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## Demographic Impacts on Environmentally Friendly Purchase Behaviors

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## Original Article

# Demographic impacts on environmentally friendly purchase behaviors

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**ABSTRACT** Researchers have continued to study green consumer demographics with mixed results. The relevant literature since 1998 (the last review) was summarized to determine what demographics seemed to impact environmental purchasing. The greatest consistency was found for gender with women more likely to exhibit green behaviors. This research article analyzed survey responses to determine the environmentally friendly behaviors of consumers and their relationships to demographics. Several demographics were found to be related to a number of specific environmentally friendly behaviors, more than in prior research. The authors concluded that using specific behaviors, in contrast to general statements or attitudes, may be more sensitive to the effects of demographics.

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**Keywords:** environmental marketing; green marketing; demographics; environmentally friendly behaviors

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## INTRODUCTION

The last few decades of green business evolution are represented by three waves of change among business organizations.<sup>1</sup> In the 1960s, it started

with the notion ‘Do no harm’, companies aimed at getting the worst environmental abuse under control.<sup>1</sup> In the beginning of the 1960s, the notion of *pollution control* included stopping illegal activities as well as the spewing smokestacks and drainpipes. In the 1970s, the Environmental Protection Agency was formed in the United States and similar legislation was passed in other countries to curtail pollution of air and water.<sup>1</sup> The second wave in the 1980s was ‘Doing well by doing good’; companies found that they could reduce costs and enhance their reputations by taking a few proactive steps.<sup>1</sup> Later, companies started being concerned about things such as pollution prevention, waste reduction and energy efficiency. Then in the 1990s came phase three: ‘Green is green’. Companies recognized that environmental thinking can do more than improve the bottom line; it can help grow the top line through innovation, new markets and new business opportunities.<sup>1</sup>

Today, many consumers explicitly express their environmental concerns by purchasing products that assure them a minimal standard for social and/or environmental stewardship. Consumers, shareholders, local communities and other stakeholders increasingly demand assurances that the production of goods conforms to minimum standards of social and environmental responsibility.<sup>2</sup> Consumers express their concerns about the ethical behavior of companies by means of ethical buying.<sup>3</sup> As a result, most companies today are developing different labels and communicating different strategies to inform consumers that their products are environmentally friendly and organic, animal and plant friendly, and production processes and people friendly (for example, products free from child labor or fair-trade products).

In September 1996, the ISO 14001 environmental management system was issued, establishing a baseline set of rules for how companies should organize for increased environmental consciousness.<sup>4</sup> As companies scrutinized their products and operations, they began to understand how much of their environmental impacts were affected by those outside their organizations – their suppliers,

contractors and business partners. Supply-chain environmental management became the watchword; after that, the concepts of industrial ecology, zero waste and carbon-neutrality emerged.<sup>1</sup> Today, companies are ultimately concerned about the S-word, *sustainability*, the three-legged stool consisting of people, profit and planet.<sup>1</sup>

The modern world has led consumers to become increasingly concerned about the environment and such concerns have begun to be displayed in their purchasing patterns, with consumers increasingly preferring to buy so-called ‘environmentally friendly products’.<sup>5</sup> Companies need to know their customers’ environmental preferences, including what they will and will not pay for, as well as what their competitors are doing in the green area.<sup>6</sup> Recently, increasing attention has been paid to the relationship between consumer behavior, marketing and the environment, and such attention has been manifested in two ways: on the one hand, public awareness about environmental aspects has increased, and, on the other, the evidence of environmental responsibility or green marketing activities has increased.<sup>5</sup>

## ENVIRONMENTALLY FRIENDLY BEHAVIORS

The term ‘green marketing’ has been described as an organization’s efforts at designing, promoting, pricing and distributing products that will not harm the environment.<sup>7</sup> Understanding consumers’ preferences is very important in green marketing.

The study of consumers’ environmentally friendly behaviors has received major attention from the research community because it is extremely beneficial for companies to understand what factors influence consumers’ behaviors. Studies show that consumers have become relatively more aware and concerned about the environmental impacts of the products they buy.<sup>1</sup> In fact, the green demographic crosses all age groups, all income levels and all education levels<sup>1</sup> and understanding green product perceptions helps businesses in many ways. In 1989, a London and New York-based

consulting firm called the Michael Peters Group, cited in Makeower,<sup>1</sup> issued a research report about US consumers' interest in buying products and services with fewer negative environmental impacts. The study was based on a telephone poll of 1000 consumers and found that 89 per cent of shoppers said they were concerned about the environmental impact of the products they purchased. Nearly 78 per cent said that they were willing to pay about 5 per cent more for a product that is green.

The results of one study suggests that, 'measures of environmental consciousness are closely linked to environmentally-responsible purchasing behavior, although the strength of the relationships varies according to sample type, the conceptualization of the purchasing domain and the particular product category at issue'.<sup>8</sup>

Another study on buying behavior of Canadian and Hong Kong consumers<sup>9</sup> concluded that both Canadian and Hong Kong respondents tended to purchase more environmentally friendly products than in prior studies. The study defined environmentally friendly products as those associated with the three R's: reduce, reuse and recycle.

A survey completed by ICOM Information and Communications<sup>10</sup> provided an insight into the penetration of green products in the American home; 61.9 per cent of survey respondents said that they used some type of environmentally friendly product. When asked why they elected to purchase eco-friendly goods, 33 per cent of the group selected self-gratification: 'makes me feel good about myself'.

Key values and environmental awareness appear to be defining characteristics in determining consumers' level of interest in green products. In 1999, a study was conducted to see the effects of perceptions, awareness and price on consumer willingness to purchase and pay a premium for environmentally certified forest products. The results of that study suggest that willingness to pay is positively correlated with the independent variables used in the research, such as environmental consciousness, certification involvement and perceived importance of certification.<sup>11</sup>

## DEMOGRAPHICS AND ENVIRONMENTALLY FRIENDLY BEHAVIORS

A substantive amount of research has been conducted to identify the willingness of consumers' to buy environmentally friendly products. Makeower<sup>1</sup> reviewed research on demographics and environmental behaviors conducted in the 1970s. Results of those studies show that the willingness of consumers to buy environmentally friendly products is highly related to demographics. According to Makeower,<sup>1</sup> research conducted in the beginning of the 1970s identified values, beliefs/knowledge, needs and motivation, attitudes, and demographics as variables that influence the consumer to be willing to buy green products.

Roberts<sup>12</sup> summarized the research on demographics and environmentally friendly behaviors up through 1996. Roberts found that green behaviors are affected by age, education and income, with results varying from study to study. He concluded that further research on demographics was needed.

A similar review of the research on demographics and green consumerism was completed by Diamantopoulos *et al.*<sup>13</sup> This article reviewed numerous studies dated from 1969 through 1998 and concluded that the inconsistencies in findings indicated a need for study of the relationships between demographics and all aspects of environmental consciousness (knowledge, attitudes and behavior).

As noted by Roberts,<sup>12</sup> public opinions on environmental concerns changes rapidly over time. A number of papers have been published since 1996 and not included in a prior review that studied the relationship between demographics and environmentally friendly behaviors. These publications are summarized below by demographic characteristic. Table 1 summarizes the results provided in the current article.

### Age

Results of studies that compared age groups were very mixed. Two studies found that younger

**Table 1:** Results of prior research on demographics and green consumer behavior

Article demographic	Anderson and Hansen <sup>14</sup>	Chan <sup>9</sup>	Do Paco et al <sup>15</sup>	Furlow and Knott <sup>16</sup>	ICOM <sup>10</sup>	Laroche et al <sup>17</sup>	Ling-yeet <sup>18</sup>	Loureiro et al <sup>19</sup>	Meyer and Liebe <sup>20</sup>	Roberts <sup>12</sup>	Straughan and Roberts <sup>21</sup>
Age	ns	Younger	Older	*	Over 55 years of age	*	*	ns	ns	Older	Older
Children Education	*	*	*	*	*	At least 1	*	Yes	*	*	*
Gender	*	More	More	*	*	ns	*	*	*	More	More
Income level	Female	*	ns	Female	Female	Female	Male	Female	*	Female	Female
Population	ns	ns	Higher	*	The United States	ns	Higher	ns	Higher	Lower	Lower
	College students	Female Shoppers, Canada and Hong Kong	Portugal	College students	College students	US city	Hong Kong	Portland	Switzerland	The United States	College students
Product	Wood CD racks	Five categories	General	General	Home goods	General	Health food	Apples	Environmental protection and CO <sub>2</sub> device and fuel	General	General

\*Not tested.

ns: Not significant.

people were more likely to exhibit environmentally friendly behaviors; four found that older people were more likely to do so; and four studies did not find any significant difference.

A US nationwide survey using a random (cluster) sample<sup>12</sup> showed that age had an impact on ecologically conscious consumer behavior (ECCB) with older consumers more likely to exhibit such behavior. The study measured ECCB using a scale of 22 behavioral items. However, all demographics combined explained only 6 per cent of the variation in the sample's ECCB however. The addition of attitudinal variables increased the percentage of variance to 45 per cent.

The same year, another study on buying behavior of Canadian and Hong Kong female supermarket shoppers<sup>9</sup> found that younger consumers were more likely to respond to products that are environmentally friendly. The researcher used 10 statements related to purchase behavior that focused on reduced usage, reusability and recyclability of products. Five of the statements were related to specific products.

The results of another study<sup>21</sup> using a convenience sample of college students showed that age was significantly correlated with ECCBs. This study used measures of respondents' purchases of goods and services with more positive impacts on the environment.

A survey completed by ICOM Information and Communications<sup>10</sup> found that consumers over 55 years of age were the most prolific users of green products in the United States. Leading the way was the 55–59 year-old female demographic, which was more than twice as likely as the average consumer to use green products. Males from 65 to 69 years old were more than 1.7 times as likely to use green products as the average American.

In a study of Portuguese consumers,<sup>15</sup> the researchers developed three clusters of consumers based on demographics and measures of concern, affect, knowledge, environmentally friendly buying behavior and other dimensions. The cluster that was identified as most environmentally concerned, 'the green activists',

was primarily from the age segments of 25–34 and 45–54.

### Children

Presence of children in the household was used as a demographic variable by only two studies. Both found that people with children in their households were more likely to exhibit environmentally friendly behaviors.

Laroche *et al*<sup>17</sup> studied consumers located in neighborhoods in a large North American city where recycling programs were available and advertised. They used five questions measuring behaviors toward the environment, including recycling and buying environmentally unfriendly products. They reported that married females with at least one child living at home were willing to pay more for environmentally friendly products.

Loureiro *et al*<sup>19</sup> interviewed consumers who buy apples at two grocery stores in the Portland, Oregon area. They measured willingness to pay more for apples labeled as environmentally friendly using certification by the Food Alliance through a bidding process. Their findings indicated that females with children under the age of 18 were the most willing to pay more for environmentally friendly apples.

### Education

The most consistent results were found for education. Four studies found that those with a higher level of education were more likely to exhibit environmentally friendly behaviors, whereas one found no significant difference.

The Chan study<sup>9</sup> on buying behavior of Canadian and Hong Kong consumers, described under age above, found that more educated consumers were more likely to respond to products that are environmentally friendly.

The nationwide survey of Roberts,<sup>12</sup> described under age above, showed that education had an impact on ecological consumer behavior. However, adding attitudinal variables into the mix resulted in the educational impact becoming non-significant.

The study by do Paco *et al*,<sup>15</sup> described above under age, found that those in the cluster who

demonstrated the highest level of concern about the environment were those with the highest education levels.

### Gender

Highly consistent results were found for gender. Seven studies found that females were more likely to exhibit environmentally friendly behaviors. One study found that males were more likely to consume green health food products and one study found that gender was not significant.

Robert's study<sup>12</sup> showed that gender had an impact on ecological consumer behavior. He found that females performed more ECCB in every analysis performed. This study is described under age.

One study examined the moderating role of consumer demographic characteristics and product involvement on the value–attitude–behavior relationship in health food consumption of residents of Hong Kong.<sup>18</sup> The author used two-item Likert-type scales to measure frequency of green consumption and extent of information search related to green products. Males engaged in more extensive green-product-related information search and purchased green products more frequently.

The research by Laroche *et al*,<sup>17</sup> described above (under children sub-head), found that females were more willing to buy environmentally friendly products.

Loureiro *et al*'s study,<sup>19</sup> described above (under children sub-head), also found that females were willing to pay more for environmentally friendly apples.

The results of another study<sup>21</sup> described above under age showed that gender was significantly correlated with ECCB. Gender, however, was no longer significant when psychographic variables were included in the analysis.

Anderson and Hansen<sup>14</sup> had college students rank eight versions of a wood CD rack where environmental certification, adjustability of shelves, wood type (solid or composite), storage capacity and price varied. They classified the students by the attribute that was most important to them. They found that females are 1.67 times

more likely to rate environmental certification as most important.

A survey completed by ICOM Information and Communications<sup>10</sup> found that females from 55 to 59 years of age were more than twice as likely as the average consumer to use green products. Whereas these females were most likely to use green products, males from 65 to 69 years of age were more than 1.7 times as likely to use green products as the average American.

Another study<sup>16</sup> examined six independent variables: gender, environmental concern, environmental practices, environmental involvement, news frequency and hobbies in comparison with the dependent variable of environmental product label use. The results of this study indicated that label users tend to be female.

## Income

Four studies found no significant difference based on income in environmentally friendly behaviors. Three found that higher levels of income were related to more environmentally friendly behaviors and two found that lower levels were more likely to exhibit these behaviors.

Roberts<sup>12</sup> determined that those with lower income levels were more likely to perform ecological consumer behaviors. This study is described under age.

Another study<sup>17</sup> examined the moderating role of consumer demographic characteristics and product involvement on the value–attitude–behavior relationship in the context of health food consumption as described above. Males engaged in more extensive green-product-related information search, and purchased green health food products more frequently.

Straughan and Roberts,<sup>21</sup> in their replication of Roberts' study,<sup>12</sup> found that those with lower levels of income were more likely to demonstrate environmentally friendly behaviors. This study is described under age.

The study by do Paco *et al*<sup>15</sup> described above found that Portuguese consumers with higher income levels were more likely to exhibit

environmentally friendly behaviors. This study is described under age.

Meyer *et al*<sup>20</sup> studied willingness to pay more taxes for general environmental protection and to pay more for a device to reduce CO<sub>2</sub> emissions or fuel that produced less CO<sub>2</sub>. The researchers found that inhabitants of Switzerland with higher income levels were more willing to pay more for these environmentally friendly products or services.

## HYPOTHESES

### Research hypotheses

On the basis of the research results given above, several hypotheses were developed. The general research hypothesis is that consumer's environmentally friendly actions (behavior) are related to demographics. Individual hypotheses were developed and tested for each combination of behaviors/actions and each demographic, resulting in 42 separate hypotheses.

- Older people are more likely to exhibit environmentally friendly behaviors.
- People with children in the home are more likely to exhibit environmentally friendly behaviors.
- More highly educated people are more likely to exhibit environmentally friendly behaviors.
- Females are more likely to exhibit environmentally friendly behaviors.
- People with higher incomes are more likely to exhibit environmentally friendly behaviors.
- Married people are more likely to exhibit environmentally friendly behaviors.
- Caucasians are more likely to exhibit environmentally friendly behaviors.

### Dependent variables

Specific behaviors were tested rather than a general statement. The approach of testing specific behaviors instead of general statements helped us reduce possible self-report bias in the responses; this could give different outcomes than the ones who tested using general statements.

Consumers may be likely to state that they use green products when they do not because they think it is a socially correct action, no matter their demographics. Questions about specific behaviors may be more sensitive to individual differences.

We included a general statement (I use products that are green) for a direct comparison. The specific actions or behaviors tested were:

- I use recyclable bags often.
- I separate my trash at home for recycling.
- I turn off lights when I leave a room.
- I use energy-efficient light bulbs.
- I have switched to a product because it is green.

**Independent variables**

The demographics measured were:

- Age
- Children
- Education
- Gender
- Income
- Marital Status
- Race

**METHODOLOGY**

A questionnaire was prepared using closed-choice and Likert scales. Demographic questions were designed to measure the same demographics used in previous studies with categories within the questions that were similar to those used previously<sup>17</sup> to maximize the ability to compare results. Likert scales, with scales of strongly disagree (5) to strongly agree (1), were used to measure behaviors, 1 general and 5 more specific:

- I use recyclable bags often.
- I separate my trash at home for recycling.
- I turn off lights when I leave a room.
- I use energy-efficient light bulbs.
- I have switched to a product because it is ‘green’.

The data for this study were gathered through an online survey of the Missouri University of

Science and Technology community (faculty, students and staffs) using Qualtrics. Messages requesting participation in the survey were placed in the university announcement emails and sent to email lists. The university-wide population of about 8000 was included through their email addresses in the potential pool of respondents; no sampling procedure was used. Respondents self-selected whether or not to participate. Data were collected in March and April of 2010.

**RESULTS**

**Demographic responses**

The total number of respondents was 316 (3.95 per cent of the population) of which 306 (97 per cent of those accessing the questionnaire) provided usable responses. Of those 306, 61.8 per cent of the respondents were male, whereas 31.3 per cent had completed 4-year college degree. In all 39.1 per cent of the respondents were in the age group of 21–25 and 56.3 per cent were single. Annual income of 39.5 per cent of the respondents was <\$10000 . The majority of the respondents surveyed were Caucasian. Around 57 per cent of the respondents were single and 40 per cent were married. Almost 70 per cent of the respondents did not have a child and 13 per cent of them had two children. The income level of most of the respondents was less than \$10000 and 13 per cent of the respondents earn more than \$100000 per year.

Tables 2 to 8 provide details of the demographic breakdowns.

**Behavioral responses**

Likert scales, with scales of strongly disagree (5) to strongly agree (1), were used to measure behaviors. Table 9 shows the five behavioral questions along with their means and standard deviations. Means were used since Likert scales,

**Table 2:** Gender

<i>Gender</i>	<i># of respondents</i>	<i>%</i>
Male	189	63
Female	112	37
Total	301	100

**Table 3:** Age group

Age Group	# of responses	%
15–20	41	13
21–25	119	39
26–30	44	14
31–40	35	12
41–50	34	11
51–60	24	8
61–over	7	2
Total	304	100

**Table 4:** Education

Level	# of responses	%
High School/GED	78	26
2-year college degree (Associates)	28	9
4-year college degree (BA/BS)	95	31
Master's degree	70	23
Doctoral degree	31	10
Professional degree (MD, JD)	1	0
Total	303	100

**Table 5:** Marital status

Status	# of responses	%
Single	171	57
Married	119	40
Separated	1	0
Divorced	9	3
Widowed	1	0
Total	301	100

**Table 6:** Race

Race	# of responses	%
White, non-Hispanic	237	79
African American	7	2
Hispanic	6	2
Asian Pacific Islander	27	9
Native American	1	0
Other	23	8
Total	301	100

although ordinal, approximate interval scales. More respondents reported that they were likely to turn off lights when they left the room (mean of 1.62) than any of the other behaviors listed. Respondents were least likely to switch to a product because it was green (mean of 2.9).

A  $\chi^2$  analysis was used to evaluate the relationships between the behaviors and consumer demographics as the demographic scales were

**Table 7:** Annual income

Income (in Dollars)	# of respondents	%
<\$10000	120	40
10000–19999	30	10
20000–29999	20	7
30000–39999	13	4
40000–49999	8	3
50000–59999	14	5
60000–69999	16	5
70000–79999	11	4
80000–89999	13	4
90000–99999	14	5
100000 or more	39	13
Total	298	100

**Table 8:** Children

Number of Children	# of respondents	%
0	210	70
1	23	8
2	40	13
3	22	7
4 or more	6	2
Total	301	100

**Table 9:** Means and standard deviations for behavioral questions

Questions	# of response	Mean	SD
I use products that are green	306	2.4	0.9
I use energy-efficient light bulbs	305	2.1	1.12
I separate my trash at home for recycling	305	2.3	1.24
I turn off lights when I leave a room	305	1.6	0.71
I use recyclable bags often	305	2.6	1.18
I have switched to a product because it is 'green'	304	2.9	1.29

nominal or ordinal at best. The results are shown in Table 10.

### Gender

The  $\chi^2$  value for gender and usage of green products and usage of recyclable bags is significant at the  $P < 0.05$  value. The  $\chi^2$  for gender and switching to a green product is significant at the  $P < 0.01$  level. This means that green product usage, recyclable bag usage and switching to a green product are related to gender. Separating trash for recycling, turning off lights when leaving a room and

**Table 10:** Relationships between behaviors and demographics

Questions	Gender	Age	Education	Marital status	Children	Income	Race
I use products that are green	15.7*	33	29.2	22.69	18.98	79.3**	35.23
I use recyclable bags often	20.83*	32.6	116.12**	82.34**	90.49**	47	28.18
I separate my trash at home for recycling	9.19	40.19	32.9	26.78	28.77	79.08**	25.28
I turn off lights when I leave a room	15.13	27.3	28.95	30.48	35.11	44.70	73.59**
I use energy-efficient light bulbs	13.76	28.79	41.88	21.95	18.82	42.28	72.66**
I have switched to a product because it is 'green'	20.02**	57.45**	43.46	34.55	20.02	72.56	26.65

\* $<0.05$ ; \*\* $<0.01$ .

using energy-efficient bulbs are not significantly related to gender.

### Age

The  $\chi^2$  values show that age and switching to green products was significant at the  $P < 0.01$  level.

### Education

The  $\chi^2$  values show that usage of recyclable bags is related to education ( $P < 0.05$ ) but none of the other behaviors were significantly related to education level. According to our results, 29 per cent of the doctoral degree holders and 23 per cent of the master's degree holders strongly agreed that they use recyclable bags often. Around 17 per cent of the 4-year college degree holders, 18.5 per cent of 2-year college degree holders and 15 per cent of the high school graduates strongly agreed that they use recyclable bags often. The doctoral degree holders who strongly disagreed that they use recyclable bags often accounted for 3 per cent of the total; master degree holders, 3 per cent; 4-year college degree, 7 per cent; 2-year college degree, 7 per cent; and high school graduate, 5 per cent.

### Marital status

The  $\chi^2$  values show that using recyclable bags is related to the marital status of the respondents ( $P < 0.05$ ) but all others are not related.

### Number of children

The  $\chi^2$  value shows that consumer's actions such as using green products, separating trash for

recycling, turning off lights while leaving room and using energy-efficient bulbs are not related to the number of children they have ( $P < 0.05$ ). But the usage of recyclable bags is related to number of children the consumer has. The result shows that 31.1 per cent of the consumers with no children, 43.5 per cent of the consumers with one child, 46.2 per cent of the consumers with two children, 27.3 per cent of the consumers with three children and 33.3 per cent of the consumers with four or more children agreed that they use recyclable bags often. Percentage of the consumers who strongly disagreed that they use recyclable bags often with no child, one child, two children, three children and four or more were, respectively, 7.2, 4.3, 0, 0 and 0.

### Income

The  $\chi^2$  values shows that usage of green product and separating trash for recycling are related to income level of the consumer ( $P < 0.05$ ). But using recyclable bags and energy-efficient light bulbs, and turning off the lights while leaving the room have no relationship with income level.

### Race

The  $\chi^2$  values show that turning off lights when leaving a room and using energy-efficient bulbs are related to consumers' race ( $P < 0.05$ ). But other consumers' actions, such as using green products and recyclable bags and separating trash for recycling were not related to race. Our results show that 77.85 per cent of the Asian Pacific Islanders, 66.7 per cent of the Hispanics, 63.6 per cent of the White, non-Hispanics and 43.1 per cent of the Whites strongly agree that

they turn off lights while leaving a room. Similarly, 44.4 per cent of the Asian Pacific Islanders, 36.1 per cent of the Whites, 33.3 per cent of the white, non-Hispanics and Hispanics, 28.6 per cent of the African Americans strongly agreed that they use energy-efficient light bulbs.

## DISCUSSION

This research study tested the relationship between demographics (gender, age, education, marital status, children, income and race) and behaviors of the respondents. It used specific behavioral questions instead of general attitude questions used in previous research and the results are quite different from the previous research in the field.

Most of the previous research concluded that gender has a significant impact on consumers' environmentally friendly behavior. These conclusions are based on the general attitude test. We found that the impact of gender is different for different specific behaviors. Gender is related to using green products and recyclable bags but gender has no impact on separating trash for recycling, turning off light while leaving room and using energy-efficient light bulbs. Our result shows that 16.2 per cent of women strongly agreed that they use products that are green, whereas only 7.4 per cent of men strongly agreed to that statement. Only 0.9 per cent of females strongly disagreed that they use products that are green with the men's per cent being 2.7. Similarly, 24.3 per cent of the women respondents strongly agreed that they use recyclable bags and only 16 per cent of men strongly agreed to that. The percentage of women who strongly disagreed that they use recyclable bags was 3.6 and that of men was 6.4. Our results for these two actions are similar to most previous research, however, for other specific behaviors this result does not hold true. For other environmentally friendly actions such as separating trash for recycling, turning off lights while leaving home and using energy-efficient light bulbs, the gender does not have any impact. The variations in the outcomes in our research and other research might have resulted because of the testing methods. We

tested the specific behaviors rather than the general behaviors that helped to avoid biases.

According to the ICOM Information and Communications,<sup>10</sup> consumers over 55 years of age performed more environmentally friendly actions, whereas the IISD found that young adults are more environmentally concerned and perform environmentally friendly behaviors more frequently. In contrast, our results showed that age has no impact on the environmentally friendly behaviors of respondents. None of the specific behaviors tested showed a significant relationship with age, perhaps due to our sample having few older respondents; only two were over 60 years of age.

Most of the prior research did not find any relationship between education level and environmentally friendly actions. Our results were consistent with the other research results on education with one exception. Our results showed that using recyclable bags is related to the level of education. According to Laroche *et al*,<sup>17</sup> married consumers are more likely to perform environmentally friendly actions. However, marital status was not related to four of the actions we tested; the exception was for usage of recyclable bags. Married consumers were likely to use recyclable bags more often. Around 30 per cent of the single and 33.3 per cent of the divorced respondents agreed that they use recyclable bags more often.

According to Laroche *et al*,<sup>17</sup> consumer's environmentally friendly behaviors depend on the number of children they have and consumers with at least one child perform more environmentally friendly actions. The actions/behaviors we tested were not related to the number of children a consumer has. Only one action was impacted by the number of children, the usage of recyclable bags. Our result shows that consumers with one or two children are likely to use recyclable bags more often than the other groups.

Our results showed that income is related to some environmentally friendly actions of the consumers. Our study found that usage of green products and separating trash at home for recycling are related to the level of income but

the other three actions were not related to the level of income. The International Institute for Sustainable Development (2006) found that consumers' environmentally friendly actions are related to the level of income; the more consumers earn, the more likely they perform environmentally friendly actions. Our study found that usage of green products depends on the level of income. For example, 42.5 per cent of those whose annual income is less than \$10 000, 33.3 per cent of those earning \$ 10 000–\$19 999, 45 per cent of those who earn \$20 000–\$29 999, 69.2 per cent of those who earn around \$30 000–\$39 999, 87.5 per cent of those who earn \$40 000–\$49 999, 21.4 per cent of those who earn \$50 000–\$59 999, 43 per cent of those who earn \$60 000–\$69 999 and 50 per cent of those who earn \$70 000–89 999 agree that they use products that are green.

The current study results showed that turning off lights when leaving a room and using energy-efficient light bulbs are related to the race of the consumer. But the other actions were not related to race. Asian Pacific Islander tends to be more cautious on using energy-efficient light bulbs and saving energy by turning off unnecessary lights.

**Implications for practice**

These research findings are quite different from previous findings. The unique outcomes of this study can be used by marketers to make decisions. This information can be used by marketers to select target markets and design marketing campaigns.

Table 11 shows the statements in the first column and their relationships to demographics in the other columns. The first row shows that

using green products is related to gender and income. Age, education, children, marital status and race have no significant relationship with using green products. Marketers of green products may want to select target markets based on gender and income and use advertising vehicles that reach the groups most likely to buy green products.

'The analysis [of their results] provides the motivations for the management (1) to build strong competitive advantage for the product, in terms of quality and price, (2) to develop and project a profile of green consumers based on demographics and (3) to meet customers' expectations by genuinely being as well as effectively being recognized by consumers as being demonstrably socially responsible'.<sup>22</sup>

**Future research**

This research article included an analysis of survey responses collected to determine the environmentally friendly behaviors of consumers and their relationships to demographics. This study found more significant relationships between environmentally friendly behaviors and demographics than previous research. The major difference between the current study and prior work is that this study used more specific behaviors.

Increasing awareness of the environmental impacts of products makes the study of green consumers' behaviors of growing importance. It is beneficial to understand how consumers' behaviors are influenced by demographic factors. Future studies should continue to use specific behaviors and not just general statements. Some studies that can be used as sources of additional behavioral questions are by Marjaine Szerenyi<sup>23</sup> and by Brown and Wahlers.<sup>24</sup>

**Table 11:** Relationships between tested behaviors and demographics

Questions	Gender	Age	Education	Marital status	Children	Income	Race
I use products that are green	Yes	No	No	No	No	Yes	No
I use recyclable bags often	Yes	No	Yes	Yes	Yes	No	No
I separate my trash at home for recycling	No	No	No	No	No	Yes	No
I turn off lights when I leave a room	No	No	No	No	No	No	Yes
I use energy-efficient light bulbs	No	No	No	No	No	No	Yes
I have switched to a product because it is 'green'							

Another area for future research is factors other than demographics that influence environmentally friendly behaviors. Consumer behavior models suggest variables that should be tested, including attitudes. Researchers began using psychographics, knowledge, beliefs and attitudinal variables in addition to demographic variables in the 1990s, and several have found that psychographic variables have as large or greater impact on environmentally friendly behaviors.<sup>23,17,18,12,21</sup> Variables showing impacts include perceived consumer effectiveness, environmental knowledge and environmental concern. Environmental concern received the greatest amount of research support.<sup>5,12,21,17–20,25,26</sup> Perceived consumer effectiveness received almost as much research support.<sup>5,12,21,25,27,26,28,29</sup>

Another step forward in the research on environmentally friendly behaviors would be to find an existing model or develop a model and test its applicability. The generalized exchange theory would be one potential model to test. The ‘generalized exchange model’ focuses on broad, indirect, social benefits as motivators to engage in certain exchange and applies to areas where the consumer does not receive a direct return for his behaviors. Willingness to enter into an exchange requires that consumers see the exchange as beneficial in terms of self-interest. In the generalized exchange paradigm, consumers’ perceptions of community benefits, social responsibility and social equity lead to an action (that is, to recycle waste). Buying green products is a particularly useful test of the generalized exchange concept because the alternative might be financially better for the consumer.

## Limitations

Only two respondents were over 60 years of age and almost all of the respondents were at least high school graduates. The survey was conducted via Internet with requests for participation sent through a broadcast email service; the response rate could not be identified and the demographics could not be compared with the population.

## CONCLUSION

Prior research found very few relationships between demographics and general attitude using general attitude as the dependent variable. When this study used six specific behaviors as dependent variables, a large number of demographics were found to be related to the behaviors.

Consumers have difficulty answering general questions. In the future, people studying green behaviors should use more specific behavioral descriptions to be sure that they are identifying differences that may not appear when only general questions are asked.

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