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Emily Elizabeth Isaac April 12, 2022

On the fence: role of the attitude-behavior gap in residential yard management

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Abstract

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By Emily Isaac

Residential yards comprise a significant portion of urban and suburban green space, yet they are largely ignored as spaces for conservation. Although ecological awareness in the US is gradually increasing, cultural norms and neighborhood expectations still dominate front-yard landscapes. Previous research has examined the influence of environmental values on consumer behaviors, but rarely has this approach been applied to landscaping choices. Through an online survey of homeowners in two neighborhoods in the Atlanta suburbs, the relationship between environmental views and front-yard landscaping and management choices is examined. Residents were also asked to identify any dissonance between their current and ideal yards and explain any barriers to implementation. Key informant interviews with landscaping companies and other stakeholders in the area were also used to supplement and contextualize survey responses. Environmental attitudes of respondents were not associated with a specific type of yard or management behaviors. However, aesthetic preference for lawns was indicative of an attitude-behavior gap. Respondents across the board indicated the desire to implement native yards, although structural barriers remain difficult to overcome.

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1. Introduction

The lawn has been an almost ubiquitous staple of American suburbia since the early 20th century. These monocultures of turfgrass were imported from Europe as symbols of prosperity, but eventually expanded to middle-class Americans via golf courses and public parks (Jenkins, 1994). It is estimated that lawns cover about 2% of the continental US, making them the largest irrigated crop in the country (Milesi et. al, 2005). While some research shows potential for turfgrass to sequester carbon dioxide, sequestration potential varies heavily based on management practices, and emissions from mowing can counteract sequestration potential (Allaire et al., 2008). Maintaining turfgrass monocultures requires large amounts of water, fertilizer, chemicals, and machinery, all of which have well-documented environmental impacts (Bormann et. al, 2001; Robbins, 2007). Even in areas which rarely suffer from drought, rainfall is inconsistent throughout the seasons, leading to frequent irrigation of lawns (Wherley et al., 2015). In addition to lawns, habitat fragmentation and the popularity of non-native ornamental plant species in residential yards have contributed to the decline of pollinators and other beneficial wildlife (Burr et. al, 2018). In the 1970s and 1980s, a movement for alternative lawns began, along with the rise of organic food and environmentalism (Teyssot, 1999). However, these movements were largely relegated to the fringes of society and not widely adopted. Recent trends suggest that homeowners are choosing native plants, natural landscaping, and low-impact management practices at increasing rates (Larson et. al, 2009; Lawn and Landscape, 2015; Eisenhower et. al, 2015). Native plants have been shown to significantly increase insect and bird biodiversity in suburban areas, as well as increasing abundance of vulnerable species (Burghardt et. al, 2009). However, there are still significant barriers that prevent widespread adoption of eco-conscious yards.

A variety of studies have explored different factors that influence landscaping choices at different scales (Nassauer et. al, 2009; Larson et. al, 2010). Cost, time constraints, health concerns, and aesthetic preference have all been identified as being important to people when making decisions about landscaping (Templeton et. al, 1999; Carrico et. al, 2012). Social pressures to keep yards "well kept" are also significant, and neighborhood norms are perhaps the best indicator of landscaping choices (Nassauer et. al, 2009). According to a meta-analysis of 84 studies on human drivers of landscaping decisions, 74% of studies focused on behavior at the household level (Cook et. al, 2012). It posits that resident's values and attitudes can have limited influence on landscaping practices, due to the constraints of institutional and structural forces, such as zoning and local governance. A few studies have documented the disconnect between homeowners' landscape preferences and actualized landscape decisions, especially as it pertains to the difference between front and back yards (Larsen and Harlan, 2006; Hurd, 2006). However, there has been little exploration of the gap between homeowners' aspirational versus actual front yards. This is important to consider as residents who may wish to implement eco-conscious landscaping choices, but have not, are a vital target group for initiatives.

In this paper, I investigate the disconnect between the environmental views of homeowners in Decatur, Georgia, especially as it pertains to yard choices and care, and their actualized landscaping decisions. Wheeler et. al explored a similar concept in their 2020 study, but the vastly different climate and culture of desert cities makes it difficult to extrapolate results to mesic areas. I explore the relationship between environmental attitudes and residents' ideal

yards, as well as any barriers that prevent them from implementing them. The Theory of Planned Behavior (TPB) will provide a framework within which I can interpret the reasoning behind this phenomenon. The TPB states that the intention predicting one's behavior is a function of attitudes, subjective norms, and perceived behavioral controls (Fishbein and Ajzen 2011; 2015). These elements then lead to the behavioral intention, which is an accurate predictor of carrying out a behavior. The TPB is an extension of the Theory of Reasoned Action (TRA), which suggests that the main determinant of volitional behavior is one's intention, or motivation, to engage in that behavior. (Ajzen and Fishbein, 1975). The TPB, however, aims to predict non-volitional behavior by incorporating the concept of one's perception of control over performing a behavior. The TPB has been used in a number of studies examining determinants of pro-environmental behavior (Staats, 2003), but these studies have focused primarily on individual behaviors such as green consumerism, travel choices, and water conservation.

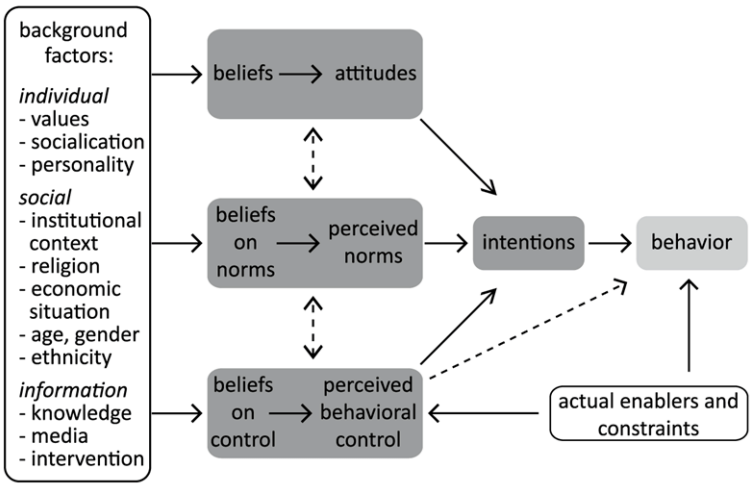

Fig. 1 Diagram of elements of the Theory of Planned Behavior, taken from Krapf, (2014).

The discontinuity between environmental knowledge, beliefs, and action, or the "attitude-behavior" gap, is a similarly under-explored phenomenon as it pertains to landscaping choices. This dissonance has also been well documented as it pertains to other environmental decision-making processes, such as consumer choices and travel behavior (Juvan & Dolnicar, 2014; Terlau & Hirsch, 2015; Kollmuss et al, 2002). In general, research concludes that general attitudes are not a good predictor of specific behaviors (Ajzen, & Fishbein, 2005). However, this model does not fully take into consideration the role of moral considerations, or personal norms, which are defined as self-expectations based on internalized values (Schwartz, 1977). Various studies have linked pro-environmental behavior to personal norms (Stern and Dietz, 1994; Thøgersen, 1996), and thus an individual's perception of responsibility towards the environment may be a factor influencing the gap between attitudes and behavior.

I will also be looking at the internal environmental locus of control (I-ELOC) as a potential factor in the attitude-behavior gap of homeowners, as it has been shown in consumer research to be a determinant of environmentally conscious behavior (Cleveland et. al, 2005). This concept

encapsulates the differing perceptions that people have about being able to exert control or enact change upon environmental issues, and if they believe their individual actions make a difference. The ELOC is an extension of the perceived behavioral control aspect of the TPB, but addresses the unique relationship that individuals have with their own effect on large-scale environmental crises, and the struggle between personal and institutional responsibility. I hypothesize that the ELOC will be a mediating factor in the presence of an attitude-behavior gap, based on research that suggests that loci of control moderate the link between people's values and their actions (Engqvist Jonsson et al., 2014).

This research is important to help further understand what gaps exist between people's attitudes and their behaviors, and why these gaps occur. If homeowners have predictive environmental values and subjective norms, and no significant material barriers, yet still do not exhibit eco-conscious behavior, it is vital to understand what other mechanisms are at play. The sample size of this project will not be significant enough to confidently extrapolate information to the entirety of Decatur, however I believe it will help determine the scope of the issue and provide some narrative insight. Thus, rather than testing hypotheses with traditional statistical analysis, I provide a visual and descriptive analysis of the data. This information may be used to guide future research and has implications for policy and educational campaigns that seek to engage homeowners in environmentally friendly yard practices. In addition, very little research on social drivers of landscaping practices has been done in the south, with the majority of research focusing on xeric areas in the arid southwestern US. This is especially pertinent given that southeastern lawns demand high amounts of water usage, and domestic water use in the Atlanta metro area increased by approximately 27 million gallons per day between 1985 and 2015 (USGS, 2015).

2. Methods

An online survey of homeowners in two neighborhoods in Decatur, Georgia was conducted in the fall of 2021. Neighborhoods were chosen based on socio-economic status and neighborhood governance, as well as proximity. Due to limited resources, I selected areas that were an accessible distance from me, where I could reasonably distribute flyers by myself. While it has been demonstrated in the literature that socio-economic factors and neighborhood norms are influential factors in driving individual decision making (Cook et al, 2012), I aimed to target upper-middle class homeowners, as they often have the ability to make a larger impact due to owning larger parcels of land, and wealth has been shown to be positively correlated with intensive yard practices (Robbins et al. 2001). I also wanted to tease out potential barriers to implementation of environmentally conscious yards for those who are relatively financially comfortable. I target homeowners specifically, as renters are often bound by agreements with their landlords that make changing their landscaping difficult. Lastly, I wanted to see if the existence of formal neighborhood governance in the form of a homeowner's association (HOA) made a difference in responses, so I chose one neighborhood with formal governance and one without.

The survey was administered via Qualtrics and took less than five minutes to complete, in order to maximize the response rate. The survey was distributed through neighborhood listservs, Facebook pages, and by posting flyers with a link and QR code directly in people's mailboxes.

Approximately 100 flyers were distributed per neighborhood, and target response rate was approximately 20 responses per neighborhood, for a total of 40 responses. A relatively low response rate was anticipated, around 20 percent, and thus I aimed to distribute the survey information on as many platforms as possible.

In creating the survey questions, I aimed to target all areas of the TPB (Table 1). The first section included demographic questions to determine how the sample population compares to that of the target population. Then, questions about current yard management techniques were asked, and participants chose between four images which best represented their current yard (Fig. 1). Next, they were asked to choose their ideal yard from the same four images, and about what barriers prevent them from implementing their ideal yards. Finally, they were asked to respond to attitude statements on a Likert scale (1- strongly agree, 5- strongly disagree). Table 1 indicates where survey questions fit in the TPB framework.

Table 1. List of survey statements that participants were asked to rank on a Likert scale (1- strongly agree, 5- strongly disagree) according to the aspects of the TPB they address.

Subjective Norms	Attitudes	Perceived Behavioral Control
I feel pressure from my neighbors to keep my yard a certain way.	A well-mowed lawn is important for a visually pleasing property.	I believe that my individual actions have the power to make a difference in the world.
I believe that my neighbors take the environment into consideration when making decisions about their yards.	I think that my yard is environmentally friendly.	
	I am concerned about the health of my local environment.	
	I believe that urban and suburban areas can contribute to conservation efforts.	
	I believe that loss of habitat and biodiversity is a pressing issue.	
	I believe that climate change is a pressing issue.	

In order to examine management behaviors, participants were asked to select from a list of common yard management techniques that have been shown to have adverse effects on the environment (Table 2). Herbicides, which are used in order to maintain turf grass monocultures, have caused shifts in soil microbiomes, and can leach into waterways, affecting aquatic

ecosystems (Qasem, 2011; Van Bruggen et al., 2018). Pesticides have an even more direct effect on wildlife, killing not only target organisms but other beneficial insects and pollinators (Mahmood et al., 2016). Frequent mowing of turfgrass has a substantial effect on its' carbon footprint, in addition to discouraging growth of plants such as dandelions, which pollinators rely on in the early spring (Simmons et al., 2011). Excessive fertilizer application also contributes to excessive nutrient inputs and eutrophication in marine and freshwater environments (Smith et al., 1999; Toor et al., 2017). Finally, turfgrass requires frequent irrigation in the summer months, sharply increasing urban water consumption (Mayer et al., 1999). Thus, I refer to these management practices as environmentally damaging.

In order to quantify behaviors, I gave each environmentally damaging yard-maintenance behavior provided in the survey one point and then summed the number of behaviors listed by each respondent. This value is an indicator of the how intensive an individual's yard management is. I then assigned a number value to the four different yard types provided in the survey (Fig. 1) according to their environmental impact, with lower numbers indicating yard types with more ecosystem benefits and less intensive management techniques required (Pardee et al. 2014; Watson et al. 2020). The "native yard" received a score of 0, the "low-maintenance yard" and "ornamental yard" received a score of 1, and the "manicured yard" received a score of 2. I then added these two indexes together to get the total Yard Behavior Score (YBS). Thus, the higher the score, the more damaging the behavior. Rather than keeping maintenance behaviors and yard types separate, the YBS gives a more complete idea of what type of landscape is implemented and how intensively that landscape is managed.

Table 2. List of environmental attitude statements (Likert scale) and yard care behaviors used to make up respective value and behavior scores.

Environmental attitude statements (Environmental Attitude Score)	**Yard care behaviors (Yard Behavior Score)**
I am concerned about the health of my local environment	Use of pesticides
I believe that urban and suburban areas can contribute to conservation efforts	Use of Herbicides
I believe that loss of habitat and biodiversity is a pressing issue	Frequent lawn mowing (every 1-2 weeks)
I believe that climate change is a pressing issue	Lawn mowing (every month or more)
	Lawn fertilizer
	Frequent lawn irrigation
	Yard Type

Fig. 2 Yard types presented to survey participants. Clockwise from the top left, descriptions read "yard landscaped with native plants and minimal lawn," "minimalistic yard with manicured lawn," "manicured yard with ornamental plants," and "minimalistic yard with low maintenance."

Key informant interviews with landscaping professionals and neighborhood stakeholders were also performed in order to get a more in-depth perspective on neighborhood dynamics and institutional barriers, as well as changes within the landscaping industry and consumer trends. Informants' information was acquired from publicly available websites, and snowball sampling was employed in order to get recommendations for informants from initial contacts. Ultimately, five individuals from landscaping companies and neighborhood governing bodies were interviewed, with each semi-structured interview lasting approximately one hour. Financial compensation was offered to both informants and potential survey participants in order to incentivize participation. Interviewees were asked a range of questions regarding experiences in their respective industries, changes in landscaping practices over time, and what producer-level challenges prevent people from implementing environmentally conscious yards. Interview quotes are used to help contextualize the data.

3. Results

In the following section, I describe the results of the survey in several parts. The first part compares survey results with census demographic data in order to contextualize the sampled communities. The second part describes participants' management activities, as well as what their current and ideal yards look like, and looks at barriers that keep homeowners from achieving their ideal yards. The final section analyzes the relationship between the attitudes and behaviors of participants, and if any common beliefs can explain this disconnect.

3.1 Neighborhood Demographics

I began by comparing respondents in the survey to the neighborhood population as measured in the US Census. The survey collected data from 86 respondents, 60% of whom were from Neighborhood B, 20% from Neighborhood A, and 20% from just outside the official borders of either of these two areas (Table 3). Neighborhood A has more traditional neighborhood governance in the form of an HOA, however this distinction did not have a significant effect on the results between the two neighborhoods. Decatur as a whole is characterized as a liberal area, with 83.1% of the surrounding county voting Democrat in the last election. Demographic results indicate that the sample population is on average whiter, more heavily female, and older than the reported neighborhood populations. As only homeowners and not renters were surveyed, this is likely part of the reason for this skew, with other potential reasons being interest in the survey subject and time needed to complete the survey.

Table 3. Summary of demographic data from the 2019 US Census, as compared to study results.

	Neighborhood A	*Neighborhood B*	*Greater Decatur*	*Study results*
Median household income	$110,000	$82,726	$106,088	--
population (% white)	84%	75%	66%	97%
Median age (years)	48.5	36.6	36.8	50
Length of Ownership (Years)	--	--	--	11
Gender (% F:M)	57:43	53:47	53:47	72:28
Have Children at home (%)	--	22.7%	42.7%	36%
Use landscaping companies	--	--	--	9.6%
Median house price	$371,400	$308,200	$541,800	--

3.2 Current and Ideal Yards

In the figure below, I check my own assumptions about maintenance practices and yard types following similar trends. The distribution of maintenance practices by yard type indicates generally that yard types with lower yard scores are also associated with lower maintenance scores (Fig. 2). In other words, more ecologically conscious yards are also associated with a lower frequency of environmentally damaging maintenance behaviors. This finding supports my decision to combine yard types and maintenance practices into one Yard Behavior Score (YBS), as these scores work together additively to reflect the intensity of yard management, rather than one offsetting the intensity of the other. Although there was not a large difference in YBS between the two neighborhoods, Neighborhood A did have a slightly larger score of 2.7 (Sd = 1.7), compared to Neighborhood B's 1.8 (Sd = 1.6), which suggests that intensive management

practices are more frequent in Neighborhood A. It is possible that this discrepancy is due to higher income availability in Neighborhood A, but there is not enough evidence to conclude this with certainty.

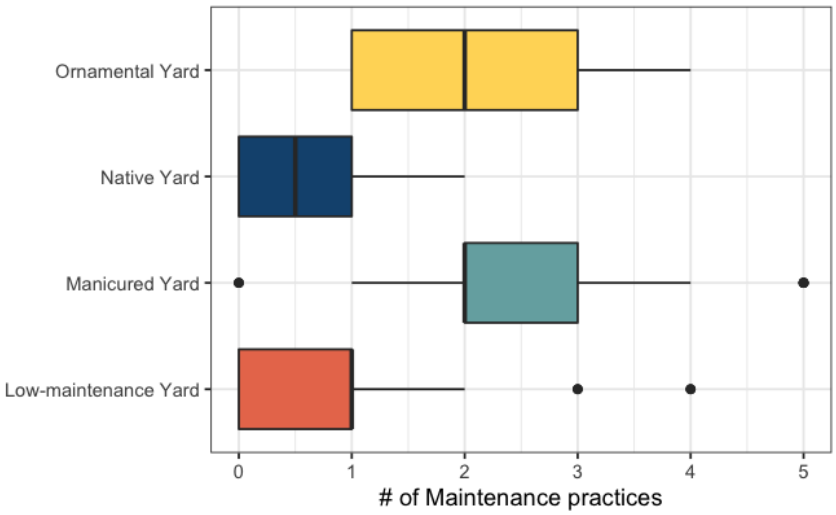

Fig. 3 Number of environmentally damaging maintenance practice plotted by yard type, in order to justify reasoning for combining these elements into the YBS. Lines represent the upper and lower quartile of data, while boxes represent the middle 50%. Dotted points indicate outlier values.

Fig.3 visualizes the intersections of residents' self-identified current yard and the ideal yard they would like to have, given four set yard types (Fig 1). The most commonly cited current yard type amongst respondents, and also the least popular ideal yard type, was the low-maintenance yard. The native yard was the most popular ideal yard option, and this yard type also experienced the highest rate of satisfaction, or the number of respondents with this yard currently who also wish to keep this type of yard. The most frequently cited yard change was from a low-maintenance yard to a native yard (Fig. 1).

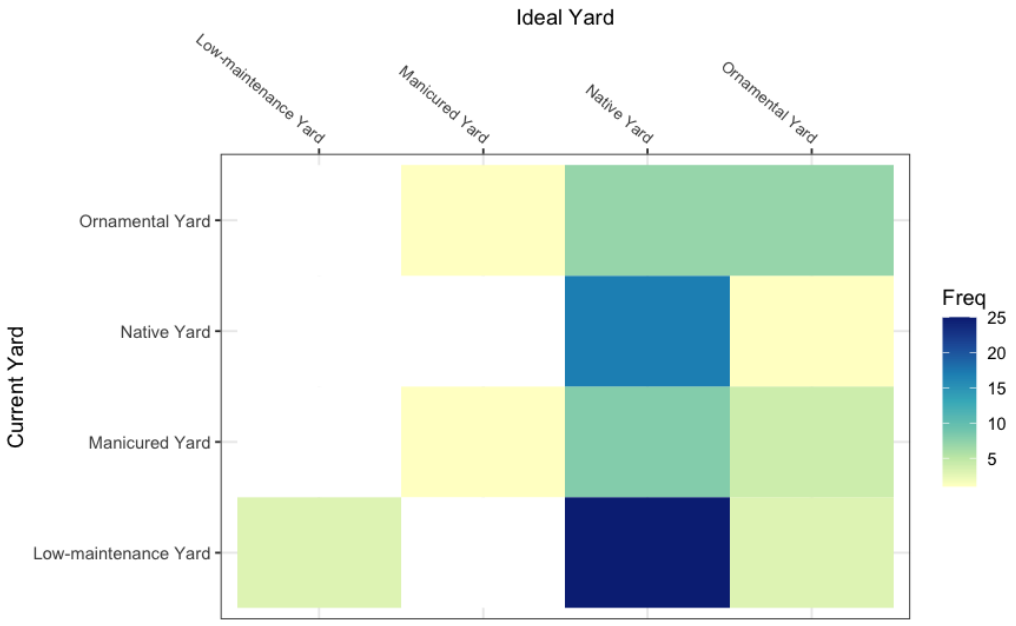

Fig. 4 Current and ideal yards, as chosen from the four options in Fig. 1. White squares indicate no responses.

3.3 Management Behaviors

I then asked respondents to choose from a list of options which factors most influenced their yard care routines. Of all the provided options, personal aesthetic preference was the most cited, followed by cost, time restraints, and concern for the environment (Fig. 4). Factors cited as having the least amount of influence were safety and health concerns, and concern for property value. Creating wildlife habitat and concern for the environment collectively make up 30% of responses, despite the fact that only 24% of respondents identified their current yard as the "native" yard type. This indicates that there may be varying perceptions of what it means to have a yard that is environmentally conscious. "A lot of people that say they want native, say they don't want any chemicals, but they spray their yards from mosquitoes," says one informant. "Or people saying they love butterflies, so they have all these butterfly bushes, and I have to explain to them that they're not a host plant for any butterfly, things like that."

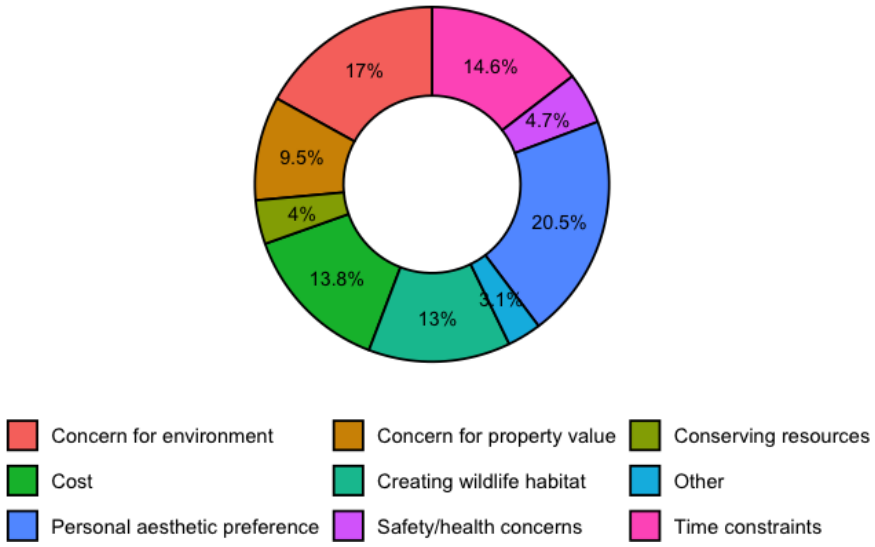

Fig. 5 Response to the question "which of the following factors influence your yard care routine the most?" This question allowed participants to select three options from a list.

Despite the fact that personal aesthetic preference as a primary factor influencing yard care prevails over the cost option (Fig. 4), 33.3% of participants cited cost as being the most important limiting factor that prevents them from making changes to their yards, followed by time constraints (25%) and physical labor (24%) (Fig. 5). This is somewhat contradictory, because if cost was the most important factor overall, we would expect it to be selected as the top choice in both questions. In the "other" category, many cited logistical issues such as sun exposure or issues with drainage in their yards. Most participants also disagreed with the statement "there is nothing I would change about my yard," with an average Likert score of 3.66 (Sd = 1.06).

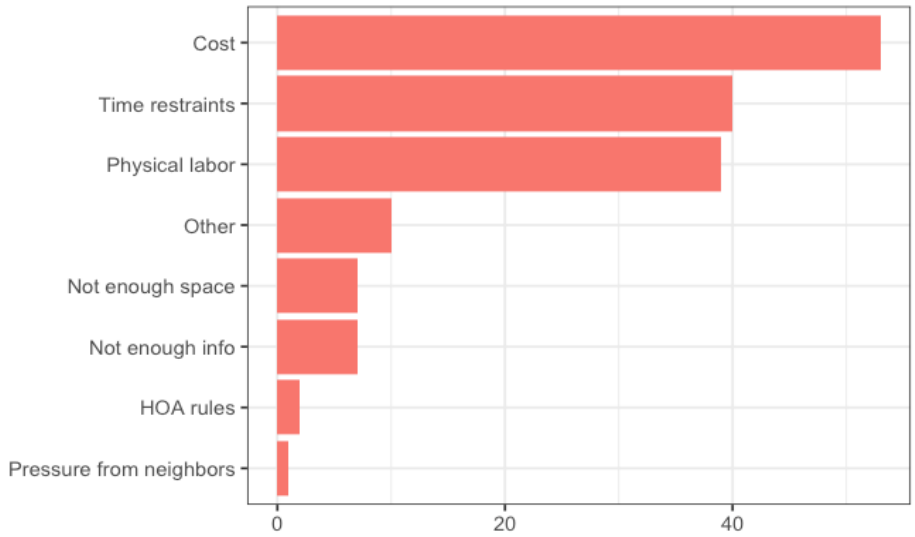

Fig. 6 Survey responses to the question "If you wish to change your yard but haven't, what factors are keeping you from doing so?" X axis indicates count of respondents listing this factor, not percentage.

3.4 Attitudes vs. Behaviors

I made a new index, Environmental Attitude Score (EAS), that tallies up how often people agree or disagree with various attitude statements. Lower scores mean they strongly agree with environmental attitude statements (Table 3), and higher scores mean they strongly disagree with these statements. In other words, individuals with a low EAS report a higher level of concern for environmental issues and attribute high importance to environmental quality. YBS and EAS were then plotted against each other in order to determine the relationship between attitudes and behaviors. **Vertical and horizontal** lines for Fig. 7 and Fig. 8 were determined by calculating the mean YBS and EAS. It is important to note that there are quite a few data points that fall on the boundary between two quadrants, as most of the observations fall within a fairly small range. However, it is important to create these categories in order to quantify differences between those who exhibit an attitude-behavior gap and those who do not. Based on Fig. 7, there is not a strong correlation between YBS and EAS (cor = 0.17). Respondents are mostly distributed evenly amongst the four quadrants, however Q3 has the greatest number of data points. Thus, environmental attitudes are not a strong indicator of environmentally positive nor negative behavior.

When categorized by yard type, the data shows that low-maintenance and native yards are associated with low YBS but cover a range of EAS (Fig. 8). Overall, EAS was not a predictor of respondents' actualized yard type. When categorized by ideal yard type, those who prefer manicured yards fall on the higher end of the EAS spectrum, while native yards are preferred regardless of YBS or EAS (Fig. 8). Thus, desire for manicured yards are associated with less strong environmental views, but preference for native yards is ubiquitous across the scales. Self-identified "ideal" yards come close to being a behavioral intention, with the difference being the external barriers that prevent participants from carrying out this intention.

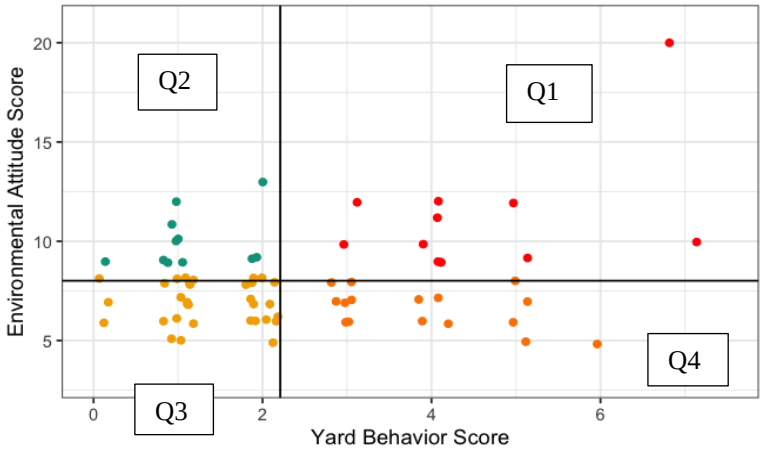

Fig. 7 Environmental Attitude Scores mapped against Yard Behavior Scores (lower number = more pro-environment), with participants split into quadrants based on their relationship to the mean. Points are jittered to avoid overlap.

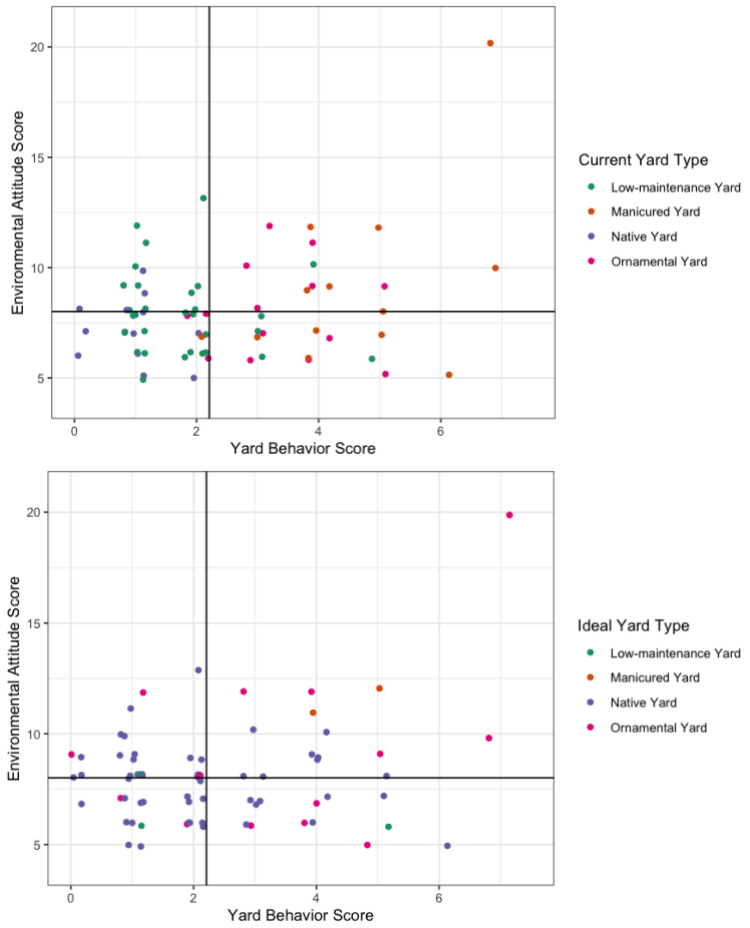

Fig. 8 Same as Fig. 7, except respondents are color coded based on their chosen current yard type (left) and ideal yard type (right).

Next, I compare various attitude statements by quadrant. First, I test my hypothesis about the ELOC with the statement "I believe my individual actions have the power to make a difference in the world." Q2 appeared to agree the least strongly with this statement. People in this quadrant had higher EAS and lower YBS, meaning they exhibited weaker pro-environmental attitudes yet also did not engage in damaging behaviors as often. My target group is those in Q4, who exhibited strong environmental views but also engaged in environmentally damaging behaviors. These people responded to the above statement similarly to those in Q3, who also strongly with the statement "I believe urban and suburban areas can contribute to conservation efforts," with an average Likert score of 1.32. These questions were used to evaluate the persistence of the ELOC, and thus the data suggests that this is not a significant determinant of the attitude-behavior gap.

For the statement "I believe my yard is environmentally friendly," participants in Q1 and Q4 answered similarly. Q1 is comprised of those with high YBS and EAS, while Q4 is those who have low EAS and high YBS. Participants in Q2 and Q3 also answered similarly, while agreeing more strongly with the statement than the other two groups. This indicates that those with low YBS recognize that their yards are low-impact, and suggests a degree of self-awareness amongst those with higher YBS. When asked if they believe their neighbors take the environment into consideration in their yard care, the average Likert score jumped to 2.79, indicating that participants generally see their own yard care behaviors as being more environmentally friendly than that of their neighbors. However, they also did not report feeling pressure from neighbors to keep their yards a certain way, with an average Likert score of 3.55, indicating low levels of agreement with the associated statement.

The respondents in Q2 disagreed the strongest with the statement "A well mowed lawn is important for a visually pleasing property," followed by those in Q3. This is consistent with the fact that these two quadrants are characterized by lower YBS. Respondents in Q4, the target

group, replied similarly to Q1, indicating a similarity in aesthetic preference that may help account for the gap between their pro-environmental views and their high-impact behaviors.

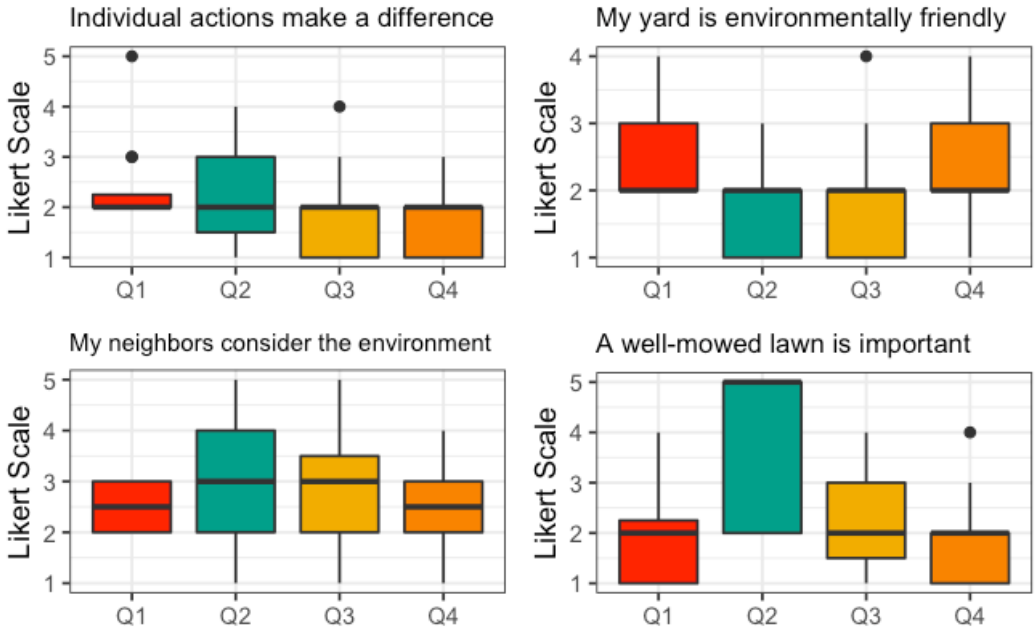

Fig. 9 Response to various belief statements by quadrant, as determined in Fig. 7.

4. Discussion

This research ultimately aimed to understand why neighborhoods populated by homeowners with liberal, pro-environmental views are still to this day dominated by monoculture lawns and exotic ornamental landscaping. Given the importance of the environmental locus of control (ELOC) on consumer behavior, I originally hypothesized that an individual's perceived ability to make a difference and personally contribute to large-scale environmental goals would be a significant factor in determining the presence of an attitude-behavior gap (Yang and Weber, 2019). In many ways yard care relies on consumption, through the purchase of lawn care materials and plants from nurseries. However, respondents displayed similar attitudes about personal impact across the board, regardless of which quadrant they fell in. This indicates that perceived lack of control over environmental issues is not a major factor contributing to this attitude-behavior gap, which refutes my original hypothesis (Fig. 9). This is also backed by the fact that participants generally supported the idea that urban and suburban areas can contribute to conservation efforts, which indicates a level of comprehension of the anthropogenic, built world as being interconnected with the natural world, rather than being separate from it.

Despite the fact that homeowners cite environmental concern as being a top priority, there are still a number of monetary concerns and time restrictions that keep people from implementing their ideal yards (Fig. 6). Native plants are often sold by smaller nurseries and therefore can be expensive, on top of the large volume of knowledge needed to understand how to successfully incorporate them. Seeing as many participants expressed physical labor as being a barrier as well, this may indicate that they feel they would need the services of a landscaping contract

company, whose costs can add up quickly. Gathering the knowledge necessary to incorporate native plants can be time consuming, and the fast pace of American life does not allow adequate time for most people to obtain that knowledge unless it is highly prioritized. These external barriers keep behavioral desires from becoming behavioral intentions, which is an important distinction from the traditional trajectory of the TPB (Conner et al., 1998). Attitudes, subjective norms, and perceived behavioral controls in this case lead to the desire for a certain behavior, but perceptions about the availability of resources prevent this desire from turning into intention.

This research also supports the idea that having pro-environmental beliefs is not always a good predictor of pro-environmental behavior. This supports previous research that shows weak links between general attitudes and behavior (Ajzen, & Fishbein, 2005). EAS was not associated with certain yard types or behaviors, indicating that environmental attitudes were not the main driver of landscaping choices. It is possible that environmental attitudes have a greater effect on behavior when systemic and social barriers are low, as is observed with recycling (Steel, 1996). Unlike other consumer activities, there is not a lot of pre-existing infrastructure for ecological landscaping, and a lot more time, effort, and knowledge is required than one would spend at the grocery store or sorting waste.

The tendency for participants to perceive themselves as taking the environment into consideration more often than their neighbors is consistent with previous research (Peterson et al, 2012). Those who had strong feelings about their own yards as being environmentally friendly also felt the strongest that their neighbors do not take the environment into consideration (Fig. 9). Although most participants did not report feeling strong pressure from neighbors to keep their yard a certain way, the sentiment that one's neighbors don't take the environment into consideration denotes that people wishing to landscape in an ecologically conscious manner will be deviating from the norm. "One thing that shocked me a lot was that my property has a problem with the water, so all the water in the in the street comes straight downstream into my driveway. So my driveway is broken. And I heard several complaints. Why don't you fix your driveway, it looks ugly; people said this on Nextdoor," says one informant.

A different informant says, "One neighbor of our client, we were putting in like a pollinator garden…and this person came over and was like, absolutely not. None of my bushes touch the house. There's nothing planted within two feet of the house, because I don't want any bugs, any critters. It's just a very common thing to happen where people will judge you or shame you for what you're doing in your yard because it's not their style. And then she miscommunicated information, because she didn't have the knowledge."

Since the data indicates that native yards are positively perceived and even desired, it may help homeowners feel less alienated and more emboldened to know that native yards are well received by many of their neighbors. The fact that native yards are preferred by homeowners regardless of EAS or YBS means that even those without strong pro-environmental views are warming up to the idea of landscapes that have ecological benefits, and there is a great opportunity to get a wide variety of people on board.

Although native yards are becoming more aesthetically accepted, homeowners who exhibited an attitude-behavior gap still reported believing that lawns are necessary for an aesthetically

pleasing property at the same rate as homeowners with less strong pro-environmental views. The lawn still remains a cultural fixture in suburban neighborhoods, one that persists regardless of attitudes towards environmental issues. There is ultimately still a tension between what people have been taught to see as a marker of prosperity and aesthetic quality, and the environmental tradeoffs that come with it. “People understand that gas lawnmowers and leaf blowers are contributing to global climate change. They understand the concept of that, but when it comes down to actually what they're practically going to do in their yard, they still expect to see no leaves,” says one informant. Aesthetic perceptions of native plants have been shown in other studies to increase behavioral intention more so than environmental attitudes (Gillis et al. 2020), and results from this study also indicate that aesthetics dominate homeowners’ priorities (Fig. 5). Therefore, the continued promotion of the aesthetics of native plants may be more effective than trying to target individual altruism.

4.1 Limitations and Next Steps

Although the exploratory nature of this study and small sample size make it difficult to extrapolate results to the greater population, initial results have many implications for policy and social campaigns aiming to increase ecologically conscious yards. In general, respondents exhibited pro-environmental views, so results may have been skewed towards homeowners who are already environmentally conscious. Results may have differed if the data was compared with homeowners who exhibit stronger anti-environmental attitudes.

As is mirrored in other studies, efforts should be concentrated at the community or neighborhood level in order to garner a sense of neighborhood support for native yards and environmentally conscious management practices. Efforts must also be made at the producer level, as large box stores have a huge impact on what consumers buy to plant in their yards, and stock of native plants is still scarce. “Even with the interest that there is right now, it can't be met. People aren't producing enough native plants,” says one informant. There are also still structural barriers to landscaping professionals that should be explored. “Part of the Georgia certified landscape professional program is that you have to show them that you know how to use a gas weed eater, and you have to show them that you know how to apply pesticides and herbicides. You have to have been tested on all of these things to get that accreditation.”

Further research is needed to determine the extent to which behavior gaps differ from those observed in consumer habits and should also investigate the extent to which plant and landscaping service availability influences what homeowners implement in their yards. This research supports the theory that environmental attitudes have more of an effect on ideal yards rather than actualized ones (Wheeler et al, 2020), so further research should aim to focus more on structural barriers rather than internal, individualized ones.

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Survey Instrument

Demographic Background

1. Age
2. Race
3. Gender
4. Do you have children living at home?
5. How long have you owned your home?

6. Which neighborhood do you live in?

Current Yard Management

1. Which of the following techniques or products do you use when maintaining your yard? Select all that apply.
    a. Lawn mowing (every 1-2 weeks)
    b. Lawn mowing (every month or more)
    c. Pesticides
    d. herbicides
    e. Lawn Fertilizer
    f. Frequent lawn irrigation
    g. landscape contracting companies

2. Which of the following factors influence your yard care routine the most? (choose 3)
    a. Cost
    b. Time constraints
    c. Concern for the environment
    d. Safety/health concerns
    e. Personal Aesthetic preference
    f. Concern for property value
    g. Conserving resources
    h. Creating wildlife habitat
    i. other

3. Which of the following factors influence your yard care routine the least? (choose 3)
    a. Cost
    b. Time constraints
    c. Concern for the environment
    d. Safety/health concerns
    e. Personal Aesthetic preference
    f. Concern for property value
    g. Maintaining neighborhood aesthetic
    h. Conserving resources
    i. Creating wildlife habitat
    j. other

Aspirational Yard Management

1. please choose the image that best represents your current yard.
    a. Minimalistic yard with manicured lawn
    b. Manicured yard with ornamental plants

    c. Minimalistic yard with low maintenance
    d. Yard with native plants and minimal lawn
2. There is nothing I would change about my yard. (Agree-Disagree)
    a. What would you like to change?
3. If you wish to change your yard but haven't, what factors are keeping you from doing so?
    a. Cost
    b. Time constraints
    c. Physical labor
    d. Not enough information
    e. Pressure from neighbors
    f. Not enough space
    g. HOA rules
    h. other

Participants see the same pictures as before and are asked to choose their ideal yard.

Attitudes

To what degree do you align with the following statement (1-strongly agree, 5-strongly disagree)

4. I feel pressure from my neighbors to keep my yard a certain way.
5. A well-mowed lawn is important for a visually pleasing property.
6. I think that my yard is environmentally friendly.
7. I believe that my neighbors take the environment into consideration when making decisions about their yards.
8. I am concerned about the health of my local environment.
9. I believe that urban and suburban areas can contribute to conservation efforts.
10. I believe that my individual actions have the power to make a difference in the world.
11. I believe that loss of habitat and biodiversity is a pressing issue.
12. I believe that climate change is a pressing issue.