



## Housing Choice and the Importance of Ecological Sustainability: Do Demographics Influence Sentiment?

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### Abstract

*Green housing features can be an important consideration for consumers. This study aims to investigate if residents found ecological sustainability important when moving to a small urban downtown area in the United States and any demographic factors that influence this importance. An online survey was administered with 127 survey respondents and five demographic characteristics analyzed for influence through statistical analysis including t-test and ANOVA analyses.*

*Findings indicate that while the majority of respondents find ecologically sustainable housing as an important determining factor when deciding to live in a small downtown urban area, the majority of demographic characteristics are not significant including age group, relationship status, education level, and income level. Gender was the only significant demographic characteristic with females finding ecologically sustainable housing significantly more important as a determining factor when deciding to live in a small downtown urban area than males. This study adds to the limited literature regarding demographic impacts on green housing choice within the United States by addressing who may be most likely to consider ecological sustainability important in their decision in moving to a small urban downtown area. These results can help various stakeholders in their decision-making processes regarding green housing.*

**KEYWORDS: GREEN HOUSING, CONSUMER HOUSING CHOICE, MULTIFAMILY HOUSING, ECOLOGICAL SUSTAINABILITY INITIATIVES**

### Introduction

Consumer housing choice is determined by factors relating to location, floor plan, and affordability (Jussila et al., 2023). More recently, it has been shown that green housing features can also be an important consideration for consumers (Goodwin, 2011; Noiseux & Hostetler, 2010). The prevalence of green housing continues to increase, partly because consumers are becoming more aware about the negative environmental impact externalities of products they consider while companies are also increasingly engaging in green marketing activities (do Paco and Raposo, 2009; Zhang et al., 2019).

With the increased awareness of negative environmental impacts of housing, a central question that arises is whether consumers are interested in green housing and if it is part of their decision-making process. Another question of equal importance focuses on the demographic profile of the consumer who considers green housing features important in their housing choice. The answers to these questions can help various stakeholders in their decision-making processes regarding green housing.

This study starts to address these questions by examining if consumers are interested in green housing and who may be most likely to consider ecological sustainability important in their decision in moving to a small urban downtown area. The manuscript begins with a discussion of demographic impacts on ecological sustainability purchase behaviors. Next, demographics and environmentally friendly behavior specific to housing are reviewed. An overview of the data and methods used to examine demographic impacts on ecologically sustainable housing as a determining factor when deciding to live in a small downtown urban area is presented next. This is followed by a summary of the results and an analysis of these results. The paper concludes with key findings of the study, research limitations, and issues in need of further analysis.

## Literature Review

### Demographic Impacts on Ecological Sustainability Purchase Behaviors

Roberts (1996) reviews twenty-two previous studies in the literature from 1968 through 1993 regarding the impact of demographics on environmentally friendly behaviors. The specific demographic characteristics reviewed include age, socio-economic status, place of residence, sex, education, income, and occupation. The significance of all reviewed demographic variables was not consistent across studies and when a demographic was found significant, the relationship varied with most of the demographic variables across studies with the exception of socio-economic status and the prestige of the occupation which were only shown to have a positive relationship with environmentally friendly consumer behaviors. This demographic characteristic variability continues with the more recent literature reviewed below.

### Gender

Significant relationships among more recent studies vary by the gender demographic with the majority of findings illustrating a positive relationship between gender and environmentally friendly behaviors. Roberts (1996) finds that women are more likely to exhibit environmentally conscious consumer behavior while Straughan and Roberts (1999) confirm that sex is significantly positive regarding environmentally conscious consumer behavior. Specifically, it has been shown that women are more inclined to consume less electricity and air conditioning, use environmental product labels, purchase green personal products, and pay more for environmentally friendly products including eco-labeled apples (Chan et al., 2017; Furlow & Knott, 2009; In & Ahmad, 2018; Laroche et al., 2001; Loureiro et al., 2002). However, Ling-Yee (1997) finds that males more likely in the context of health food consumption to be more thorough in their search for green product information and buy green products more often.

In contrast, gender has also been shown as a weak predictor of sustainable consumption attitudes and behaviors (Nguyen et al., 2019). For example, Canöz (2022) finds no significant results regarding gender differences in tourist green product buying behavior while gender is not a strong predictor for willingness to pay more for environmentally friendly furniture (Shahsavari et al., 2020).

**Age**

The majority of recent findings demonstrate that older people are more inclined to exhibit environmentally friendly behaviors (Roberts, 1996; Straughan & Roberts, 1999). Specifically, it has been shown that older people are more likely to purchase green personal products, use less electricity, shower less than five minutes every day, and separate household waste (Chan et al., 2017; In & Ahmad, 2018). It has also been shown that older generations are willing to pay more than younger generations for eco-furniture (Shahsavari et al., 2020).

On the other hand, it has been demonstrated that younger consumers are more likely to act on their intention to purchase environmentally friendly grocery packaging and recyclable products (Chan, 1996; Oliver et al., 2022). Also, while Chan et al. (2017) find a significance in age when it comes to purchasing recyclable products, this did not translate into a significant difference when this variable was examined among a sample in another country. Furthermore, no significant differences were found in age and its impact on foreign tourist views on green product buying behaviors or energy efficient appliance consumption (Canöz, 2022; Nguyen et al., 2019).

**Marital Status**

The impact of marital status on environmentally friendly behaviors seems to vary depending on the specific behavior in the more recent literature. For example, it has been shown that single consumers prefer environmental products more than their married counterparts when traveling internationally, more likely to act upon their intention to purchase eco-friendly grocery packaging, and eat more vegetarian meals (Canöz, 2022; Chan et al., 2017; Oliver et al., 2022). Conversely, married consumers are more likely to pay more for environmentally friendly products (Laroche et al., 2001).

**Education Level**

The majority of more recent studies demonstrate a positive significant relationship between education level and environmentally friendly behavior. More generally, findings show that more educated consumers tend to practice ecologically conscious consumer behavior and display sustainable consumption attitudes (Nguyen et al., 2019; Roberts, 1996). More specifically, those with more education are more likely to buy green personal care products including unbleached paper products, recycled notepaper and toilet paper as well as bring their own eating utensils when dining out (Chan et al., 2017; Chan, 1996; In & Ahmad, 2018). And while no recent studies demonstrate a significant negative relationship between education level and environmentally friendly behavior, Canöz (2022) discovers no significant results regarding education differences in tourist green product buying behavior while Shahsavari et al. (2020) find that education level is not a strong predictor for willingness to pay more for environmentally friendly furniture.

**Children**

The majority of more recent findings demonstrate that households with children are more likely to exhibit environmentally friendly behaviors. This includes the intention to purchase green personal care products and energy efficient appliances and the willingness to pay more for environmentally friendly products including eco-labeled apples (In & Ahmad, 2018; Laroche et al., 2001; Loureiro et al., 2002; Nguyen et al., 2019). However, it has been shown that married consumers without children are willing to pay more for environmentally friendly furniture (Shahsavari et al., 2020).

### **Income Level**

For the most part, higher income consumers are more inclined to demonstrate environmentally friendly behaviors in the more recent literature. These environmentally friendly behaviors are diverse and include purchasing green personal care products, purchasing green products while traveling internationally, buying more organic food, searching for more green-product-related information, willingness to pay more for green products, and purchase energy efficient appliances (Canöz, 2022; Chan et al., 2017; In & Ahmad, 2018; Ling-Yee, 1997; Meyer & Liebe, 2010; Nguyen et al., 2019). There is one study found where environmentally conscious consumer behavior and income are negatively related and one study where this relationship is insignificant (Roberts, 1996; Straughan & Roberts, 1999).

### **Housing Tenure**

There is a lack of existing literature on housing tenure and its impact on environmentally friendly behavior. The existing literature that does examine this relationship finds conflicting results or insignificant results. Chan et al. (2017) find that consumers living in private permanent housing were likely to use more air conditioning but also more likely to separate household waste. Shahsavari et al. (2020) determine that flat ownership is not a strong predictor for willingness to pay more for eco-furniture.

### **Demographics and Environmentally Friendly Behavior Specific to Housing**

The theme of variability between demographic characteristics and their impact on environmentally friendly behavior continues when examining the limited research on ecologically sustainable housing. Multiple studies demonstrate significant and nonsignificant relationships as well as positive and negative correlations between consumer willingness to pay for green buildings and various demographic characteristics (Lawluy et al., 2022; Li et al., 2018; Myeda et al., 2016). While Li et al. (2018) find female residents more willing to pay for green housing, Lawluy et al. (2022) and Myeda et al. (2016) find no significant differences between genders regarding willingness to pay for green housing. Li et al. (2018) show that middle income, not high income consumers have the highest willingness to pay for green housing while Myeda et al. (2016) show a positive relationship between income level and willingness to pay. Lawluy et al. (2022) find that consumers holding a Ph.D. are willing to pay a higher premium for green housing than consumers holding a master's degree. Myeda et al. (2016) find no relationship between willingness to pay for green housing and educational background. Both Lawluy et al. (2022) and Myeda et al. (2016) find no significant relationship between age and willingness to pay for green housing. Furthermore, two studies find no significant correlations between any of their tested social demographic characteristics and consumer intention to choose a green home (Rafiq Ali & Abdille, 2021; Rosner et al., 2022).

The existing literature on demographics and green building choice are within the geographies of Ghana, China, Malaysia, Norway, and Israel. This study adds to the literature by looking at demographic impacts on green housing consideration within the United States. Specifically, this study examines if residents found ecologically sustainability important when moving to a small urban downtown area and any demographic factors that influence this importance.

## **Data and Methods**

Data were obtained through administration of a web survey to downtown Roanoke, VA residents. The City of Roanoke is a tertiary city in southwest Virginia with a small downtown urban area. The survey was inputted into the Qualtrics web software and postcard mailings were sent to the 1,597 identified downtown Roanoke households as provided by the City of Roanoke. Specifically, three postcard mailings were completed starting with a primer postcard sent prior to the survey as primer postcards have been shown to increase response rates (Edwards et al., 2002). The second and third postcard mailings contained a web survey link and a QR code link to the web survey. The response rate was 127 which represents a response rate of approximately 8 percent. While the response rate may seem somewhat low for this survey, a 2019 City of Roanoke citizen survey was conducted using mail-to-web collection and 62 completed the online survey out of 4,500 postcards that were mailed to city residential addresses representing a response rate of 1.38% (Issues & Answers Network, Inc., 2019).

One question on the survey asked respondents to rank ecologically sustainable housing as a determining factor when deciding to live in downtown Roanoke on a scale from 1 to 5 with 1 being “Not Important At All” and 5 being “Very Important”. All 127 respondents answered this question. The survey instrument also contained items to collect respondent demographic information. The demographic characteristics of interest include gender, ownership of a car, housing tenure, ethnicity, age group, relationship status, education level, employment status, race, income level, and presence of a child in the household. The ownership of a car, housing tenure, ethnicity, employment status, race, and presence of a child in the household could not be examined as the sample size is not large enough for respondents who do not own a car, own their residence, are not Hispanic or Latino, not employed, not white, or have a child in the household. Therefore, the demographic variables examined include gender, age group, relationship status, education level, and income level.

The data were then analyzed similar to other studies examining potential demographic impacts on sustainability behaviors (Li, Long, & Chen, 2018; Nguyen et al., 2019). An independent t-test analysis was deemed appropriate for the binary variables of gender, age group, relationship status, and education level while a one-way ANOVA was deemed appropriate for the 3-level variable of income level (Leech et al., 2014).

## **Results**

The demographic profile of respondents can be found in Table 1. The gender distribution of respondents was approximately equal at around 50% while there were more younger respondents at 62.8% versus respondents 35 or older at 37.2%. Approximately 70% of respondents were single and held a bachelor’s degree or lower. Only 22% of respondents were in the lower income category.

Table 1 Demographic profile of respondents

Variable	Scale	Frequency	Percentage
Gender	Male	64	50.4%
	Female	63	49.6%
Age Group	Younger (18-34)	76	62.8%
	Older (35-65+)	45	37.2%
Relationship Status	Single	88	69.3%
	Not Single	39	30.7%
Education Level	Bachelor's Degree or Lower	87	68.5%
	Master's Degree or Higher	40	31.5%
Income Level	Lower Income (<\$20,000-\$39,999)	28	22.0%
	Middle Income (\$40,000-\$59,999)	44	34.6%
	Higher Income (\$60,000-\$150,000+)	55	43.3%

The largest proportion of respondents (39.4%) found ecologically sustainable housing an important determining factor when deciding to live in downtown Roanoke while the second largest proportion of respondents (31.5%) were neutral on this topic. Out of 127 respondents, 52.8% found ecologically sustainable housing as an either important or very important determining factor when deciding to move to downtown Roanoke while 15.8% found it either somewhat unimportant or unimportant. These findings are presented in Figure 1. Table 2 illustrates the mean score and standard deviation of the survey item regarding ecologically sustainable housing as a determining factor when deciding to live in downtown Roanoke.

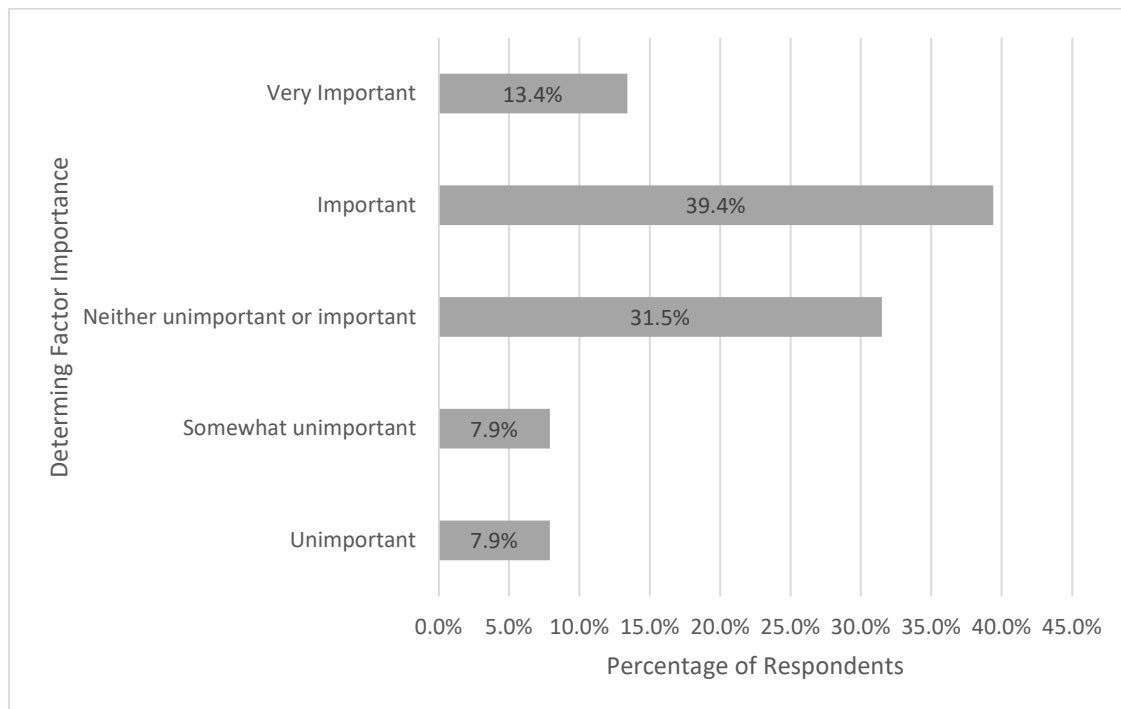


Figure 1 Ecologically sustainable housing as a determining factor when deciding to live in downtown Roanoke

Table 2 Ecologically sustainable housing as a determining factor when deciding to live in downtown Roanoke mean score, standard deviation

Item	N	Minimum	Maximum	Mean	Std. Deviation
Ecologically sustainable housing	127	1	5	3.43	1.073

An independent samples t-test was performed to evaluate whether there was a difference between ecologically sustainable housing as a determining factor when deciding to live in downtown Roanoke and gender. Levene's test was non-significant so equal variances were assumed. The results are presented in Table 3 below. The results indicated that males find ecologically sustainable housing significantly less important ( $p < .01$ ) as a determining factor when deciding to live in downtown Roanoke than females.

Table 3 Effect of gender on ecologically sustainable housing as a determining factor when deciding to live in downtown Roanoke (independent sample t-test, equal variance assumed—Levene's test)

Gender	n	Mean	Std. Deviation	t	p
Male	64	3.16	1.144	-2.932	0.004
Female	63	3.70	0.927		

An independent samples t-test was performed to evaluate whether there was a difference between ecologically sustainable housing as a determining factor when deciding to live in downtown Roanoke and age. Levene's test was non-significant so equal variances were assumed. The results are presented in Table 4 below. The results indicated that there is no significant difference between age and ecologically sustainable housing as a determining factor when deciding to live in downtown Roanoke.

Table 4 Effect of age on ecologically sustainable housing as a determining factor when deciding to live in downtown Roanoke (independent sample t-test, equal variance assumed—Levene's test)

Age	n	Mean	Std. Deviation	t	p
Younger (18-34)	76	3.37	1.044	-0.606	0.546
Older (35-65+)	45	3.49	1.079		

An independent samples t-test was performed to evaluate whether there was a difference between ecologically sustainable housing as a determining factor when deciding to live in downtown Roanoke and relationship status. Levene's test was significant so Welch's t-test was used. The results are presented in Table 5 below. The results indicated that there is no significant difference between relationship status and ecologically sustainable housing as a determining factor when deciding to live in downtown Roanoke.

Table 5 Effect of relationship status on ecologically sustainable housing as a determining factor when deciding to live in downtown Roanoke (independent sample t-test, equal variance not assumed—Welch's test)

Relationship Status	n	Mean	Std. Deviation	t	p
Single	88	3.40	0.989	-0.394	0.695
Not Single	39	3.49	1.254		

An independent samples t-test was performed to evaluate whether there was a difference between ecologically sustainable housing as a determining factor when deciding to live in downtown Roanoke and education level. Levene's test was non-significant so equal variances were assumed. The results are presented in Table 6 below. The results indicated that there is no significant difference between education level and ecologically sustainable housing as a determining factor when deciding to live in downtown Roanoke.

Table 6 Effect of education level on ecologically sustainable housing as a determining factor when deciding to live in downtown Roanoke (independent sample t-test, equal variance assumed—Levene's test)

Education Level	n	Mean	Std. Deviation	t	p
Bachelor's Degree or Lower	87	3.43	1.041	0.001	0.999
Master's Degree or Higher	40	3.43	1.152		

A one way ANOVA was performed to evaluate the relationship between income level and ecologically sustainable housing as a determining factor when deciding to live in downtown Roanoke. The means and standard deviations are presented in Table 7 below. The ANOVA was not significant at the .05 level,  $F(2, 124) = 126$ ,  $p = .647$ . Therefore, there is no significant difference between income level and ecologically sustainable housing as a determining factor when deciding to live in downtown Roanoke.

Table 7 Effect of income level on ecologically sustainable housing as a determining factor when deciding to live in downtown Roanoke (ANOVA)

Income Level	n	Mean	Std. Deviation
Lower Income (<\$20,000-\$39,999)	28	3.39	1.227
Middle Income (\$40,000-\$59,999)	44	3.55	1.044
Higher Income (\$60,000-\$150,000+)	55	3.35	1.022

## Discussion

This research has investigated the differences between various demographic characteristics and their effects on the importance of ecologically sustainable housing as a determining factor when deciding to live in a small downtown urban area. While the majority of survey respondents believe ecologically sustainable housing is an important determining factor when deciding to live in downtown Roanoke, the only demographic characteristic which produced a significant difference in the dependent variable was gender. This study suggests that females find ecologically sustainable housing more important than males as a determining factor when deciding to live in downtown Roanoke. This is in line with the majority of existing literature showing a positive significant relationship between environmentally friendly behaviors and gender (Chan et al., 2017; Furlow & Knott, 2009; In & Ahmad, 2018; Laroche et al., 2001; Li, Long, and Chen, 2018; Loureiro et al., 2002; Roberts, 1996; Straughan & Roberts, 1999).



There was no significant difference demonstrated in the age, relationship status, education level, and income level demographic characteristics. The insignificance of age is contrary to the majority of findings demonstrating that older people are more inclined to exhibit environmentally friendly behaviors (Chan et al., 2017; In & Ahmad, 2018; Roberts, 1996; Shamsavar et al., 2020; Straughan & Roberts, 1999). The study results on relationship status insignificance are also contrary to the existing findings that show significance between relationship status and environmentally friendly behavior (Canöz, 2022; Chan et al., 2017; Laroche et al., 2001; Oliver et al., 2022). The lack of significance between education level and the importance of ecologically sustainable housing is contrary to the majority of literature showing a positive significant relationship regarding education level (Chan et al., 2017; Chan, 1996; In & Ahmad, 2018; Nguyen et al., 2019; Roberts, 1996). The current insignificant results of income level within this study are also contrary to the majority of literature that demonstrates higher income consumers are more inclined to demonstrate environmentally friendly behaviors (Canöz, 2022; Chan et al., 2017; In & Ahmad, 2018; Ling-Yee, 1997; Meyer & Liebe, 2010; Myeda et al., 2016; Nguyen et al., 2019).

While only the gender demographic of the current study at hand seems in line with the findings of the majority of existing studies, these current study results are somewhat in line with findings on demographics and environmentally friendly behavior specific to housing. Myeda et al. (2016) find no relationship between willingness to pay for green housing and educational background and both Lawluy et al. (2022) and Myeda et al. (2016) find no significant relationship between age and willingness to pay for green housing. Furthermore, two prior studies found no significant correlations between any of their tested social demographic characteristics and consumer intention to choose a green home (Rafiq Ali & Abdille, 2021; Rosner et al., 2022).

## Conclusion

This study adds to the literature by examining the level of interest in ecologically sustainable housing as well as demographic impacts on green housing consideration within the United States. Specifically, this study examines if residents find ecologically sustainability important when moving to a small urban downtown area and any demographic factors that influence this importance. While the majority of respondents find ecologically sustainable housing as an important determining factor when deciding to live in a small downtown urban area, the majority of demographic characteristics are not significant. The theme of variability between demographic characteristics and their impact on environmentally friendly behavior specific to housing continues with this current study as gender was the only significant demographic characteristic.

A limitation of this study is that there were voluntary study participants sharing their sentiment on housing choice and the importance of ecological sustainability as a determining factor when deciding to live in a small downtown urban area. Another limitation is that consumer sentiment on housing choice and the importance of ecological sustainability can change over a relatively short period of time in response to social, economic, and environmental forces rendering the results of this study obsolete. Additionally, these findings are not generalizable as respondents only include residents from one small downtown urban area.

However, it would be interesting to compare the current study results to a future study conducted on the importance of ecologically sustainable housing as a determining factor in housing choice in another small urban downtown area and demographics. This can help inform future policy in downtown tertiary cities. Future research examining the potential impact of the consumer belief that they can help solve environmental problems on ecologically sustainable housing considerations will be helpful as this belief has been shown to be a predictor on environmentally conscious consumer behavior (Roberts, 1996).


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## Biography

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