, the three independent variables explain 40.5% of the variance in the dependent variable. Although the beta coefficients indicate that the three relationships are significant, the non-significant correlation between perceived seriousness of environmental problems and consumers' green products purchase willingness implies the presence of the suppression effect. To further confirm a statistical suppression, the absolute path-correlation ratio must be larger than one (Kock, 2013). As shown in Table 3, the ratio was 1.938, suggesting that the suppression effect was strong. Therefore, the significant influence of perceived seriousness of environmental problems should be ignored (Kock, 2013), thereby rejecting Hypothesis 3. Because consumers' attitude and perceived environmental responsibility are significant predictors of green products purchase willingness, Hypotheses 2 and 4 are supported.

The final set is to examine the relationship between consumers' green products purchase willingness and consumers' green products purchase behavior. As shown in Table 3, the relationship is significant, thus supporting Hypothesis 5. Additionally, consumers' green products purchase willingness explains 16.1% of the variance in consumers' green products purchase behavior. Fig. 1 illustrates the findings of the structural model.

5. Discussion

5.1. Research implications

This study finds that undergraduate students' perceptions on the importance of green marketing practices are primarily related to their environmental attitudes and their perceived environmental responsibility and perceived seriousness of environmental problems, while their attitudes and perceived responsibility are in turn related to their willingness to purchase green products. Although a few studies have examined the factors affecting the antecedents of willingness and intentions (Chan, 2001; Ha & Janda, 2012; Park et al., 2010), the present research is perhaps the first to identify the role of perceptions about

the importance of green marketing practices in green purchase behaviors. Researchers may consider examining the relationships using another context or in another region.

The environmental attitude of consumers is the second strongest predictor of green products purchase willingness. Undergraduate students' willingness to purchase green products is more easily activated by rational assessment. The finding partially coincides with Peattie's (2001, p. 194) claim that there is a need to "return to rationality" when targeting adult consumers in green marketing, because this study uses a sample of undergraduate students who are only regarded as young adults and may not represent the behavior of older, more mature consumers. Although the present study finds a significant relationship between attitudes and the purchase willingness, researchers have queried that such a relationship may be influenced by other factors (Paço & Raposo, 2009). For example, in Kim and Chung (2011), perceived behavioral control over buying organic skin/hair care products, which refers to the extent to which individuals believe that they have the ability to buy organic skin/hair care products, moderates the relationship between attitudes and intentions. Schuitema and de Groot (2015) also suggest the exploration of the moderating role of consumers' self-interests in studying peoples' purchasing behaviors.

Perceived environmental responsibility is the strongest predictor of green products purchase willingness. The findings show that undergraduate students can realize their individual responsibility in environmental protection. Lee (2008, 2009) adds that the perception of an individual's action could make a difference in affecting the teenagers' decision in purchasing green products. Lin and Hsu (2015), using a sample of 231 adults in Taiwan, also find a significant relationship between green consumption self-efficacy and green consumer behavior. Such findings echo the theory of efficacy expectation, which predicts that "people process, weigh, and integrate several different sources of information with regard to their abilities and the outcomes of a behavior, and then use this information to guide their behavior and efforts" (Bandura, 1977, cited from Lee, 2008, p. 582). According to the theory of planned behavior, if people think that they are able to perform a particular behavior, they would be more willing to do so. This

is called perceived behavioral control, which is found to be significantly related to behavioral intentions (Kim & Chung, 2011). Moreover, Wray-Lake, Flanagan, and Osgood (2010) uncover that adolescents have a declining sense of responsibility over time and a tendency to ascribe responsibility to government rather than to themselves. They refer to the latter phenomenon as an abstract notion of “consumers”. Niva and Timonen (2008) also find that consumers attribute the environmental responsibility to product manufacturers and perceive their opportunities to influence the product-oriented market as small. There is a need to reveal mechanisms that account for their low sense of responsibility. Perhaps when they believe that they cannot do much for the environment, they do not bother to be involved in purchasing eco-friendly products (Paço, Alves, Shiel, & Filho, 2013; Vicente-Molina et al., 2013).

Perceived seriousness of environmental problems is not an important factor affecting undergraduate students' green product purchase willingness. Finding a non-significant relationship in this study is inconsistent with Lee (2008, 2009), who finds a negative relationship between perceived seriousness of environmental problems and green purchasing behavior. Lee (2008) attributes the negative relationship to the effect of desensitization, which is defined as the “elimination of cognitive, emotional, and ultimately, behavioral responses to a stimulus” and happens when consumers are repeatedly exposed to the news and messages about the seriousness of environmental problems (Rule & Ferguson, 1986, p. 29). However, the results of the present study suggest that emphasizing the seriousness of the environmental problem may become ineffective in persuading the undergraduate students to have a willingness to purchase green products.

Moreover, the relationship between students' willingness to purchase green products and their green purchase behavior is significant in the present research. This is somewhat consistent with Moser (2015), who finds such a significant relationship based on a very large sample of households in Germany. The similarity of conclusions across samples from different contexts and in different regions adds to the generalizability of the finding. However, due to the low magnitude of the relationship, there may be other factors affecting green purchase behaviors. For example, Carrete, Castaño, Felix, Centeno, and González (2012) suggest that perceived personal benefits, decreased perceived risk and uncertainty, a sense of control over costs, and a decomposition and reconstruction of cultural values and practices may be the driving forces for green behaviors.

The current study examines a more “cognitive” mechanism that leads to undergraduate students' willingness and behavior to purchase green products. Future research may add more “affective” variables, such as social influence and environmental concern, to examine their ability in explaining the target population's willingness and behavior on consuming green products. Lee (2008, 2009) suggests that these two variables influence adolescents' green purchase behavior. Social influence on green purchasing refers to the pressure to follow the social circle to cultivate, circulate, and reinforce a “norm” of the environmental protection behavior (Lee, 2008). As a result, the purchasing behavior carries social meanings and functions. According

to Lee (2008, 2009), studies, such as Chan (2001), have revealed the significant effect of individuals' collectivist orientation on his/her recycling behavior, propensity to search for green product information, and actual green consumption in an adult sample. Research has found that subjective norms, which refer to an individual's perceived social pressure to perform a particular behavior, affect both the purchase intention (Kim & Chung, 2011) and the purchase behavior (Moser, 2015). Therefore, social influence should be a variable worth examining in the study of consumers' green purchase behavior.

Environmental concern refers to the degree of emotional involvement in environmental issues tapping individuals' affective responses toward environmental protection and is found to be predictive of green product choices (Bertrandias & Elgaaied-Gambier, 2014; Lee, 2008, 2009). Through the addition of this variable, whether consumers are under the emotional appeal or not can be looked at to provide insights for green marketers. By incorporating the additional variables mentioned above, a more comprehensive model can be developed.

5.2. Practical implications

The findings of the present study implies that improving undergraduate students' perceptions on green marketing practices is important in carrying out the students' green products behavior.

To improve consumers' perceptions on green marketing practices, green marketing concepts should further be promoted in Hong Kong. These concepts must be associated with promoting green marketing practices. As shown in Appendix, the respondents consider the majority of green marketing practices to be important (with a mean value higher than 4). This finding suggests that consumers expect the business sector and organizations to employ green practices toward environmental protection. The practices' overall mean value of the undergraduate students in Hong Kong (4.14) is not high. This reveals that green marketing practices in Hong Kong deserves further development and promotion to draw consumers' awareness to this new concept. Among the eight green marketing practices, consumers are concerned with green product packaging the most, followed by education, environmentally friendly products, eco-friendly manufacturing processes, green supply chain, green labels, and eco-friendly modes of communication. Although these practices belong to different domains, they help to reduce damages to our environment (Cherian & Jacob, 2012; Polonsky, 2011; Testa, Iraldo, Vaccari, & Ferrari, 2015).

Moreover, by emphasizing consumers' environmental attitudes and responsibility and their awareness of environmental problems, businesses can change the consumers' level of willingness to pay for green products. To change the consumers' attitude, businesses can set a green marketing communication strategy to provide information for a specific environmentally related issue and explain the positive environmental consequences of the product and the negative consequences of substitutes. Green marketers can make use of packaging and advertising, incentives, and single issue labels, such as the energy rating label for

refrigerators and washing machines, to draw the consumers' attention to the likelihood that negative consequences on the environment can be reduced after purchasing eco-friendly products (Testa et al., 2015; Young et al., 2010). To promote eco-friendly products, the information system may play a role (Corbett, 2013). The power of Internet may help organizations and individuals make better decisions for preserving the natural environment through a social network, product description, feedback and referral, and so forth.

On the other hand, businesses may consider educating their consumers to increase their awareness of the environmental issues. Education is one of the most effective strategies to promote positive messages and ideas. Cheng, Stimpson, and Wong (2004, p. 28) note that "the desire (of environmental education) is that young people (and others as well) will come to accept that environmental protection is something that involves everyone and that some personal sacrifice is needed for the common good of society". However, not only is it important for consumers to have an understanding of the consequences associated with the product that they purchase, but it is also important to modify the product to reduce its negative consequences as a critical strategy for green marketers to bring about consumers' attitudinal changes (Barber, Kuo, Bishop, & Goodman, 2012).

5.3. Limitations

Due to the difficulty of obtaining a random sample from the population of this study, a non-random sample is adopted. Hence, the PLS-SEM is selected as the appropriate statistical tool for this research. In addition, the concepts of green marketing and green products are too general. In the future research, green marketing can be narrowed down to eco-labeling and green advertising (Juwaheer, Pudaruth, & Noyaux, 2012; Leonidou, Leonidou, Palihawadana, & Hultman, 2011; Testa et al., 2015). To receive more accurate responses from consumers, certain types of green

products can be targeted and measured in terms of daily necessity. Wells et al. (2011) propose the study of how consumers perceive their environmental responsibility in everyday life, such as buying from a supermarket, cooking in a kitchen, or traveling on an airplane.

6. Conclusions

In conclusion, the results of this study suggest that green marketing practices should be continuous to promote in Hong Kong, particularly the aspects of eco-labeling and the eco-friendly ways of communication, to enhance consumers' knowledge on this new concept. To further convince undergraduate students to consume green products, the strategies on packaging and advertising must emphasize individuals' positive effects on particular environmental issues if green products are purchased to change students' environmental attitudes and senses of responsibility, which in turn alter their green product purchase willingness and behaviors. Chamorro et al. (2009), after reviewing the articles on green marketing published within the period 1993–2003, conclude that studies on green consumers will continue to be necessary because the findings of prior studies will not necessarily be valid in the future. The research implications of the present study provide possible lines of future research.

Acknowledgements

This research was partially supported by The Hong Kong Institute of Education under the project code: R6403. We would like to thank the anonymous reviewers for their constructive comments on an earlier version of the paper.

Appendix A.

Table A1.

Table A1
Measures of the latent variables.

Measure	M	SD
Green marketing practice		
(1) Modifying product packaging to minimize harmful to the environment	4.40	0.76
(2) Educating consumers to use products in environmentally friendly manner	4.38	0.74
(3) Manufacturing products through eco-friendly processes	4.20	0.75
(4) Modifying products to make them environmentally friendly	4.18	0.68
(5) Manufacturing eco-friendly products	4.15	0.74
(6) Using green supply chain for procurement and distribution of products	4.06	0.76
(7) Branding products with green labels	3.90	0.85
(8) Promoting products through eco-friendly modes of communication	3.87	0.81
Consumers' attitudes toward the environment		
(1) It is important to raise environmental awareness among Hong Kong people	4.44	0.64
(2) It is meaningful to protect our environment	4.36	0.67
(3) More environmental protection is needed in Hong Kong	4.31	0.76
(4) I am concerned about environmental protection	3.81	0.73
Perceived seriousness of environmental problems		
(1) Hong Kong's environmental problems are worsening	4.15	0.76
(2) Hong Kong's environmental problems need to be dealt with urgently	4.12	0.70
(3) Environmental problems in Hong Kong are serious	4.11	0.68
(4) Hong Kong's environmental problems are threatening our health	4.08	0.76
(5) Hong Kong's environmental problems are threatening the reputation of Hong Kong	3.89	0.82

Table A1 (Continued)

Measure	M	SD
Perceived environmental responsibility		
(1) Everyone should be responsible for protecting the environment	4.47	0.58
(2) Environmental protection is the responsibility of environmental organizations, not me (reverse-scored)	4.18	0.80
(3) Environmental protection should start immediately	4.17	0.61
(4) Environmental protection is the responsibility of the government of Hong Kong, not me (reverse-scored)	4.11	0.86
(5) I should take up the responsibility to protect the environment in Hong Kong	4.06	0.54
(6) Environmental protection starts with me	4.05	0.67
Consumers' green products purchase willingness		
(1) I am willing to buy products that use recycle/recyclable packaging	4.15	0.65
(2) I am willing to buy products that contain no or fewer chemical ingredients	4.06	0.71
(3) I am willing to buy products that support fair community trades	4.00	0.67
(4) I am willing to buy products that are against animal-testing	3.97	0.75
(5) I am willing to buy products that are labeled as environmentally safe	3.91	0.61
(6) I am willing to buy organic products	3.64	0.71
Consumers' green products purchase behavior		
(1) I often buy products that use recycled/recyclable packaging	3.39	0.93
(2) I often buy products that contain no or fewer chemical ingredients	3.29	0.93
(3) When I go shopping, I will look for products with certified environmentally-safe or organic stamp	3.10	0.93
(4) I often buy products that support fair community trades	3.08	0.89
(5) I often buy products that are against animal-testing	3.05	0.95
(6) I often buy products that are labeled as environmentally safe	2.96	0.93
(7) I often buy organic products	2.71	0.94

Notes: M refers to mean value. SD refers to standard deviation.

References

- Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Englewood Cliffs, NJ: Prentice-Hall.
- Angelovska, J., Sotiroska, S. B., & Angelovska, N. (2012). The impact of environmental concern and awareness on consumer behavior. *Journal of International Environmental Application & Science*, 7(2), 406–416.
- Bagozzi, R. P., Yi, Y., & Baumgartner, J. (1990). The level of effort required for behavior as a moderator of the attitude–Behavior relation. *European Journal of Social Psychology*, 20(1), 45–59.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84, 191–215.
- Barber, N., Kuo, P.-J., Bishop, M., & Goodman, R., Jr. (2012). Measuring psychographics to assess purchase intention and willingness to pay. *Journal of Consumer Marketing*, 29(4), 280–292.
- Bertrandias, L., & Elgaaiid-Gambier, L. (2014). Others' environmental concern as a social determinant of green buying. *Journal of Consumer Marketing*, 31(6/7), 417–429.
- Bhatia, M., & Jain, A. (2013). Green marketing: A study of consumer perception and preferences in India. *Electronic Green Journal*, 1(36), 1–15.
- Brougham, R. R., Jacobs-Lawson, J. M., Hershey, D. A., & Trujillo, K. M. (2011). Who pays your debt? An important question for understanding compulsive buying among American college students. *International Journal of Consumer Studies*, 35, 79–85.
- Bryman, A., & Bell, E. (2007). *Business research methods* (2nd ed.). New York, NY: University Press Inc.
- Carrete, L., Castañó, R., Felix, R., Centeno, E., & González, E. (2012). Green consumer behavior in an emerging economy: Confusion, credibility, and compatibility. *Journal of Consumer Marketing*, 29(7), 470–481.
- Chamorro, A., Rubio, S., & Miranda, F. J. (2009). Characteristics of research on green marketing. *Business Strategy and the Environment*, 18, 223–239.
- Chan, C. (2000). Market segmentation of green consumers in Hong Kong. *Journal of International Consumer Marketing*, 12(2), 7–24.
- Chan, R. Y. K. (2001). Determinants of Chinese consumers' green purchase behavior. *Psychology & Marketing*, 18(4), 389–413.
- Chen, T. B., & Chai, L. T. (2010). Attitude towards the environment and green products: Consumer perspective. *Management Science and Engineering*, 4(2), 27–39.
- Cheng, G., Stimpson, P., & Wong, B. K. (2004). China–Guangzhou. In J. Fien, D. Yencken, & H. Sykes (Eds.), *Young people and the environment: An Asia-Pacific perspective* (pp. 23–38). New York, NY: Kluwer Academic Publishers.
- Cherian, J., & Jacob, J. (2012). Green marketing: A study of consumers' attitude towards environment friendly products. *Asian Social Science*, 8(12), 117–126.
- Corbett, J. (2013). Designing and using carbon management systems to promote ecologically responsible behaviors. *Journal of the Association for Information Systems*, 14(7), 339–378.
- Elham, R., & Wahid, N. A. (2011). Investigation of green marketing tools' effect on consumers' purchase behavior. *Business Strategy Series*, 12(2), 73–83.
- Environmental Protection Department (EPD). (2012). *Strengthening waste reduction: Is waste charging an option?* Hong Kong: Public Consultation. Environmental Protection Department, HKSAR, Government.
- Gruber, V., & Schlegelmilch, B. B. (2014). How techniques of neutralization legitimize norm- and attitude-inconsistent consumer behavior. *Journal of Business Ethics*, 121(1), 29–45.
- Gupta, S., & Ogden, D. T. (2009). To buy or not to buy? A social dilemma perspective on green buying. *Journal of Consumer Marketing*, 26(6), 376–391.
- Guräu, C., & Ranchhod, A. (2005). International green marketing: A comparative study of British and Romanian firms. *International Marketing Review*, 22(5), 547–561.
- Ha, H.-Y., & Janda, S. (2012). Predicting consumer intentions to purchase energy-efficient products. *Journal of Consumer Marketing*, 29(7), 461–469.
- Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2014). *A primer on partial least squares structural equation modelling (PLS-SEM)*. Thousand Oaks, CA: Sage Publications, Inc.
- Heberlein, T. A., & Black, J. S. (1976). Attitudinal specificity and the prediction of behavior in a field setting. *Journal of Personal and Social Psychology*, 33, 474–479.
- Ho, W. P. L., Dickinson, M. N., & Chan, Y. S. G. (2010). Green procurement in the Asian public sector and the Hong Kong private sector. *Natural Resources Forum*, 34, 24–38.
- Hoffmann, S., & Schlicht, J. (2013). The impact of different types of concernment on the consumption of organic food. *International Journal of Consumer Studies*, 37(6), 625–633.
- Juwaheer, T. D., Pudaruth, S., & Noyaux, M. M. E. (2012). Analyzing the impact of green marketing strategies on consumer purchasing patterns in Mauritius. *World Journal of Entrepreneurship, Management and Sustainable Development*, 8(1), 36–59.
- Kang, G. D., & James, J. (2007). Revisiting the concept of a societal orientation: Conceptualization and delineation. *Journal of Business Ethics*, 73(3), 301–318.
- Kim, H. Y., & Chung, J.-E. (2011). Consumer purchase intention for organic personal care products. *Journal of Consumer Marketing*, 28(1), 40–47.
- Kock, N. (2011). Using WarpPLS in e-collaboration studies: Descriptive statistics, settings, and key analysis results. *International Journal of e-Collaboration*, 7(2), 1–18.
- Kock, N. (2013). *WarpPLS4.0 user manual*. Laredo, TX: ScriptWarp Systems.
- Lai, O. K. (2000). Greening of Hong Kong? Forms of manifestation of environmental movements. In S. W. K. Chiu, & T. L. Lui (Eds.), *The dynamics of social movement in Hong Kong* (pp. 259–296). Hong Kong: Hong Kong University Press.

- Laroche, M., Bergeron, J., & Barbaro-Forle, G. (2001). Targeting consumers who are willing to pay more for environmentally friendly products. *Journal of Consumer Marketing*, 18(6), 503–520.
- Lee, K. (2008). Opportunities for green marketing: Young consumers. *Marketing Intelligence & Planning*, 26(6), 573–586.
- Lee, K. (2009). Gender differences in Hong Kong adolescent consumers' green purchasing behavior. *Journal of Consumer Marketing*, 26(2), 87–96.
- Lee, M. K. O., Shi, N., Cheung, C. M. K., Lim, K. H., & Sia, C. L. (2011). Consumer's decision to shop online: The moderating role of positive informational social influence. *Information & Management*, 48, 185–191.
- Leonidou, L. C., Leonidou, C. N., Palihawadana, D., & Hultman, M. (2011). Evaluating the green advertising practices of international firms: A trend analysis. *International Marketing Review*, 28(1), 6–33.
- Li, J. J., & Su, C. (2007). How face influences consumption: A comparative study of American and Chinese consumers. *International Journal of Market Research*, 49(2), 237–256.
- Lin, H.-Y., & Hsu, M.-H. (2015). Using social cognitive theory to investigate green consumer behavior. *Business Strategy and the Environment*, 24, 326–343.
- Liu, X., Wang, C., & Shishime, T. (2012). Sustainable consumption: Green purchasing behaviors of urban residents in China. *Sustainable Development*, 20, 293–308.
- McCarty, J. A., & Shrum, L. J. (2001). The influence of individualism, collectivism, and locus of control on environmental beliefs and behavior. *Journal of Public Policy and Marketing*, 20(Spring), 93L 104.
- Mendleson, N., & Polonsky, M. J. (1995). Using strategic alliances to develop credible green marketing. *Journal of Consumer Marketing*, 12(2), 4–18.
- Moisander, J. (2007). Motivational complexity of green consumerism. *International Journal of Consumer Studies*, 31(4), 404–409.
- Moser, A. (2015). Thinking green, buying green? Drivers of pro-environmental purchasing behavior. *Journal of Consumer Marketing*, 32(3), 167–175.
- Mostafa, M. M. (2007). A hierarchical analysis of the green consciousness of the Egyptian consumer. *Psychology & Marketing*, 24(5), 445–473.
- Niva, M., & Timonen, P. (2008). The role of consumers in product-oriented environmental policy: Can the consumer be the driving force for environmental improvements? *International Journal of Consumer Studies*, 25(4), 331–338.
- Ottman, J. A., Stafford, E. R., & Hartman, C. L. (2006). Avoiding green marketing myopia: Ways to improve consumer appeal for environmentally preferable products. *Environment*, 48(5), 22–36.
- Park, J., Ko, E., & Kim, S. (2010). Consumer behavior in green marketing for luxury brand: A cross-cultural study of US, Japan and Korea. *Journal of Global Academy of Marketing Science*, 20(4), 319–333.
- Paço, A., Alves, H., Shiel, C., & Filho, W. L. (2013). A multi-country level analysis of the environmental attitudes and behaviors among young consumers. *Journal of Environmental Planning and Management*, 56(10), 1532–1548.
- Paço, A., & Raposo, M. (2009). "Green" segmentation: An application to the Portuguese consumer market. *Marketing Intelligence & Planning*, 27(3), 364–379.
- Polonsky, M. J. (2011). Transformative green marketing: Impediments and opportunities. *Journal of Business Research*, 64(12), 1311–1319.
- Polonsky, M. J., & Rosenberger, P. J., III. (2001). Reevaluating green marketing: A strategic approach. *Business Horizons*, 44(5), 21–30.
- Peattie, K. (2001). Golden goose or wild goose? The hunt for the green consumer. *Business Strategy and the Environment*, 10(4), 187–199.
- Rule, B. K., & Ferguson, T. J. (1986). The effects of media violence on attitudes, emotions, and cognitions. *Journal of Social Issues*, 42(1), 29–50.
- Schuitema, G., & de Groot, J. I. M. (2015). Green consumerism: The influence of product attributes and values on purchasing intentions. *Journal of Consumer Behavior*, 14, 57–69.
- Steinhart, Y., Ayalon, O., & Puterman, H. (2013). The effect of an environmental claim on consumers' perceptions about luxury and utilitarian products. *Journal of Cleaner Production*, 53, 277–286.
- Straughan, R. D., & Roberts, J. A. (1999). Environmental segmentation alternatives: A look at green consumer behavior in the new millennium. *Journal of Consumer Marketing*, 16(6), 558–575.
- Testa, F., Iraldo, F., Vaccari, A., & Ferrari, E. (2015). Why eco-labels can be effective marketing tools: Evidence from a study on Italian consumers. *Business Strategy and the Environment*, 24, 252–265.
- Vicente-Molina, M. A., Fernandez-Sainz, A., & Izagirre-Olaizola, J. (2013). Environmental knowledge and other variables affecting pro-environmental behavior: Comparison of university students from emerging and advanced countries. *Journal of Cleaner Production*, 61, 130–138.
- Weigel, R. H., Vernon, D. T., & Tognacci, L. N. (1974). Specificity of the attitude as a determinant of attitude-behavior congruence. *Journal of Personality and Social Psychology*, 30(6), 724–728.
- Wells, V. K., Ponting, C. A., & Peattie, K. (2011). Behavior and climate change: Consumer perceptions of responsibility. *Journal of Marketing Management*, 27(7–8), 808–833.
- Wray-Lake, L., Flanagan, C. A., & Osgood, D. W. (2010). Examining trends in adolescent environmental attitudes, beliefs, and behaviors across three decades. *Environment and Behavior*, 42(1), 61–85.
- Young, W., Hwang, K., McDonald, S., & Oates, C. J. (2010). Sustainable consumption: Green consumer behavior when purchasing products. *Sustainable Development*, 18(1), 20–31.
- Zhou, Y., Thøgersen, J., Ruan, Y., & Huang, G. (2013). The moderating role of human values in planned behavior: The case of Chinese consumers' intention to buy organic food. *Journal of Consumer Marketing*, 30(4), 335–344.