

A CASE STUDY OF GREENTOGO IN DURHAM, NORTH CAROLINA

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## **Executive Summary**

Worldwide global plastic production grew more than 600% between 1976 and 2017 (“Global Plastic Production,” 2017). The annual worldwide production of polystyrene (styrofoam) has now reached 44 million metric tons, 40% of which is associated with food services (Chandra et al., 2016). The throwaway culture associated with this level of production comes with countless environmental, economic, and health effects. The GreenToGo program in Durham, North Carolina offers a trash-reducing grassroots solution to one component of single-use styrofoam consumption (“GreenToGo: How It Works,” 2018). The goal of the initiative is to provide the shared customers of GreenToGo and local Durham restaurants with an environmentally-conscious option for carryout food containers.

Since the program’s inception in 2017, reusable carryout containers have been used as a substitute for more than 2,000 single-use disposable to-go boxes that would otherwise have ended up in landfills. After PBS NewsHour featured an episode on GreenToGo last year, the GreenToGo team received widespread and international interest from communities looking to adopt similar initiatives (Carey, 2018).

This report highlights our efforts to identify and address the barriers to implementing GreenToGo reusable to-go containers for both businesses and consumers. We conducted research on consumer behavior and attitudes around green products, interviewed restaurant owners and managers, and surveyed customers to provide insight on opinions and perspectives of the GreenToGo program. Strategy summaries detailed important aspects of the program framework for scaling up the business plan to other community types. The development of program recommendations can be used to support the long-term sustainability of the Durham-based initiative along with its implementation in other locations.

Survey data collected from 133 Durham residents showed consumer habits and opinions regarding the GreenToGo program and single-use plastics. Through survey data collection, we found that Durham residents wished that the GreenToGo service were offered at more restaurants, that participating restaurant staff were more educated about the program, and that the program provided greater variety in box size and shape. Seventy percent of respondents reported that they would visit a restaurant more often if it used waste-reducing products. We concluded that subscription price may be a factor for individuals who do not already subscribe to the

GreenToGo program. Interviews conducted with businesses participating in the GreenToGo program showed that restaurant owners and managers were satisfied with the initiative but frustrated with the perceived lack of customer interest in the program. Interviewees seemed relatively hopeful of expansion and provided recommendations for future marketing strategies to more efficiently target a broader audience. The use of a Threats, Opportunities, Weaknesses and Strengths Analysis (TOWS) to map the potential of expanding the GreenToGo program to four example locations (Northampton, MA; Austin, TX; San Francisco Bay Area, CA; and San Diego, CA) provides useful options for future expansion for our client.

Our suggestions for successful continuation of the program in Durham and its implementation elsewhere can be used to more efficiently reduce single-use plastic consumption within the food industry. We suggest that GreenToGo continue to improve its business model by addressing subscribers' and business owners' concerns about the program. We also recommend that they focus future expansion around areas experiencing population growth like Downtown Durham and East Durham to reach a larger population of potential subscribers. To continue to improve the program and collect more information about GreenToGo subscribers, future studies should provide other language options (e.g. Spanish) for customer surveys to reach a larger demographic, offer the survey for a longer period of time, and conduct interviews with previous subscribers to find out why they no longer subscribe.

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## **INTRODUCTION**

Single-use and disposable plastics are ubiquitous in daily life, especially in the food industry. Styrofoam containers, plastic packaging, cutlery, straws and to-go lids are the norm in most take-out and many sit-down dining establishments. Plastics are a cheap, versatile, and disposable solution for restaurants, and their widespread use has led to an incredible amount of global plastic pollution. The use of polystyrene (styrofoam) is especially common in the food service sector. Our goal is to tackle this pervasive challenge by working toward the reduction of styrofoam consumption in local restaurants. Our client is the Durham, North Carolina environmental non-profit [Don't Waste Durham](#), which founded and manages the [Durham GreenToGo program](#) (referred to as GTG throughout this paper) (“Don't Waste Durham: Home,” 2018).

Our Master's Project is a case study of GTG in Durham, North Carolina (“GreenToGo: How It Works,” 2018). The GTG program is leading the charge towards a trash-free Durham. GTG encourages citizens to join the “reuse revolution,” by using reusable carry-out containers instead of polystyrene to-go boxes (GreenToGo Team, 2018). Our client believes a deeper understanding of how both consumers and food providers perceive and use the GTG program will provide a better idea of how to effectively implement the program framework and business plan in other communities. Our Master's Project includes a literature review of consumer behavior and preferences around environmental products, findings from interviews conducted with GTG restaurant owners/managers, findings from restaurant customer surveys, and strategy summaries for expansion of GTG into other communities. We assessed consumer-conscious buying, analyzed the barriers to businesses and consumers using GreenToGo, and created implementation plans to help GTG interface with local businesses and consumers to reduce single-use food packaging pollution.

The GTG model has generated a lot of interest in communities outside of Durham, thus presenting an opportunity to assess the potential challenges associated with scaling and expanding the model (Carey, 2018). Crystal Dreisbach, the GTG project leader, plans to share her knowledge and the program framework with other interested communities.

Strategy summaries will recommend best methods for GTG expansion into university campuses, towns, and urban centers. These strategy summaries and our research on consumer behavior will be especially helpful in ensuring successful wide-scale adoption of the program.

We will use our findings to examine which elements of the GTG program are scalable and useful in other communities, as well as what aspects of societal change need to occur for customers to use the program. As business models similar to GreenToGo are implemented across the world, their impacts on global plastic pollution will multiply.

## **BACKGROUND**

### **Plastic Consumption**

Styrofoam products account for 0.25% of US landfill weight but approximately 30% of landfill volume (Kremer, 2003). Since its local landfill shut down in the 1990's, Durham County has been transporting waste two hours away to the Sampson County Landfill (Berendt, 2016). The GreenToGo program predicts that reducing the number of trash trucks driving to Sampson County and back each day by just one truck would save 10,000 gallons of fuel annually (GreenToGo Team, 2018). Each month, almost one-half ton of Durham's waste comes from restaurants' single-use takeout containers – a staggering statistic the GreenToGo program is trying to tackle (Johnson, 2016). If we assume styrofoam takes up 30% of landfill truck volume as previously mentioned, that styrofoam is taking up space which could otherwise be occupied by different waste products. Because the typical trash truck has an average fuel economy of 1 to 3 miles per gallon, a great deal of gasoline and carbon emissions could be saved from eliminating styrofoam waste (Thiruvengadam et al., 2010).

Global plastic production has been continuously increasing to supply growing demand and dependence on plastic products and packaging (Martin, 2015). In 1976, global plastic production was 50 million metric tons, but 40 years later in 2016, production had increased to 355 million metric tons (Figure 1) (“Global Plastic Production,”2017).

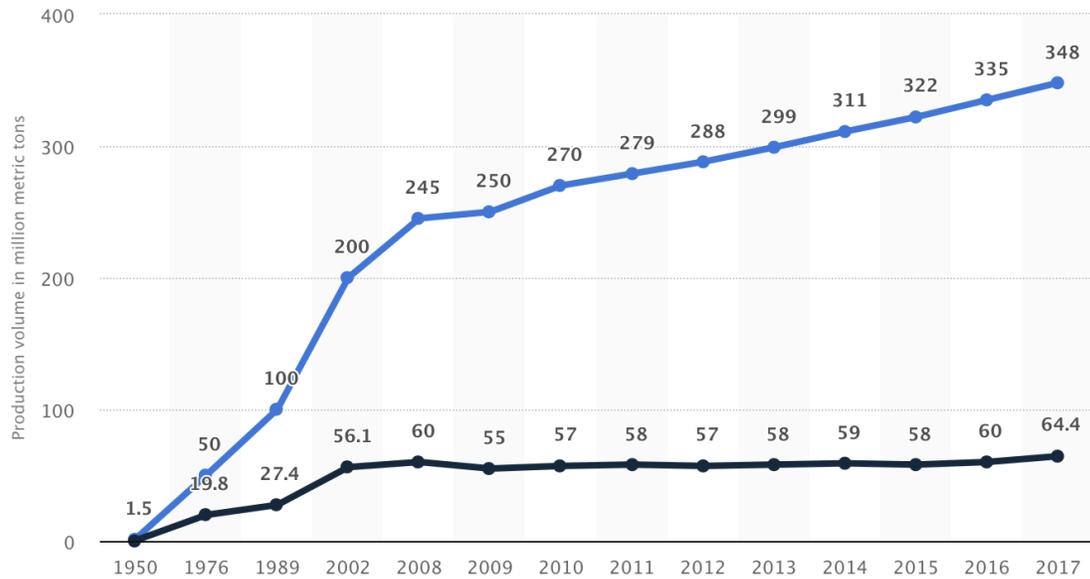


Figure 1. Worldwide plastic production from 1950 to 2017 in million metric tons (world totals in light blue and Europe in navy) ("Global Plastic Production," 2017).

Today, annual worldwide production of polystyrene is 44 million metric tons, 40% of which is associated with food services (Chandra et al., 2016). Plastic offers a healthy, safe, durable, efficient, and cost-effective way of packaging that reduces food waste in many cases (Martin, 2015). Plastic has become a part of our everyday lives. It is now seen as a necessary element in not only food packaging, but in the manufacture of our cookware, homes, clothing, phones, computers, and vehicles. However, the most commonly consumed single-use plastics are found in food packaging, such as bottles and plastic bags (Martin, 2015).

Despite the short timespan over which plastic products and packaging are actually used, the amount of time these products persist in the environment translates to a substantial environmental impact (Nizam et al., 2016). Polystyrene waste can take anywhere from 400 to 1000 years to degrade because it is resistant to photolysis (Asmuni et al., 2014). Single-use plastic contributes to soil, water, and air pollution (Asmuni et al., 2014). According to the EPA, of the 3 million tons of polystyrene produced in the US each year, 80% ends up in landfills while the remaining 20% pollutes our nation's waterways (Chandra et al., 2016). Further research shows the negative effects of plastic on the health of marine mammals and fish, while human health impacts to the respiratory, nervous, and reproductive systems have also been found ("Single-Use Plastics," 2018).

Because of the complexities associated with plastic usage, various plastic-reduction programs focus on reducing waste at the start of the cycle. Those at GreenToGo believe the best option we have at reducing plastic waste is to minimize the use of single-use plastics on the consumer level in day to day life (Martin, 2015). One target of these campaigns is to harness the power of consumers themselves, who have influence over businesses and governments from a bottom-up approach (“Single- Use Plastics,” 2018). Companies from the private sector have been encouraged to participate by offering environmentally conscious alternatives and rewarding greener behavior, but a lack of incentives and push from their consumer base has limited widespread progress (Martin, 2015).

### **Plastic: A Wicked Problem**

If the federal government continues to avoid restrictions on single-use plastic, some believe the next- best solution includes reducing the amount of plastic consumed (Ocean Portal Team, 2018). While businesses can argue they are just providing the public with what they want, consumer demand can shift company behavior toward environmental responsibility (Ylitalo & Gerdin, 2009). According to one member of the plastic industry, manufacturers feel stuck because consumers rely on plastic products throughout their everyday lives but have also grown to “resent” some of the products produced (Microdyne Plastics, 2018).

Even if consumers are educated and concerned about plastic waste, the issue is complicated further by assessing the tradeoffs between plastic, paper, and other alternatives (Microdyne Plastics, 2018). Assessing whether an alternative product or behavior advertised is more eco-friendly has also become more difficult due to “greenwashing” and an excess of information and competing claims (Hoyer & MacInnis, 2004). In addition, consumer decision-making requires assessing the tradeoffs between price and sustainability. Individual willingness to pay and acceptance that sustainable products often come at a higher cost varies. It is difficult to start including environmental externalities, or “hidden costs,” in the price of creating and supplying a good when so many other options are listed as cheaper. Many consumers believe that just because a product is more sustainable, it should not be more expensive (Hoyer & MacInnis, 2004).

Another challenge associated with reducing plastic consumption is that interventions have different effects on different individuals. Encouraging messaging like “do your part to save

the planet” may not be sufficient motivation to act for some consumers, while stricter messaging like “don’t suck, lose the straw” may be too harsh and could dissuade others.

Another side of the issue is how individuals measure their influence on the environment. Many individuals feel powerless in tackling such a widespread global problem. Perceived consumer effectiveness relates to whether what we do as individuals makes a difference (Straughan & Roberts, 1999). Even if someone is concerned about the environment, they are unlikely to be proactive in a behavioral sense unless they feel they can be effective in combating environmental concerns. The “freerider dilemma” is another related challenge where individuals hold a lesser perception of personal impact on a good or service, perceiving environmental wellbeing and the world’s natural resources as public goods instead of private goods that require paying a fee in exchange for use (Ylitalo & Gerdin, 2009). Because attitudes and perceptions serve as precursors to behavioral responses, they need to be positive and linked to the belief that the individual consumer can make an impact (Straughan & Roberts, 1999).

Changing personal behavior and sacrificing time, effort, or money to diminish negative environmental effects through individual action can have significant impacts. However, altering the social norms and creating change within a community as a whole often proves to be more difficult (Martin, 2015). On the national level, regulations, bans, and taxes can be used to create widespread change but this requires a favorable political climate. Commercial alternatives such as business campaigns can be used to create a new norm and produce similar environmental outcomes from wide-scale adoption.

### **GreenToGo and How it Works**

GTG is a reusable and returnable take out container service in Durham, NC (“GreenToGo: How It Works,” 2018). In late 2016, GTG launched a Kickstarter campaign to raise \$24,000 to help fund the program. The campaign was extremely successful, raising more than \$26,000 from over 400 backers (Duke Fuqua School of Business, 2016). Leadership of the program has now been partially assumed by Don’t Waste Durham whose mission is to inspire and proliferate reuse everywhere – a passion which can be seen in their projects around plastic straw substitutes, public school cafeteria composting, and sustainable food truck certification (GreenToGo Thinkific, 2018). GTG’s goal is to help reduce single-use takeout container waste by providing local restaurants with reusable to-go containers that take the place of disposable

plastic carryout boxes. Currently, 28 restaurants in Durham have joined GTG for its reusable to-go container service.

As of March 2019, 28 Durham restaurants are actively participating in GreenToGo, as shown in Table 1.

*Table 1. 28 Durham Restaurants participated in the GreenToGo program*

<b>Number</b>	<b>Restaurant</b>
1	Alpaca Peruvian Chicken
2	Bagel Bar
3	Blue Corn Café
4	Bull City Burger and Brewery
5	Buldega Grocery Store
6	Bull McCabes
7	Copa
8	Dain's Place
9	Durham Co-Op Market
10	Geer St. Garden
11	Global Breath Yoga Studio Cafe
12	Grub
13	Ko Kyu Na'Mean
14	Luna Rotisserie
15	Monuts
16	NanaTaco
17	Neomonde
18	Ninth St. Bakery
19	Pie Pushers
20	Pompieri Pizza
21	Rose's Noodles, Dumplings, and Sweets
22	Saltbox Seafood Joint (2637 Durham-Chapel Hill Blvd.)
23	Saltbox Seafood Joint (608 N Mangum Street)
24	Souly Vegan

25	The Boot
26	The Original Q-Shack
27	Toast
28	Zenfish

Restaurant customers can subscribe to the GTG program for an annual fee of \$25. They can choose to use the service at any participating GTG restaurant for ordering take-out food or for leftovers (“GreenToGo: How It Works,” 2018). A customer simply shows the restaurant cashier their electronic membership certificate on their mobile device, and then they can check out containers through the GTG app. They can return the box to any participating GTG restaurant or drop box by checking it back in with their phone.

Participating restaurants are stocked with GTG’s reusable, spill-proof containers (see Figure 2). When a subscriber dines at a GTG restaurant and requests a GTG container for his/her takeout or leftovers, the restaurant staff provides a clean GTG container. The customer can then check the box out by following directions provided by GTG at each restaurant counter. The restaurant’s stock of containers is inventoried electronically by GTG staff based on the number of checkouts and is refilled as needed. On a weekly basis, GTG collects used containers from 23 return stations (located outside of participating restaurants) by bicycle, thereby reducing their carbon footprint, and washes and sanitizes the containers.



Figure 2. Typical GreenToGo box. (“Don’t Waste Durham: Home,” accessed 2019)

## Life Cycle of the GreenToGo Box

GTG advertises their reusable containers as a “trash-free dining experience” that “eliminates waste from landfills by preventing it in the first place” (“GreenToGo: How It Works,” 2018). So how sustainable are the GTG boxes if they are still made of plastic? GTG boxes are a product called Eco-Takeout and are distributed by [G.E.T. Enterprises](#) located in Texas (“Eco-Takeouts,” 2018). These containers are made from thick plastic and are designed to last through more than 1,000 high-heat commercial washes (GreenToGo Thinkific, 2018). GTG selected this reusable container model because it is air-tight, spill proof, and can be stacked easily for storage (see Figure 3). GTG currently has 507 subscribers and has successfully replaced 2,233 styrofoam containers since its creation two years ago. Assuming each GTG subscriber checked out and returned one container, this would translate to each container being used approximately four times (“GreenToGo: How It Works,” 2018). GTG has decommissioned about 40 containers after a year and a half of use primarily due to breakage at the box hinge and latch. This brings the total number of GTG containers in circulation to approximately 960 (GreenToGo Thinkific, 2018).



*Figure 3. Typical GreenToGo box, open view ("GreenToGo: How It Works," accessed 2019)*

While the goal of GTG is to reduce plastic use, it must focus on eliminating just single-use plastics as a first step. Crystal Dreisbach admits that using a reusable, non-plastic material for the GTG boxes would be ideal, however the current #5 plastic product is the most viable option after balancing cost with environmental benefits (GreenToGo Thinkific, 2018). The use of the reusable carryout containers still significantly reduces the number of disposable styrofoam

boxes ending up in landfills and waterways as well as cuts greenhouse gas emissions. In addition, because all GTG containers are eventually sent back to the washing and sanitizing facility before reuse, containers which are found to be damaged can be recycled properly (GreenToGo Thinkific, 2018). The GTG program is taking further steps to ensure their boxes can be utilized efficiently throughout their lifetimes by partnering with recycling centers and researching the potential for using broken containers to create 3D printing filament (GreenToGo Thinkific, 2018). GTG is well-aware of the shortcomings of their current product, noting it is “sub-optimal in design and function” and is currently developing more ideal boxes which will perform better functionally, have increased longevity, and be tech-enabled for trackability (GreenToGo Thinkific, 2018). GTG is confident they are utilizing the best available option to provide an affordable and net positive solution to single-use plastic pollution.

### **Prior Research Conducted for GreenToGo**

Since the inception of GTG, a number of student groups have analyzed the environmental impact of the service. In 2017, a group of Duke students called the Duke Interdisciplinary Social Innovators (DISI) developed a calculation tool that can be used to determine the positive impact GTG has on the environment (DISI, 2017). The GTG team originally considered using compostable boxes, however after analyzing with an environmental impact calculator created by the Duke Interdisciplinary Social Innovators, they found them to be less beneficial than a reusable product (DISI, 2017). Compostable food packaging is second to reusables only if composted properly, however research shows the majority of compostable containers are just added to the landfill where they biodegrade anaerobically, release methane, and therefore contribute to global climate change (see Figure 4) (GreenToGo Thinkific, 2018). In addition, compostable containers are more expensive for restaurant owners and managers to provide to customers whereas the GTG program is a free service for most food providers (Joshi & Rahman, 2015). DISI’s environmental impact tool can be used to compare the net impact of using styrofoam, compostable, and GreenToGo carryout containers (DISI, 2017). They assumed a very conservative estimate that a single GTG container would replace 360 styrofoam or compostable containers. As shown in Figure 4, GreenToGo serves as an ideal option when factoring in number of product units, total lifetime, and carbon dioxide emissions (DISI, 2017).

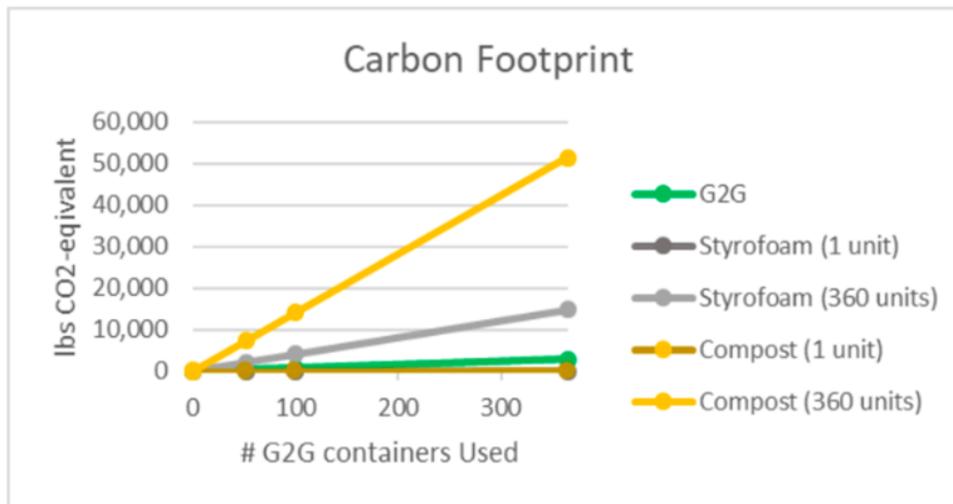


Figure 4. Comparison of the carbon footprints of different to-go box materials, using an impact calculation tool (DISI, 2017). \*The dark grey “Styrofoam (1 unit)” line is hidden behind the “Compost (1 unit)” line.

Duke University's Environmental Science Program calculated the impact GTG has on reducing waste, finding one GTG container replaces the need for approximately 1,000 disposable takeout containers (GreenToGo Thinkific, 2018). Another study conducted by students at the Duke Fuqua School of Business projected the sustainability impact of the GTG business to reach 600,000 disposable to-go containers averted from the landfill per year by 2025 (Duke Fuqua School of Business, 2016). Research conducted by other universities using the same G.E.T. Enterprise design GTG utilizes showed similar results, suggesting the reusable to-go container has a net positive environmental benefit over its lifetime (Duke Fuqua School of Business, 2016). It is important to note that reuse often results in a larger water footprint compared to styrofoam or compostable material due to dishwashing, however other positive environmental benefits overwhelm this downside (Duke Fuqua School of Business, 2016).

Duke’s Innovation and Entrepreneurship students conducted a study to determine customer strategy for GTG before the GTG program was implemented in the summer of 2017 (Duke Innovation & Entrepreneurship, 2017). They found that the target population of GTG is professional females that are 35+ (Duke Innovation & Entrepreneurship, 2017). They also asked respondents what they were willing to pay for a GTG subscription a year. The majority of respondents said that they would be willing to pay less than \$20 a year for a subscription (Duke Innovation & Entrepreneurship, 2017). The North Carolina State University Interdisciplinary team conducted a study on how GTG can continue to improve. They conducted customer

surveys of Raleigh residents, which were run almost concurrently to our customer survey but with different variations on the questions asked. They found that the barriers to participation in the GTG program by customers were cost, location, annual membership commitment, and user experience (North Carolina State University Interdisciplinary Team, 2018). They also interviewed workers at nine GTG restaurants to determine what problems there may be with the program. Their team found that restaurant employees believe that membership is low because of perceived cleanliness of the containers, the price of annual membership, and lack of understanding about how the program works (North Carolina State University Interdisciplinary Team, 2018).

### Motivation for Project Selection

Crystal Dreisbach’s GTG plastic reduction effort was featured on a [PBS NewsHour segment](#) in August of 2018 (Carey, 2018). After this aired, almost 300 individuals reached out to Don’t Waste Durham for advice on how to implement similar programs in their businesses, restaurants, schools, and hometowns (Carey, 2018). Of these individuals, more than 100 provided their location (Figure 5).

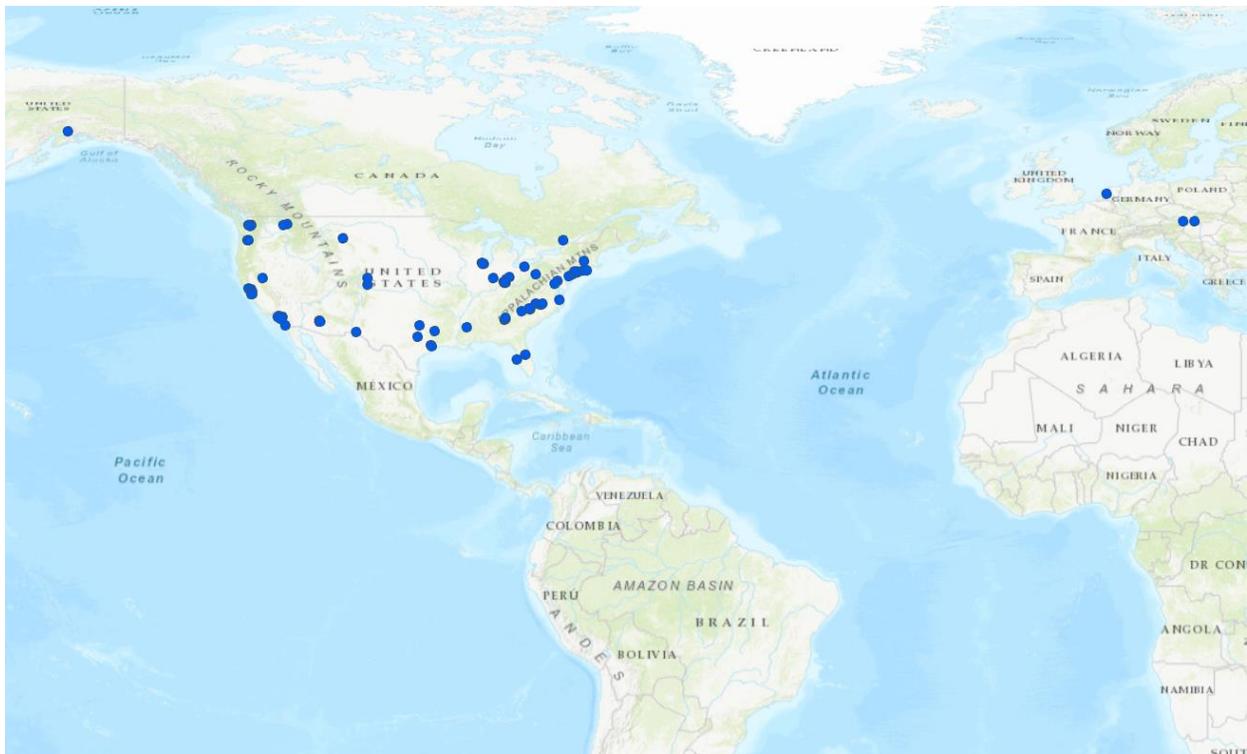


Figure 5. Map of individuals who contacted GreenToGo to express interest in adopting a program in their own communities.

After this unexpected response, Don't Waste Durham became more interested in understanding perceptions of the GTG program from the viewpoint of restaurant owners/managers as well as their customer bases. With our research, the GTG team will be better equipped to modify their business framework for easier adoption and implementation in other community types. GTG offers an on-the-ground solution to single-use plastic waste that should be shared with change leaders across the world for greater impact.

## **OBJECTIVES**

Our primary objective was to identify the barriers of implementing GTG reusable to-go containers for both businesses and consumers. This included interviewing GTG business owners, surveying restaurant customers, and developing strategy summaries for scaling up GTG in other communities. This information will be used to fortify the long-term sustainability of the Durham GTG program along with allowing implementation in other communities.

### **Specific Project Goals**

1. Research existing studies on consumer behavior and attitudes, and their impacts, on plastic consumption reduction
2. Identify the barriers for local food service businesses and consumers to switch to the GreenToGo service
3. Assess the barriers to replicating the GreenToGo program in other communities
4. Provide strategy summaries for university campuses, small towns, and urban centers

## **METHODOLOGY**

### **Literature Review**

A literature review was conducted by searching through resources such as Google Scholar, ScienceDirect, Springer Link, and the Duke Library database. In the early stages of our research, we searched for studies related to styrofoam and consumer behavior specifically. We later expanded the search to include studies focused on understanding the perceptions, attitudes, consumer behavior, and campaign success related to single-use plastic reduction more broadly.

Overall, this part of our research focused on three main topics: the effect of green marketing on consumer behavior, the influence of consumer attitudes and perception on the effectiveness of plastic reduction campaigns, and the necessary elements for consumer behavior change. The fifteen scientific articles listed in Appendices A were found to be of particular use.

## **Surveys and Interviews**

Data collection consisted of two parts: 1) Online and Paper Surveys of Current GTG Customers and 2) Interviews of GTG Restaurant Managers and Owners.

### **1. Online and Paper Surveys of Current GTG Customers**

Prior surveys conducted in partnership with GTG were targeted exclusively at current GTG users. These surveys focused on demographics and satisfaction with the service. The purpose of our survey was to get responses from not only current GTG users but also past subscribers and non-subscriber of the service. We wanted to understand what groups are using GTG and what barriers may be preventing some groups from using GTG.

We constructed an online survey through the online survey software Qualtrics. We structured this survey based on questions that the client wanted answers to while also ensuring the survey was short enough that customers would be willing to take it. The survey was sectioned into four parts: customer's general restaurant habits, environmental attitudes and opinions, GTG knowledge and opinions, and general demographics. After receiving IRB approval, we released the survey and allowed it to remain open for 4 weeks. An online link to the survey was distributed by GTG in their monthly e-newsletter and on their social media pages. Discover Durham, Durham's local tourism guide, also distributed the survey in their weekly e-newsletter. To advertise the survey at GTG participating businesses, we created promotional flyers, table top promotional materials, and asked businesses to share the survey link on their social media (see Figures 6 and 7, Appendices B1-B5). Restaurants were also given to option to distribute paper surveys to their customers. We emailed participating GTG businesses to ask permission to distribute the survey, and we visited businesses in person to distribute materials. We analyzed the data collected with Excel and the qualitative analysis software NVivo.



Figures 6 and 7. Survey promotional material displayed at participating GreenToGo restaurants in Durham.

## 2. Interviews of GTG Restaurant Managers and Owners

A second part of the study was conducted to understand why business owners have chosen to participate in the GTG program. We wanted to understand the barrier that they had to overcome in order to participate in GTG, how successful they perceive the program to be at their restaurant, and how the program fits into their business model. We wanted to understand what problems some restaurants may run into implementing this program and find ways to overcome these problems.

Over the course of two weeks (February 11th- 22th, 2019), five interviews were carried out. Scheduling was completed through a google poll for ideal times to meet so as to avoid busier hours at respective restaurant locations. A wide range of local Durham restaurants currently in different phases of GTG establishment were interviewed. Phase 1 signifies a restaurant has been participating in the program since the very start of the program, whereas a larger phase number symbolizes a more recent adoption of the program. Bull City Burger & Brewery (Phase 1), Alpaca Rotisserie (Phase 3), Saltbox Seafood (Phase 6), Zenfish (Phase 8), and Luna Rotisserie (Phase 8). During these interviews, the interviewer read from a script of questions (see Appendices C) for consistency and all discussions were voice recorded. After the interview process, responses were transcribed by listening back to recordings and later imported into a

qualitative research software, NVivo 12. Using NVivo, several analyses and comparisons were made across the data.

## **FINDINGS AND DISCUSSION**

### **Literature Review of Plastic Perceptions and Consumer Behavior Change**

#### **Current State of Social Perceptions on Plastic**

##### *Plastic Bags, Straws, and To-Go Containers*

The perceptions and attitudes consumers have around plastic products have a large influence on how they are used. In some cases, objects such as straws and to-go containers are seen as an expected, or even guaranteed, service instead of a product (Ylitalo & Gerdin, 2009). The majority of plastic products are designed to be used only once despite their durability and extremely long lifetimes (Martin, 2015). The average consumer would drink from a styrofoam cup for a few minutes and then discard the container without thinking twice about the remaining decades that object will spend slowly decomposing, waiting to be incinerated or buried.

Every day, consumers are becoming more and more knowledgeable about the importance of buying environmentally sound products, and their attitudes are growing greener (Minton & Rose, 1997). In the environmental context, those who are more likely to purchase more eco-friendly products are also more likely to be younger, affluent, well-educated women (“Who Are the Green Consumers?,” 2013). Recent polls show an increasing level of American public concern for the environment, but there are large gaps between what is reported and what is actually carried out (Anderson, 2017; Marlon, et al., 2018). Some studies show an increase in consumer importance placed on ethical and environmental considerations when evaluating a business (Ylitalo & Gerdin, 2009). Others show a partisan divide between those who are concerned about the environment and will take action to help and those who will not (Anderson, 2017).

##### *Reduction Strategies and Bans*

Reduction strategies such as the GreenToGo program offer suppliers and consumers with a voluntary alternative to single-use plastic. The UN recognizes that “the value of reduction

strategies is that they do not attempt to force sudden changes in the market,” as opposed to bans and taxes (“Single-Use Plastics,” 2018). Many consumers feel threatened when their ability to choose is taken away from them. Reduction strategies offer a more understanding method of plastic reduction which leaves the choice of picking more eco-friendly products and behaviors up to the individual consumer (“Single- Use Plastics,” 2018).

Changing habits towards more sustainable practices can also be taught through disincentivizing mechanisms such as a levy on polluting products like plastic bags or styrofoam containers (Asmuni et al., 2014). The use of an environmental tax, placed either on the retailer or the consumer, as an incentive to steer society towards more sustainable practices is another option (Asmuni et al., 2014). However, much like forced change, decisions with large public impact that do not consider public input typically end in opposition (Nizam et al., 2016).

Bans on plastic bags, styrofoam, and straws have been very successful in regions with high public pressure, an engaged government, and first-hand proof of the damage plastics can have on communities. The deleterious impact of single-use plastic is often most evident in coastal communities, where stormwater runoff and water flow can move marine debris up onto shores. Whole nations, including Kenya, Vanuatu, the United Kingdom, Taiwan, Zimbabwe, Australia, Canada, France, Morocco, and Rwanda, already have single-use plastic bans in place or have bans being signed into legislation shortly to reduce consumption of materials such as plastic bags, plastic microbeads, plastic plates and cutlery, etc. (Calderwood, 2018). Becoming a sustainable consumer often requires high levels of investment, political support, consumer acceptance, and willingness to pay (Antonides, 2017).

However, in areas where public engagement and other necessary elements may be lacking, there can be a lack of power to create lasting change. North Carolina has had its share of attempts at plastic bag bans (along the Outer Banks in 2009) and city ordinances on polystyrene bans (initiated by Crystal Dreisbach in Durham prior to the start of GreenToGo). The 2009 plastic bag ban enacted on the North Carolina coast was repealed last year due to an unfavorable political climate (Hampton, 2017). This decision was made despite a member survey conducted by the Outer Banks Chamber of Commerce where all but two of 500 responses opposed the repeal (Hampton, 2017). While acknowledging the reality of our state’s current political climate, there is still hope for another type of policy to drive reductions in disposable plastic usage.

Several city-wide voluntary styrofoam reduction programs have been successful in cutting down the number of polystyrene food service containers in circulation (Heverly et al., 2017). In fact, more than 100 US cities and counties have banned polystyrene foam in their businesses and public facilities, some even as early as 1989 (Ryan, 2015). On April 3rd, 2019, the Durham Environmental Affairs Board heard a proposal prepared by Don't Waste Durham and the Duke Environmental Law and Policy Clinic for a voluntary ban on single-use plastics. The proposal recommended a policy that encourages businesses and restaurants to voluntarily reduce their use of plastic bags, plastic straws, and polystyrene food and beverage containers without enforcement or penalty. Their hope is that a voluntary reduction program can efficiently reduce disposable plastic consumption and believe backing this decision could be a great opportunity to lead the state by example.

The lack of economic stress placed on businesses to offer an alternative option instead of forcing the change should be a welcomed thought. With this program, restaurants and owners would have the flexibility to adapt willingly and at their own pace while still encouraging Durham citizens to consider the environment in their decision-making. It is for these reasons that the City of Durham and the Durham Environmental Affairs Board should support this policy as an effort to safeguard the environment and public health.

In some countries, those who choose not to follow plastic usage bans could be punished with fines, revocation of business licenses, or in severe cases, prison (Martin, 2015). In an Australian study researching consumer opinion of a particular plastic bag ban, 84% of shoppers reported “always” bringing their own reusable bags, however 56% stated they were already using reusable bags before the ban was implemented (Piazza Research, 2012). While 58% of the survey respondents stated support for the plastic bag ban, 33% did not and 9% were not sure. This shows that even in regions where the majority of people voluntarily use alternative products and have more eco-conscious behaviors, there is opposition to outright bans (Piazza Research, 2012). In the case of policymakers or business owners implementing a ban which the community does not largely agree with, consumer rebellion and boycotts can take place (Nizam et al., 2016). In some instances however, for example with the 2016 statewide plastic bag ban in California, customers can be quick to adjust and adapt to changes with minimal reported resistance (The Times Editorial Board, 2017). Some attribute widespread change to the public's support behind a movement (Nizam et al., 2016). Others have found evidence that voluntary actions can be half as

effective compared to fees in reducing plastic bag consumption (Martin, 2015 and Poortinga et al., 2012). GreenToGo's role as an educator and provider of more environmentally friendly options is hopefully also building support for other ways to reduce styrofoam consumption. Despite the drawbacks to a voluntary ban on single-use plastics (including styrofoam) in Durham, a voluntary ban can serve as a stepping stone in waste-reduction progress.

### *Why Recycling Is Not Enough*

Plastics are made from crude oil or equivalent and hundreds of additives, many of which are harmful to human and environmental health and food safety (Martin, 2015). Even when plastics are recycled after use, consuming them in the first place is associated with a variety of health impacts ("Single- Use Plastics," 2018). Plastic packaging materials are made up of polymers, polyethylene, and polystyrene, compounds significantly linked with brain and learning problems as well as damage to the liver, central nervous system, and eyes ("Toxicological Profile for Styrene," 2010). These compounds are known endocrine disruptors, meaning they negatively impact elements of reproduction and cause hormone imbalances (Miller et al., 2009). The chemical styrene has also been linked to vision and hearing loss and is known as a "reasonably anticipated carcinogen" (Carey, 2018; "Report on Carcinogens," 2016). Acute exposure to styrene can cause gastrointestinal problems and irritation of the skin, eyes and respiratory tract, while chronic exposure can compromise the nervous system, causing "symptoms like depression, headache, fatigue, and weakness along with minor effects to kidney function and the blood" ("Polystyrene Foam Report," 2016; "Public Health Statement for Styrene, 2012"). The wide range of petroleum-based plastic products saturating the world market are harmful to human exposure and should be consumed less in the first place.

The large majority of plastics end up in landfills, and reuse of styrofoam is extremely low (Gately, 2015). Recycling of plastics is complex because there are so many different compounds and product shapes. Styrofoam and plastic bags are often only collected at specialized recycling centers because reuse of the material is very energy-intensive (Lamb, 2012). Polystyrene ends up in landfills where it slowly decomposes, leaching chemicals into the soil which have been shown to eventually migrate into groundwater (Lamb, 2012).

## Consumer Behavior

### *Significance Behind Understanding the Role of Attitudes*

If firms exist to satisfy the needs of their customers, understanding those customers is essential to aid in altering perceptions and attitudes toward the adoption of more sustainable materials (Ylitalo & Gerdin, 2009; Lamb, 2012). Attitudes play a large role in developing consumer opinions, preferences, intentions, and behavior (Antonides, 2017). They characterize an individual's overall evaluation of something according to a set of related associations (Hoyer & MacInnis, 2004). An attitude is therefore formed from an individual's thoughts, which could be shaped by information from friends, neighbors, advertising, etc. (Hoyer & MacInnis, 2004).

The UN recognizes that “a longstanding change in cultural attitudes towards environmental matters is often not attainable through brief or stand-alone awareness campaigns” (“Single-Use Plastics,” 2018, p.19). Instead, taking the time to embed messaging into everyday life and add plastic-specific curriculum for younger generations has proven successful in improving knowledge and ecological attitudes in the past (Minton & Rose, 1997). Starting initiatives which increase environmental awareness at an early age is a necessary step in altering personal norms as children grow into decision-making adults with purchase power (Minton & Rose, 1997). Younger individuals have grown up during a time where environmental concerns have been highly publicized so they may be more likely to mature into adults who are sensitive to environmental issues and more engaged in initiatives (Straughan & Roberts, 1999). In fact, one study recognizes that a “generation shift” is underway which is slowly reflecting an increased concern for social responsibility in purchasing decisions (Ylitalo and Gerdin, 2009).

Similarly, what we experience also has a large impact on our perceptions and attitudes. As long as consumers continue to see plastic washed up on beaches or coverage of the “Great Pacific Garbage Patch,” the plastic problem will continue to rest in the forefront of the consumer's mind. Even the plastic industry admits that “it is likely they [consumers] will continue to find fault with plastic as disposables even as they love their durable plastic products” (Microdyne Plastics, 2018).

Social influences also contribute to shaping attitudes (Antonides, 2017). In fact, some argue that the opinions of others may be more influential than an individual's own opinions (Hoyer & MacInnis, 2004). This is why word-of-mouth recommendations are so important in

shaping attitudes around a certain product or company, especially in towns like Durham which seem to value honesty and originality as seen by the range of small businesses instead of chain restaurants. Minton and Rose studied the effects of different norms on environmental behavior (1997). Injunctive norm refers to “what others think I should do,” whereas the personal norm relates to an individual’s feeling of moral obligation and encourages actions consistent with one’s values (Minton & Rose, 1997). Personal norms, oftentimes internalized social norms, carry the most influence in implementing environmentally friendly behavior and should be targeted in marketing materials persuading an individual to act environmentally (Minton & Rose, 1997).

Social dilemma theory is found to be closely related to how people behave as consumers. Much like how some individuals feel morally obligated to cut meat from their diet, others may feel drawn to curb their plastic usage (Antonides, 2017). According to Ylitalo and Gerdin, “social responsibility has become a new determinant for consumer purchase decisions” (2009, p.V). As more consumers feel drawn to include social and environmental responsibility as a factor in their decisions, public pressure for businesses and policies to adapt to these attitudes mounts (“Single- Use Plastics,” 2018; Ylitalo & Gerdin, 2009). Because demand directly influences supply, consumers have great power in influencing the private sector. One researcher suggests businesses will become more marketable to the consumer base once they start to view responsibilities towards the environment and society as similar to responsibilities to clients, shareholders, and employees (Boztepe, 2012). Ylitalo and Gerdin found that company social responsibility “has a positive effect on consumer attitude towards a company and consequently increases consumer purchase intent” (2009). These researchers also found that a company’s commitment to social responsibility “has become a competitive factor to the traditional determinants of consumer purchase decisions such as price and quality,” arguing that a company’s positively-perceived environmental initiative can be a key factor in its economic success (Ylitalo and Gerdin, 2009, pg.6).

One study found that the more important environmental responsibility is to a consumer and the more concerned a consumer is about environmental threats, the more positive their attitude towards an environmental initiative (Hoyer & MacInnis, 2004). In addition, Antonides suggests that those willing to commit to one sustainable behavior are more likely to hold additional environmentally-conscious behaviors such as recycling, conserving energy, using public transit or electric vehicles, donating to and joining environmental groups, or

communicating with elected officials, a concept also known as the “spillover effect” (2017; Minton & Rose, 1997). It may be wise to target individuals who are already environmentally responsible to sign up for a GreenToGo membership.

Stern et al. (1993) suggest that different value orientations: 1) social altruism- concern for the welfare of others, biospheric-altruism- concern for the environment, and egosim- concern for one’s self, influence willingness to pay or act. Some individuals are more influenced by messaging suggesting an environmental action would benefit the greater good, while others would be more encouraged to act due to suggestions of personal gain.

### *The Surrounding Unconscious Environment*

Consumers have grown accustomed to expecting a straw in their drink and a styrofoam vessel to carry their leftovers or to-go food home. Plastic consumption and production is proof of product acceptance over time. In the last forty years, production has grown more than 600% (“Global Plastic Production,” 2017). Even in Europe, a region which has been historically sensitive to waste, plastic packaging is nearly 40% of all plastic demand, while consumer and household durable goods make up 22% of plastic demand (Microdyne Plastics, 2018).

In order to break the habit of constant disposable plastic usage, individuals must personally decide to stop their consumption (such as cutting out straw usage all together) or be offered an alternative (a reusable or biodegradable to-go container). This begs the question how many customers would realistically notice or be upset if they were offered a drink at a restaurant without a straw, or were forced to purchase a GreenToGo membership in order to take home leftovers? Many decisions are made unconsciously, or consciously, but after only split seconds of information processing. Others require a full process of receiving new information, processing that information, and using that information to form attitudes and make decisions (Dijksterhuis et al., 2005).

Some behaviors and consumer purchase decisions are habitual and have been engrained since childhood (Martin, 2015). As previously discussed, plastic production has skyrocketed since the middle of last century and has infiltrated a broad range of markets from packaging to transportation and building to the point where we cannot imagine a world without it (Ritchie, 2018). However, in some instances, consumer behavior can be influenced by subtle environmental cues which can bypass previously held attitudes and encourage impulse actions

(Dijksterhuis et al., 2005). For example, research shows that oftentimes, the brain tells us to mimic what others are doing around us (Dijksterhuis et al., 2005). Humans are very imitative and behavior can be contagious, so if more people are perceived as using the GreenToGo program and cutting out styrofoam waste, perhaps more will join.

Other studies have shown the impact of “automatically activated attitudes” and behavioral expectations (Dijksterhuis et al., 2005). Examples of this concept include being quiet in a library or well-mannered in an expensive restaurant without giving too much thought to why (Dijksterhuis et al., 2005). Could entering certain Durham restaurants bring out automatically activated attitudes and respective behaviors such as creating less food waste, asking for no straw, and refusing styrofoam to-go containers?

### *The Consumer-Behavior Gap*

There is a large gap between how the general public reports attitudes towards sustainable consumption and what behavior is actually observed (Martin, 2015; McCarty et al., 2010). This phenomenon is often referred to as the attitude-behavior gap. Oftentimes, consumers struggle to translate environmental values into actual purchasing decisions because the economics outweigh their environmental concern (Duke Innovation & Entrepreneurship, 2017). In a survey conducted on the global scale, 87% of the respondents indicated they were concerned about the environment, however only 33% reported they have bought or would buy green products (McCarty et al., 2010). In several additional studies, 30-50% of consumers indicate their intention to purchase more sustainable products but the market share of these goods is typically less than 5% of total sales (Terlau & Hirsch, 2016). This shows that even though there are social motivations to switch to greener products, purchase barriers and other perceived challenges could be halting widespread transformation.

### Necessary Elements for Change

Across the literature, we found the following themes to be associated with positive environmental change. Many of these elements, including: awareness, consumer trust, product convenience and price, risk perception, and smart marketing, were influential in a study conducted on consumer consumption related to car sharing programs and consumer attitudes towards a plastic bag ban (Antonides, 2017; Ylitalo & Gerdin, 2009). According to McCarty et

al., consumer reluctance to buy green relates to several key impediments: eco-friendly products are perceived as more expensive and less effective than standard products and consumers are often understandably skeptical of the sustainable-product claims (2010).

The following themes can be used to combat these consumer doubts.

#### *Awareness/ “Socio-environmental consciousness”*

One critical element of progress is to increase social awareness and education about the dangers associated with continued high plastic consumption. Many studies show a positive correlation between awareness of environmental impacts, or “socio-environmental consciousness,” and willingness to reduce personal consumption or invest in greener products (Martin, 2015; Boztepe, 2012). As previously mentioned, if a community has a negative perception around plastic consumption, citizens may be more likely to work to improve it (Martin, 2015). In addition, awareness needs to be focused on educating people that their individual actions of choosing a certain product or service over another can make a difference (Straughan & Roberts, 1999).

In order to create lasting change, consumers must not only be aware of the threat of our growing plastic problem, but also of innovative businesses working to combat the problem. Improving advertising for businesses, in our case restaurants, who are excelling in their sustainability achievements is a necessary step to attracting customers and changing attitudes (Ylitalo and Gerdin, 2009). Environmental education can be integrated into a business strategy in order to differentiate new sustainable products or services with old methods and competitors (Hoyer & MacInnis, 2004). Strategic marketing should explicitly show consumers that their product choices have beneficial environmental outcomes and can help in the fight against environmental devastation (Minton & Rose, 1997; Straughan & Roberts, 1999). Advertising messages which focus on the intent and purpose of these changes can be used to increase awareness and, in some cases, profit (Hoyer & MacInnis, 2004).

#### *Consumer Trust and Company Social Identity*

Developing a distinct brand identity can reassure consumers that a company is trustworthy by communicating a business’ values and beliefs (Ylitalo and Gerdin, 2009). Over time, a brand can evoke certain thoughts and attitudes to “provide consistency over

communication channels” and offer a competitive advantage (Ylitalo and Gerdin, 2009, p.17). If a company can boast their environmental achievements, customers may start to associate that business with a positive impact and be more drawn to supporting it (Ylitalo and Gerdin, 2009). Customers have been known to prioritize companies which can use product differentiation thanks to its environmental commitments (Ylitalo & Gerdin, 2009; Nizam et al., 2016). One study found that customer trust and perception of eco-labels and brands shows a significant positive impact on actual purchase behavior (Rahbar & Wahid, 2011). In fact, another study revealed that a company’s commitment to social responsibility could act “as a tie breaker in consumer purchases” (Ylitalo & Gerdin, 2009). In addition, research shows that customers may be motivated to minimize or ignore any negative information they receive about a business that invests in social and environmental responsibility (Ylitalo & Gerdin, 2009). This suggests that initiatives like phasing out styrofoam to-go containers could increase customer loyalty. According to Straughan and Roberts, businesses will have to become more environmentally and socially sensitive if they want to stay competitive in the future (1999).

A necessary element of advertising a company’s environmental initiative or mission is to fully explain the motives behind making a sustainable change in business management (Hoyer & MacInnis, 2004). In addition, as discussed previously, perceptions are often formed from social cues and interactions. Using opinion leaders, or trusted individuals in a community such as a neighbor, minister, or well-known local advocate, to encourage an environmental action can increase reliability and minimize skepticism (Minton & Rose, 1997). The use of opinion leaders has been linked to a greater impact on behavior than the dissemination of information from companies or governments (Minton & Rose, 1997). Word of mouth continues to serve as a primary source of information about green products and companies for consumers (Boztepe, 2012).

### *Product Convenience and Price*

Consumption habits are highly motivated by the convenience and price of a good or service (Boztepe, 2012). In fact, price is the number one reason consumers choose not to buy green products (Boztepe, 2012). A more eco-friendly option can be 3-5 times more expensive than a typical product because of the addition of ethical and environmental considerations and the cost of production is often higher for products which have yet to hit the mainstream market

and drive production efficiencies (Joshi & Rahman, 2015). These economics make it more difficult for green products to gain traction and move beyond the niche market into the mass-market (Joshi & Rahman, 2015). If a grocery store suddenly started charging for plastic bags or a restaurant decided to charge customers for reusable to-go containers, some individuals would view this increase in cost also as a loss in convenience. While many customers would be upset by an increase in price due to a higher level of sustainability, others are willing to pay more to know they are doing their part to create a greener future (Hoyer & MacInnis, 2004; Boztepe, 2012). In some cases, the number of customers visiting an establishment may increase after advertising an environmental initiative because certain individuals want to support businesses with similar ideals. For example, people who perceive recycling as important tend to perceive it as less inconvenient (McCarty et al., 2010). On the other hand, customers who cannot view an initiative as beneficial overall because they feel it is implemented at the expense of product quality or price have reportedly stopped visiting these businesses (Joshi & Rahman, 2015). There are mixed results on the overall profitability of making the switch to environmentally sustainable products.

### *Risk Perception and Concern*

One study suggests individuals are more likely to act consistently with attitudes about their own needs than those of others or the environment (Arbuthnott, 2008). In other words, a consumer who witnesses environmental degradation and pollution and feels personally threatened by it will be more willing to change their behavior even though no direct benefit will come to the individual after doing so (Martin, 2015; Hoyer & MacInnis, 2004). In the same respect, someone who does not feel at risk or resonate with the cause of supporting the greater good will likely avoid action.

Even after decades of research on the impact of demographics on environmentally friendly behaviors, very little correlation can be found (Minton & Rose, 1997; Boztepe, 2012; Straughan & Roberts, 1999). If anything, young, educated, urban women seem to have the most environmental concern, translating to more eco-conscious consumer behaviors (Straughan & Roberts, 1999).

### *Smart Marketing*

Certain marketing strategies can be employed to efficiently reach a greater number of customers (Cornelissen et al., 2008). Recent research has investigated the use of a social marketing tool called “positive cueing,” the cueing of commonly performed ecological behaviors like not littering as environmentally friendly, to improve specific attitudes (Cornelissen et al., 2008). If an individual identifies themselves as more of an advocate for environmental health and welfare thanks to the framing of normal everyday behaviors as environmentally responsible, they are more likely to purchase sustainable products. In other words, positive cueing can be used to improve an individual’s attitudes and self-perceptions and establish a sense of moral obligation to behave and purchase more responsibly (Minton & Rose, 1997).

The best kind of advertising markets to green consumers, individuals who “adopt environmentally-friendly behaviors and/or purchase green products over the standard alternatives,” without alienating the average consumer (Boztepe, 2012).

In many cases, campaigns which highlight poor behavior by calling out individuals who use plastic bags and bottles are ineffective in changing behavior (Cornelissen et al., 2008). This type of marketing evokes feelings of guilt and often resentment in some consumers, and therefore should be avoided (Cornelissen et al., 2008). Messaging that tries to come off as understanding of how hard it is to switch to more sustainable alternatives before encouraging consumers to do so is also inefficient because it justifies these harmful behaviors. Marketing that encourages people to “do the right thing” by avoiding styrofoam or other single-use plastic products can be successful in the short term but often fade out in the long run due to cost considerations (Cornelissen et al., 2008). The study suggests that focusing on how others in society are behaving with a more sustainable mindset may prove to be more successful in encouraging behavior change (Cornelissen et al., 2008). Across all strategies, one should emphasize convincing consumers that they are more willing to make an effort to help the environment because they perceive themselves as the kind of person to do so (Cornelissen et al., 2008).

Cornelissen et al. also found that many individuals resonate more with what everyone else is doing more than doing the right thing (2008). Another way to meet people in the middle is to warn them against the human health hazards associated with plastic waste and styrofoam use (Boztepe, 2012). This could encourage those who may not resonate with an environmental message to still act.

Another strategy to reaching a large audience is to appeal to fear. This can be seen through powerful advertising and social marketing campaigns that link plastic usage with human health concerns. Examples include the Marine Conservation Society's "Would you care more if it was you?" campaign depicting humans with plastic bags, straws, and silverware stuck in their noses and mouths and the Surfrider Foundation's "What goes in the ocean goes in you" message advertising a sushi roll wrapped in layers of plastic bags (Mitchell, 2018; Public Service Announcements, 2018). The Surfrider Foundation has also publicized material showing different prepackaged meals of plastic marine debris and styrofoam pieces which closely resemble that of meat advertised in a grocery store (Public Service Announcements, 2018). The Plastic Health Coalition's new campaign depicts a human embryo made up of plastic floating in a plastic bag to make viewers question the impacts of plastic on health (Plastic Health Coalition, 2019). While some research suggests that fear campaigns can lead to dismissal much like guilt-inducing strategies, others show that fear appeals in public health campaigns can motivate message acceptance and lead to successful behavior change (Cornelissen et al., 2008; Witte & Allen, 2000).

## **Restaurant Customer Surveys**

### Demographics

One hundred and thirty-three individuals responded to the survey, but some respondents chose to not answer all of the questions, which limited the sample size of some questions. We also included some display logic questions that only appeared if respondents answered with a certain response to a prior question. This also limited the sample size for those questions. We positioned the demographic questions at the end of the survey, but we will begin with demographics here to provide an overview of respondents. When asked, 83% of respondents said that they are residents of Durham County. The majority of respondents reported that they lived in zip codes 27701, 27705, 27707, 27712, and 27713. Durham County has identified hotspots for population growth (see Figure 8). Most zip codes reported by respondents in this survey fall in these areas of population growth.

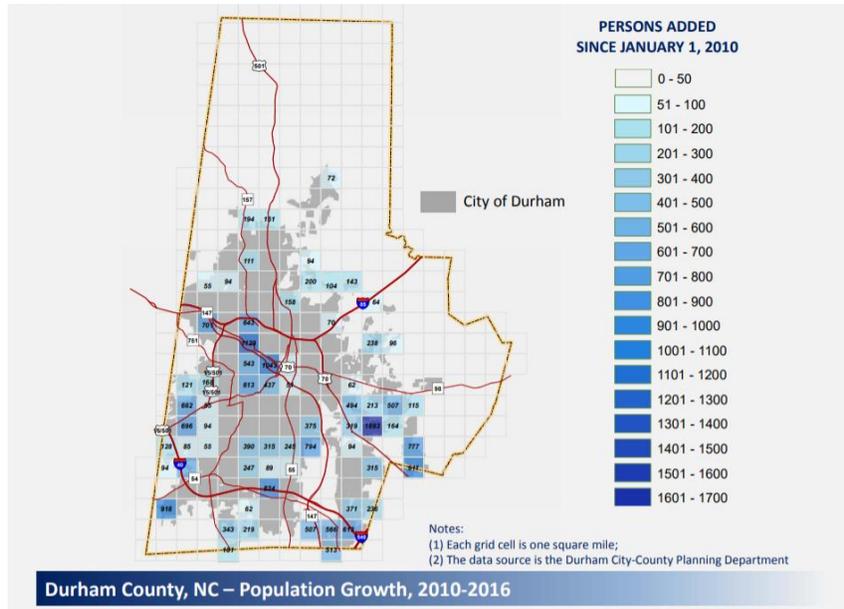


Figure 8. Map of Durham Population Growth from 2010-2016. ("Demographics", accessed April 12, 2019)

The majority of respondents (86%) identified as female (see Appendix D1). Age responses were collected by asking respondents to choose an age category (e.g. 50-59 years old). The largest number of respondents fell in the 30-39 age category and the second largest number of respondents fell in the 40-49 age category. These two age categories combined comprised over half of all survey respondents (see Appendix D2). For ethnicity, the majority (89%) of respondents identified as White/Caucasian (see Appendix D3). For income, the majority (60%) of respondents reported being in the income bracket higher than \$70,000 (see Appendix D4).

The median age for Durham County is 35.5 years old which falls within the largest age category in the findings of our survey ("Durham County, NC"). The median household income for Durham County is \$59,891, which is slightly lower than the respondents in our survey ("Durham County, NC"). Of the 312,000 residents of Durham County 16.4% live in poverty which is higher than the national average of 13.4% ("Durham County, NC"). The largest demographic group living in Durham County is females ages 25-35 ("Durham County, NC"). The ethnic makeup of Durham County is 42.4% White, 35.4% Black or African American, 13.7% are Hispanic or Latino, 4.7% Asian, <1% Native American/Native Alaskan, <1% Native Hawaiian/Pacific Islander, 2.7% two or more races, and <1% some other race ("Durham County, NC").

The demographics of our survey respondents were much different than the demographics of Durham County. The demographics of respondents in our survey are similar to the demographics found in prior surveys conducted for GTG to determine who GTG's target demographic should be. GTG is reaching the target demographic, but it needs to receive broader support in the future to continue to expand. GTG could expand their subscription base if they were able to reach a more representative sample of the total demographics of Durham County. GTG should tailor their marketing towards other demographic groups and find ways to include individuals with lower economic status.

### General Restaurant Habits

When asked how often they ate out within the past month 49% said they only ate out a few times (3-6 times) and 31% of respondents eat out every few days (7-15 times) (see Appendix D5). Only one respondent reported eating out every day. No respondents reported that they did not eat out at all in the last month. The top reasons for eating out were convenience at 21%, to be with other people at 15%, lack of time to prepare a meal at home at 14%, and to try something new at 14% (see Appendix D6). Respondents eat out frequently, and they do so because it provides benefits that they would not receive from eating at home.

### Environmental Attitudes and Opinions

When respondents were asked if local bars and restaurants used waste-reducing products, such as reusable to-go containers, would they frequent these businesses more often 70% of respondents said yes (see Appendix D7). Respondents were also asked to what degree they agreed with three statements: reducing trash in my community is very important to me, I think about the environment when making purchasing decisions, and I can make an impact by reducing the amount of disposable products that I use. The majority of respondents answered that they strongly agree with each of these three statements (see Appendix D8). These results show that the environment is an important consideration in the consumption decisions made by most respondents.

### GreenToGo Knowledge and Opinions

We asked respondents if they had heard of GTG before taking our survey; 68% of respondents said yes and 32% said no. Respondents who had heard of GreenToGo had heard of it from a wide variety of sources. The top sources were family/friends, Facebook, and advertisements. We then asked respondents if they were GTG subscribers. We found that 88.5% of respondents had never had a GTG subscription before, 2.5% do not currently have a subscription but have subscribed in the past, and 9% have a current GTG subscription.

Those respondents that do have subscriptions or previously had subscriptions reported how often they check/checked out GTG boxes. Of the 13 respondents who have or have had a GTG subscription 23% reported not checking out boxes at all, 15% reported checking out a box every few months, 23% reported they check out a box once a month, 23% reported checking out a box a couple of times a month, and 15% reported checking out a box at least once a week (see Appendix D9). No one reported checking out GTG boxes several times a week. We asked subscribers and previous subscribers that answered not at all and every few months as how often to the previous question what stops/stopped them from checking out GTG boxes more often. Common themes among their responses included that they were confused how it works, their favorite restaurants are not part of GTG, and some only get certain kinds of takeout like pizza, which GTG does not have containers for currently. The same group of respondents were also asked what would need to change about GTG for them to use their subscription more frequently. Common answers included expanding to more restaurants that are outside of downtown Durham, making different size containers available, and have better education for restaurant employees on how the program works.

All respondents were asked about the monthly price of GTG, and 54% answered that the price was perfect (see Appendix D10). We then broke out these responses by type of subscriber: current subscriber, previous subscriber, and non-subscriber. We found that 60% of current subscribers thought the monthly price of GTG is was perfect, and the remaining 40% of current subscriber thought the monthly price of GTG is either a little low or very low (see Appendix D11). No one who was current subscriber said that the price was a little high or very high. We found that 100% of previous subscribers thought that the monthly price of GTG is perfect (see Appendix D12). We found that 52% of non-subscribers thought that the monthly price of GTG is perfect. Yet, 21% thought the monthly price was a little high, and 2% thought that the price was

very high (see Appendix D13). This perception about the price of GTG may be preventing people who have never subscribed from subscribing.

When respondents were asked about what they thought of the value of GTG and how willing they were to pay the monthly price 36% answered that they were “Very willing, GreenToGo subscription provides a great value,” and 47% answered that they were “Somewhat willing, GreenToGo Subscription is an okay value.” The remaining 17% answered that they were not willing to pay the price for GreenToGo because GreenToGo is not a good value or they would not use GreenToGo (see Appendix D14). We then broke out what respondents thought of the value of GTG and how they were willing to pay the price by type of respondent. We found that 90% of subscribers answered that they were “Very willing, GreenToGo subscription provides a great value” (see Appendix D15). Of previous subscribers, 100% answered that they were “Somewhat willing, GreenToGo Subscription is an okay value” (see Appendix D16). Half of all non-subscribers that responded that they were “Somewhat willing, GreenToGo Subscription is an okay value” (see Appendix D17). Roughly 30% of non-subscribers answered that they were “Very willing, GreenToGo subscription provides a great value” (see Appendix D17). The remaining 20% said that they were not willing to pay the price for GreenToGo because GreenToGo is not a good value or they would not use GreenToGo (see Appendix D17).

### Summary of Findings

Customers suggested several changes that could improve the GTG program. First, they would like to see better education about the GTG program for both customers and restaurant employees. This would help both groups have a better understanding of how the program works and speed up the GTG box check out process at the restaurants. Second, customers want a variety of container options that vary in shape and size to accommodate different types of food like pizza and soup. Incorporating new container shapes will allow GTG to expand to restaurants that previously could not participate because the GTG one-size fits all container did not work with the food options they offer. Finally, customers would like to see more locations use the GTG program which would encourage them to more frequently utilize a subscription. GTG might also want to consider reevaluating the price structure of GTG to appeal to a larger demographic. Going forward GTG should focus on these areas of heavy population growth to continue to expand. We did ask at the end of the survey if respondents had any final questions,

comments, or concerns. Many respondents left very encouraging comments like “great program” and “keep up the good work.” Respondents overall were very positive about the program, and they would like to see it continue to improve and grow.

### Restaurant Manager and Owner Interviews

Interviews were a great source of qualitative data and served as an inside look into what restaurant owners and managers who were already part of the GreenToGo program thought about the initiative and its impact on their businesses. Interviews were conducted with management at the following restaurants: Bull City Burger & Brewery (Phase 1), Alpaca Rotisserie (Phase 3), Saltbox Seafood (Phase 6), Zenfish (Phase 8), and Luna Rotisserie (Phase 8).



Figure 9. Word cloud of most frequently-mentioned words in interviews with participating GreenToGo restaurant leadership.

A word cloud can be used to visualize the most common words used in response to questions in the five restaurant owner and manager interviews (see Figure 9). While words like “GreenToGo,” “box,” “people,” “business,” and “customers” are not surprising results of this search, phrases like “climate change” or “plastic pollution” were not mentioned. This could

mean that businesses chose to partake in the GTG program because of the consumer perception and economic benefits associated with involvement in a sustainability initiative instead of personal environmental ideals.

### 1. Getting Involved in the GTG Program

Of the five restaurants interviewed, four joined the GreenToGo program because sustainability was part of their individual restaurant mission statements from the beginning. In fact, most restaurant managers and owners reported their commitment to the environment as a core value of their business model. Most of these businesses have an additional dedication to the environmental space in Durham by either recycling, composting, or working with farms to improve efficiencies.

The one restaurant that did not mention the importance of reducing single-use plastic as part of their restaurant suggested their business decided to partner with GTG due to consumer requests for more sustainable carry out options. Additional reasons for joining included: “We try to carry out our commitment to sustainability in any way that is easy to adopt, promote, and facilitate,” “It reflects well on our business,” and “I thought it was a meaningful and compelling option in respect to managing the amount of waste and plastics.” In addition, one restaurant in particular noted the importance of Crystal Dreisbach’s leadership in their decision to join the program, quoting “I love her passion and how much she gives back to Durham. I wanted to support her, her business, and give back as well.”

Four individuals interviewed said they were approached about the program and decided to become members after initial meetings, while one heard about the program through social media and contacted Don’t Waste Durham.

### 2. Satisfaction with GreenToGo

All interviewees mentioned the simplicity of the box checkout process for both participating restaurants and GreenToGo members. All restaurants reported customers would simply request a GreenToGo box when ordering their food (either in person or over the phone) and then scan the provided QR code located near the ordering counter or register when necessary.

All managers and owners interviewed reported that those who use the GreenToGo program seem to have largely positive attitudes toward the service. They also noticed, however, that the majority of restaurant customers do not know what the program is. Many suggested that despite signage and attempts to educate their customers about the program, most individuals were not aware of it. One restaurant operator noted that they only get three to six GreenToGo member box requests in an entire week. Another reported their frustration because “people are culturally conditioned, and it takes a while for some to catch on to the idea.” Despite the perceived lack of awareness on the customer side, restaurant owners and managers believed that those who use GTG are satisfied with it.

All but one restaurant reported offering various other sustainable materials for carry out if GreenToGo boxes were not specifically requested. These alternative to-go containers included compostable or biodegradable pulp boxes. Some reported having to provide recyclable plastic containers for certain types of food requests such as for soups and sauces. Only one interviewed restaurant reported using styrofoam to-go containers if GreenToGo was not asked for. However, this manager mentioned that their restaurant was currently searching for more sustainable options to substitute for styrofoam because they noticed “a shift in consumer demand” for these alternatives.

### 3. Marketing

There were significant differences in how participating restaurants advertised the GreenToGo program. Two interviewees said their businesses have GTG flyers and stickers on their restaurant doors or around the store (where a customer would pick up a menu and at the point of sale). Two more also reported having a designated GreenToGo display in their business which housed a GTG box and marketing material. Other restaurants said they shared GreenToGo posts across their social media platforms. Only one restaurant felt there was a lack of efficient advertisement material in their store promoting the program. In the Findings section, we summarize advertising suggestions mentioned by restaurant owners and managers.

A few restaurant managers described in detail how they think GreenToGo advertising could be improved in an attempt to increase adoption. One of the main concerns was that the current marketing material could be perceived as targeting too narrow of a consumer group.

One manager responded “In order for it (GTG’s advertising) to be really meaningful, it needs to hit the masses. From a marketing standpoint, I think it’s more boutique-ish.” Many interviewees opinion focused on the thought that GreenToGo “preaches to people who are already here to save the planet.” One restaurant owner noted that current GTG members “already drive their EVs and bikes and wear hemp and birkenstocks and compost and bring their own bags to Wholefoods. They’ve bought in 100% and think the inconvenience is worth it to them. The tipping point is to not just preach to the choir but to reach out to non-believers and the masses and convince them it’s easy.” In order to gain wider appeal in the eyes of the restaurant owners and managers interviewed, GreenToGo needs to alter their marketing material to start speaking to the people who would not naturally see the benefits to the program.

In addition, one restaurant owner suggested that GreenToGo should try redirecting its marketing focus on the downtown Durham area. They explained that “Duke has 150,000 square feet of office space in that building across the street. They have a few hundred employees there who go out to lunch each and every day. There are large concentrations of businesses who get take out on the regular in downtown Durham and many are even green-conscious like Burt’s Bees. GreenToGo should advertise directly to those companies in the city center and educate them on their alternative take out options.”

#### 4. Implementation Challenges

None of the businesses felt there were any significant barriers to joining the GreenToGo program, saying “All we had to do was take the GreenToGo containers in and find a space for the return bin, it’s free.” One manager reported that if anything, the only aspect that held their business back from adopting the program sooner was just lack of education on how simple it really was to carry out. Three interviewees suggested GTG itself has more of a challenge in marketing the program, explaining the process through demos and trainings, and distributing material to the shared restaurant and GTG customers compared to what challenges the partnering restaurants must overcome.

Several reported they may come across more issues with logistics if the program became more widely used. For example, one manager expressed their concern about storage, mentioning “If the number of reusable to-go boxes increased and I had to substitute 250 compostable boxes

for GreenToGo boxes, they would take up twice the amount of space to store and there could be some real stresses in the system.”

Two restaurant owners/ managers mentioned the challenge educating individuals on the GreenToGo return receptacle bin. They mentioned that despite signage and labeling on all sides of the return station, some still saw the receptacle as a trash bin or thought it was for compost. One interviewee ran into a hurdle when the restaurant property landlord did not like the GTG return receptacle, but this challenge was overcome with the help of Don't Waste Durham. Complications with cell service continues to be an issue for one restaurant because customers are sometimes unable to use their GreenToGo apps to scan the QR code and check out a GTG box. Another manager mentioned the only challenge they have come across is trying to get more people involved in the program. They reported that despite attempts to educate customers on the simplicity of the program, many people just say they don't have time for it.

All restaurants interviewed felt their staff was prepared and knowledgeable on how to engage with customers about the GreenToGo program. Most mentioned their interactions with Crystal and the rest of the GTG team in the beginning of adoption and their help with training. Interviewed restaurants did not perceive employee training on the service was a challenge, in fact, most reported it was a simple addition to the onboarding program thanks to the educational training material Don't Waste Durham provided and even mentioned some staff were GreenToGo members.

##### 5. Perceived Benefits of the GTG Partnership

While few interviewees felt they have gained more customers specifically because of their partnership with GreenToGo, they recognize that their involvement in the program complements most of their restaurant mission's and improves their public image. One restaurant manager suggested that with larger adoption, offering the GreenToGo service could serve as a competitive edge. In addition, one interviewee mentioned a cost benefit to their participation because the use of a GreenToGo box means one less customer leaving the store with a compostable container the business has to personally purchase and provide (estimating savings at around 50 cents per GTG customer). One owner/manager even went as far as saying “I found that GreenToGo customers are really nice and they're the kind of people we want to serve because we have similar values.”

All interviewees indicated they will continue to participate in the GreenToGo program, many mentioning they have no intention of stopping because it has not been inconvenient in any way. One offered continued support of the program because “GreenToGo is doing something different and I can appreciate that,” while another mentioned “I love Crystal and I will support her in everything she does. Everything she’s involved with is a hit and it will be impactful and will change the way people eat and live.”

## 6. Opinions About GreenToGo Expansion

The majority of interviewees can see the GreenToGo program eventually expanding elsewhere. However, before focus is redirected towards growing geographically, several restaurant owners and managers feel greater support is needed in Durham, one suggesting “No expansion should happen until you’re a rock star in your own neighborhood.” All 5 interviewees felt a need to address the barriers a consumer may face in the decision to join the GreenToGo program. As mentioned previously, cost and inconvenience are two universal concerns managers have noticed after adopting the GTG program. One interviewee noted that they would become very frustrated with the process if they were a member and had to plan what they were going to eat and if they needed to return a box on a daily basis. Several interviewees recognized the immense challenge of shifting paradigms and human behavior. They mentioned that while most people can understand the environmental benefits associated with not using styrofoam, few are willing to inconvenience themselves to think about getting food a different way than what they are used to. Many of the managers and owners interviewed feel that these challenges need to be better addressed in order to increase adoption, but are unsure of how to go about it.

Across many discussions, the significance of choosing Durham as a starting point for the program was mentioned. One interviewee said “I think here in Durham, we are pretty open and supportive of homegrown ideas and products.” Some mentioned a need for a similar program in surrounding areas such as South Durham, Morrisville, and Raleigh. On the other hand, one interviewee believes a GreenToGo like program could have greater success in a different type of city. They mentioned that Durham doesn’t have the community density that this type of program calls for, suggesting Washington, D.C. or Austin, Texas as more ideal locations. This manager listed several characteristics that make these locations good expansion points: “there are tons of people working in a small, geographically dense area, lots of restaurants in a walkable area, and

lots of people getting take out all the time... attributes that Durham simply doesn't have yet." They went on to suggest the ideal target audience for expansion: "they're probably out of school working professionals, affluent, progressive minded, and super busy so eating out frequently but feel a little guilty about their footprint." They went on to add the importance of a solid group of local restaurant clientele because visitors would never invest in a program short-term.

## 7. Participating Restaurant Suggestions

If restaurant managers/ owners could suggest one improvement to the GreenToGo program, three mentioned offering more box size and shape options and two mentioned altering the membership fee structure. Several restaurants felt that GreenToGo's one-size-fits all approach was a drawback, reporting their food didn't look appealing in a single compartment and assumed that some customers don't like all their food to be touching. However, one admitted that despite the lack of presentation, "most GreenToGo customers use the boxes because they support the commitment to sustainability and values it represents, the food inside tastes the same either way." Another interviewee reported that smaller sizes would be beneficial for taking home side dishes, recalling a time when they had to box up a main entree in the GreenToGo box but still give the customer two additional styrofoam containers for a side of black beans and soup. Others were more concerned with the cost of the GreenToGo membership for customers, suggesting different price tiers for customers which require more boxes or which use the program more frequently. One offered up the idea of customers paying more for the convenience of being able to have more than just one dirty container checked out. Another manager recalled their conversations with customers who were interested in the GreenToGo program but felt they didn't eat out enough to justify the cost of becoming a member. In response to these concerns, they suggest GreenToGo tweaks their membership plan to offer a lower monthly membership fee to those who only eat out once every other week versus those who may eat out every day.

Additional suggestions to improve the GreenToGo program and its chances of success in other areas often revolved around getting more restaurant buy-in by making more of an effort to sell the economic benefits of a restaurant partnership with GTG. Many managers that participated in the interview process expressed their lack of bandwidth and incentive to promote GreenToGo. There could be substantial cuts to the cost of buying single-use to-go containers with mass adoption, however managers aren't seeing these benefits yet. For example, if a

restaurant spends ~\$1000/month on to-go material currently but only 3-6 customers out of 1000 would like a GreenToGo box, savings are a fraction of a percent. If 50% of customers request a GTG container however, the business could save up to \$500/month and therefore \$6000/year. To increase restaurant buy-in, GreenToGo would need to sell the program by putting those numbers together in a one page cost savings report or infographic expressing both feasibility and assurance the program will continue to grow. While some do not perceive a significant economic benefit from handing out GreenToGo containers in lieu of purchasing more single-use boxes until more wide-scale adoption, others believe it should still count as a promotional incentive right now and recognize “Business owners hearing about any amount of money they’ll be saving is a huge draw.”

One interviewee offered that GreenToGo should put on more community-wide events to boost awareness. They pitched the idea of a block party where all food would be served in GreenToGo containers. Another event idea provided would include more intentional collaborations with select partnering restaurants, where GTG could advertise eating out at a certain location, share their marketing material with new customers and explain the simplicity of the GTG process, and hopefully bring in new customers to the restaurant while also providing good publicity. Another idea to help boost GreenToGo customer participation and therefore incentivize more restaurant support is to provide restaurant management with ideas and strategies to increase adoption. One interviewee offered that with a grant, GreenToGo could subsidize food that will be transported in a GTG box by offering a 5-10% discount on orders.

Overall, the interviews served as an invaluable look into the perceptions of some of GreenToGo’s most important partners and their viewpoints will be extremely useful in improving the program’s outlook and marketing structure for both Durham and elsewhere.

## **Strategy Summaries**

As GreenToGo gradually develops into a mature business in Durham, it is time to consider expanding their business model to other cities and communities. In this project, we attempt to identify potential barriers for GTG’s expansion to new locations. To be specific, we focus on three different scales – university campuses, smaller towns, and urban centers. We primarily used literature reviews and case studies to summarize the general barriers of expanding the business to a new environment. For the purpose of this project, we considered GTG’s

adoption in four locations - Northampton, MA, Austin, TX, San Francisco Bay Area, CA, and San Diego, CA as pilot cities. We conducted TOWS (Threats, Opportunities, Weaknesses, Strengths) analysis for each of the four locations to evaluate their internal strengths, weaknesses, and external opportunities and threats.

After studying the literature and case studies of business expansion, along with interviewing the Go Box owner and organizer of a pilot program at Duke, we identify some of the potential barriers that GreenToGo might encounter when expanding to other cities and communities.

### *1. Local competition in the new environment*

Depending on whether there is a similar reusable to-go container business in the targeted new city, there may be local competition with or criticism about our incoming business. We need to recognize the competitive edge of GreenToGo and exploit it to develop a unique strategy to attract local customers and restaurants partners. If the city already has a similar to-go box program, it is important for GTG to consider avoiding direct competition in the same operating area as others. Instead, GreenToGo can map out potential restaurants to partner with in a different area of the city and then try to spread out the business after establishing good local reputation.

### *2. Business awareness and credibility*

Entering into a new city or community calls for creating awareness and building credibility. Public awareness of the GTG program can be achieved from advertising and marketing efforts, such as an increased presence on social media or even talking directly to the targeted restaurant owners. By stepping into individual restaurants and talking face to face, we can show our sincerity and earn trust between each other. Moreover, it is important to demonstrate the effectiveness and simplicity of using GTG to-go containers. Advertising GTG's success in Durham, NC can be a good starting point to convince restaurant managers and sell the program as a feasible and beneficial business.

### *3. Different eating/take out cultures*

Cultural fit is another important issue. Other cities and communities will have different eating habits and take-out frequency from people in Durham. To some extent, the Durham community is open to new small businesses and is supportive of homegrown ideas and practices like GTG. In this case, GTG needs to take into account local eating patterns (i.e. whether

individuals prefer dining in or taking food out) when deciding suitable geographical locations for expansion.

#### *4. Advertising and promotion at an affordable cost*

At the initial stage of running the GTG program in a new city, it usually requires advertising materials and offering promotion discounts to early customers or restaurant partners. The costs of advertising flyers, brochures or social media coverage may vary greatly. GTG needs to design a specific advertising plan depending on the features of a certain city, and control the advertising expenses at an affordable level in order to keep the program running.

#### *5. Local regulatory background*

It is also essential for GTG to pay attention to the local regulatory context in a new city or community. California, for example, is a good place to consider because of its ban on Styrofoam containers and single-use plastic bags. Under this regulatory environment, restaurant customers in California are more willing to use recyclable or reusable to-go containers and more supportive of sustainable practices. Hence, it will likely be easier for GTG to gain local community support and promote the program there. Even without similar bans, GTG should also seek policy initiatives that could be beneficial to its business.

#### *6. Route arrangement of onboard restaurants*

After attracting a certain number of restaurants, GTG needs to consider the geographical location of each establishment and find the optimal delivery route to distribute and collect the reusable containers. Alternatively, GTG could consider the optimal geographical distribution of restaurants within a certain area first, and then find suitable restaurants to get onboard.

#### *7. Human resources management*

Expanding to a new city also requires new staff and managers. In Durham, we may depend on the founding members and volunteers, but in a new city it may require a recruiting and training process. As a result, it will increase the financial burden on GTG to fund the training and pay for extra working labor.

Furthermore, we need to better understand the GreenToGo program's strengths and weaknesses, as well as leveraging the opportunities and threats in different cities to provide suitable expansion strategies. We conducted a TOWS analysis to evaluate the situations of four cities which serve as pilot cities of the GreenToGo program (see Tables 2-4). The TOWS analysis in these tables list the internal strengths and weaknesses of the GreenToGo in the two

shaded horizontal columns, as well as the external opportunities and threats in each city in the two shaded vertical columns. The TOWS analysis is a variant of the classic SWOT analysis but emphasizes more on the external environment and can provide a more in-depth evaluation.

Table 2. TOWS Analysis: Northampton, MA

		Strengths	Weaknesses
		<p><b>S1.</b> Sustainability objective: reduce landfill waste in the first place  <b>S2.</b> Proven successful business model in Durham, NC  <b>S3.</b> Experienced managing team  <b>S4.</b> Capability to build strong partnerships with local restaurants, community and university research groups  <b>S5.</b> GTG has received enormous interest in their business from over 100 cities  <b>S6.</b> Tracking system of its containers</p>	<p><b>W1.</b> Lack of local reputation and brand awareness  <b>W2.</b> Lack of community engagement in other cities  <b>W3.</b> No prior experience in operating GTG on a larger scale  <b>W4.</b> Depends mainly on local volunteers to collect and redistribute GTG containers by bicycle</p>
<b>Opportunities</b>	<p><b>O1.</b> Small town scale  <b>O2.</b> Northampton participated in STAR Communities' pilot program and is committed to being one of the most sustainable communities nationwide  <b>O3.</b> The City of Northampton banned the sale &amp; distribution of single-use plastics bags since 2016  <b>O4.</b> Public awareness of the negative impacts of single-use plastics  <b>O5.</b> Higher population density compared to MA average and much higher than the national average</p>	<p><b>S1 &amp; O2, 4:</b> The sustainability objective of GTG is aligned with the sustainable focus of Northampton and its public, so GTG can utilize its commitment to sustainability and environment as a marketing point to attract local customers and restaurants  <b>S2, 3 &amp; O1:</b> Exploit GTG successful operation experience to develop a specific plan for a smaller town compared to Durham, such as choosing the most popular restaurant circle where local residents usually eat out  <b>S4 &amp; O5:</b> With higher population density than MA average (though much less than that of Durham), GTG can engage widely with local communities and increase brand awareness with less cost</p>	<p><b>W1, 2 &amp; O1:</b> Easier to build brand reputation and engage communities on a smaller town scale  <b>W4 &amp; O1, 5:</b> The volunteer-bicycle operation pattern can also be applied to Northampton due to its smaller scale but high population density</p>
<b>Threats</b>	<p><b>T1.</b> Daily traffic congestion in downtown area and connector roads  <b>T2.</b> 4.4% higher poverty rate (15.8%) than MA average (11.4%), 0.7% higher than the national average (15.1%)</p>	<p><b>S4 &amp; T2:</b> Try to identify suitable customer base with relatively higher household income to spend on takeout food by building community relationships and researches</p>	<p><b>W4 &amp; T1:</b> The traffic congestion problem can be mitigated by using bicycles to operate the program, and it won't have much impact on GTG</p>

Table 3. TOWS Analysis: Austin, TX

		Strengths	Weaknesses
		<p><b>S1.</b> Sustainability objective: reduce landfill waste in the first place  <b>S2.</b> Proven successful business model in Durham, NC  <b>S3.</b> Experienced managing team  <b>S4.</b> Capability to build strong partnerships with local restaurants, community and university research groups  <b>S5.</b> GTG has received enormous interest in their business from over 100 cities  <b>S6.</b> Tracking system of its containers</p>	<p><b>W1.</b> Lack of local reputation and brand awareness  <b>W2.</b> Lack of community engagement in other cities  <b>W3.</b> No prior experience in operating GTG on a larger scale  <b>W4.</b> Depends mainly on local volunteers to collect and redistribute GTG containers by bicycle</p>
Opportunities	<p><b>O1.</b> Big city scale  <b>O2.</b> Austin is a 4-STAR Community as a pilot community in 2014 and has a long-standing commitment to sustainability  <b>O3.</b> Public awareness of the negative impacts of single-use plastics; a program dedicated to creating a sustainable city-wide food system  <b>O4.</b> Much bigger population and higher population density than TX average and Durham  <b>O5.</b> Higher average household income than TX average and Durham, lower poverty level  <b>O6.</b> Rich education resources and more public &amp; private schools than Durham</p>	<p><b>S1 &amp; O2, 3:</b> The sustainability objective of GTG is aligned with the sustainable focus of Austin, so GTG can utilize its commitment to sustainability and the environment as a marketing point to attract local customers and restaurants  <b>S2, 3 &amp; O3:</b> Work with city program on sustainable food system to seek policy support by exploiting GTG successful operation experience and building partnerships with local businesses  <b>S4 &amp; O6:</b> Establish partnerships with local universities and schools to promote the program, or even introduce GTG to campus dining halls and cafeteria</p>	<p><b>W1, 2 &amp; O2, 3:</b> Catering to the public and city's commitment to sustainability, GTG can quickly gain brand reputation by promoting its environmental benefits</p>
Threats	<p><b>T1.</b> Austin ended its ban on single-use plastic bags in 2018  <b>T2.</b> Austin is ranked as having the 10th worst traffic in the US and the 4th congested city nationwide in 2012</p>	<p><b>S2, 3 &amp; T1:</b> Since Durham also does not have a similar plastic bags ban, GTG can borrow the successful experience in Durham and develop a feasible strategy for Austin</p>	<p><b>W4 &amp; T1:</b> If GTG choose a suitable restaurant circle in the urban center, the volunteer-bicycle operation pattern can be helpful/more efficient in Austin due to its serious traffic congestion problem, and it won't have much impact on GTG if the restaurants are relatively close to each other</p>

Table 4. TOWS Analysis: San Francisco Bay Area, CA

		Strengths	Weaknesses
		<p><b>S1.</b> Sustainability objective: reduce landfill waste in the first place  <b>S2.</b> Proven successful business model in Durham, NC  <b>S3.</b> Experienced managing team  <b>S4.</b> Capability to build strong partnerships with local restaurants, community and university research groups  <b>S5.</b> GTG has received enormous interest in their business from over 100 cities  <b>S6.</b> Tracking system of its containers</p>	<p><b>W1.</b> Lack of local reputation and brand awareness  <b>W2.</b> Lack of community engagement in other cities  <b>W3.</b> No prior experience in operating GTG on a larger scale  <b>W4.</b> Depends mainly on local volunteers to collect and redistribute GTG containers by bicycle</p>
Opportunities	<p><b>O1.</b> Much bigger city scale  <b>O2.</b> California’s ban on Styrofoam containers and single-use plastic bags  <b>O3.</b> Public awareness of the negative impacts of single-use plastics  <b>O4.</b> Centralized company offices and food services in SF center, big corporations  <b>O5.</b> Way bigger population (850,282) and higher population density (18,128 sq miles) than CA (232 sq mi) and national average (91 sq mi)  <b>O6.</b> Higher median household income than CA average and Durham, lower poverty level (12.5%)</p>	<p><b>S1 &amp; O2, 3, 6:</b> The sustainability objective of GTG is aligned with the sustainable focus of SF, so GTG can utilize its commitment to sustainability and environment as a marketing point to sell the program. The higher income community in SF will be more willing to spend a bit more on recyclable GTG to-go containers  <b>S3, 4 &amp; O4:</b> Expand GTG business to offer corporate subscription options by establishing partnerships with SF’s large corporations and centralized restaurants  <b>S4 &amp; O5:</b> With a much higher population density GTG can reach a larger number of potential customers/restaurants and increase brand awareness with less cost</p>	<p><b>W1, 2, 3 &amp; O4, 5:</b> Try to start from operating GTG program in a carefully chosen area of SF, apply the experience on running on small scale and gain positive reputation at first, then spread out to other areas of SF building on existing customer/community base</p>
Threats	<p><b>T1.</b> SF was ranked as the 5th worst city in terms of traffic congestion in the world, and 3rd worst city in the US in 2018  <b>T2.</b> Similar program exists - San Francisco Go Box</p>	<p><b>S4 &amp; T2:</b> Rather than competing with existing programs, GTG can choose to collaborate with them to fully utilize each other’s strengths, thus increasing the program adoption to a larger scale to benefit both sides</p>	<p><b>W4 &amp; T1:</b> GTG can mitigate the impact of traffic congestion on its operation by using bicycles to collect and redistribute returnable to-go containers in a certain small area of SF</p>

Table 5. TOWS Analysis: San Diego, CA

		Strengths	Weaknesses
		<p><b>S1.</b> Sustainability objective: reduce landfill waste in the first place  <b>S2.</b> Proven successful business model in Durham, NC  <b>S3.</b> Experienced managing team  <b>S4.</b> Capability to build strong partnerships with local restaurants, community and university research groups  <b>S5.</b> GTG has received enormous interest in their business from over 100 cities  <b>S6.</b> Tracking system of its containers</p>	<p><b>W1.</b> Lack of local reputation and brand awareness  <b>W2.</b> Lack of community engagement in other cities  <b>W3.</b> No prior experience in operating GTG on a larger scale  <b>W4.</b> Depends mainly on local volunteers to collect and redistribute GTG containers by bicycle</p>
Opportunities	<p><b>O1.</b> Big city scale  <b>O2.</b> SD is committed to be a sustainable city  <b>O3.</b> The SD ban on the usage of Styrofoam and single-use plastics just goes into effect on Feb 23rd, 2019  <b>O4.</b> San Diego Green Business Network  <b>O5.</b> Bigger population and higher population density than CA and national average  <b>O6.</b> Much less traffic congestion compared to SF</p>	<p><b>S1 &amp; O2, 3:</b> The sustainability objective of GTG is aligned with newly implemented ban, so GTG can utilize its commitment to sustainability and the environment as a marketing point to attract local customers and restaurants  <b>S2, 4 &amp; O4:</b> Work collaboratively with the San Diego Green Business Network to promote the benefits and simplicity of GTG, build partnerships  <b>S4 &amp; O5:</b> With higher population density GTG can engage widely with local communities and increase brand awareness with less cost</p>	<p><b>W1, 2 &amp; O4:</b> Easier to build brand reputation and engage communities through the Green Business Network  <b>W4 &amp; O5, 6:</b> The volunteer-bicycle operation pattern can also be applied to San Diego due to its high population density</p>
Threats	<p><b>T1.</b> Slightly lower poverty rate (15.0%) than CA average (15.8%), but very polarized income level in SD</p>	<p><b>S3, 4 &amp; T1:</b> Leverage the local research resources and partnerships to identify locations with different income level and eating out frequency, and then design different membership fee structure to serve various groups of customers</p>	<p><b>W3 &amp; T1:</b> Operating GTG program in different demographic area of San Diego, apply the operation experience on a small scale facing different groups of potential customers</p>

Finally, combining the analysis above, we develop different strategy summaries based on the specific situation of university campuses, smaller towns and urban centers.

### *University campuses*

#### *Strategy 1: Promote the huge potential benefits for university*

Although introducing GreenToGo containers to a university campus includes the capital expenditure of buying in the program and maintenance expenses, the benefits can greatly offset and even exceed the costs. GTG needs to explain their simple business operation process and emphasize the water, energy, and money universities can save if they switch to reusable and returnable to-go containers. Considering the significant amount of boxes that college students check out from school dining halls every year, universities will be able to save huge expenses from avoiding the cost of buying disposable to-go boxes, high water bills from cleaning dishes, and large amounts of landfill waste which may require more workers to remove.

One of the most important aspects is cleaning facilities - if the containers can be sanitized with the college's cleaning facility, then the university can save an extra expense on their collection and transportation to a designated cleaning facility outside the campus.

#### *Strategy 2: Collaborate with various dining centers on campus*

Aside from university dining halls, there are so many other dining choices for students and faculty such as on-campus restaurants, departments or hospital cafeterias. GTG can engage with a broader campus community if they can also collaborate with these food services to provide GTG to-go containers. To increase GreenToGo's influence on campus, GTG employees can work with the university to introduce "Compostable To-Go Box Free Day" on a certain day of the week.

#### *Strategy 3: Advertise the program through student groups*

Student organizations within universities usually cover a wide range of people from different backgrounds and have a closer relationship among members. Working with student groups similar to the Duke Green Devils to organize campus activities or a campaign is a good approach to educate the benefits of using GTG containers and increase the awareness around the

GTG program. Additionally, GreenToGo can potentially offer student discounts for early subscribers who join the program on campus in the first few weeks.

#### *Strategy 4: Design a more suitable program operation process for college students*

College students may have different eating habits from restaurant customers, so GTG can consider improving its operation process to meet their specific needs. For example, if the school dining halls are buffet style, GTG needs to simplify the check-out and return process and enable students to check out with one container after packaging all the food they need. Moreover, to ensure students and faculty will return the to-go containers in exchange for a new one on campus, the to-go containers can be designed to be more trackable such as attaching a QR code under the box.

If GTG wants to further strengthen the bond with a university, it can designate college ambassadors or offer on-campus internship opportunities to promote the program and analyze students' perception of GTG through research projects.

#### *Smaller towns*

##### *Strategy 1: Carefully choose smaller towns with high population density*

When expanding to smaller towns, the first thing GTG needs to ensure is that the target community has high population density to support the program. Higher population density can greatly reduce the expenses on collecting and redistributing the to-go containers and working labor costs. It can also help GTG narrow down the area of potential participating restaurants by focusing on the center of the small town where most people eat out.

##### *Strategy 2: Raise community awareness of the benefits and simplicity of using GTG containers*

It is always important for GTG to gain awareness and brand reputation of the local community. By locating in a smaller town, GTG can utilize the word-of-mouth effect of early joiners, as well as organizing community events such as using GTG containers to provide all the food for a party or community event to advertise the program.

#### *Urban centers*

*Strategy 1: Content marketing to get more restaurants on board*

When expanding to urban centers in a larger city, GTG should aim to get more restaurants on board with the program by making better efforts to sell the economic benefits of establishing a partnership with GTG. We recommend GTG utilize content marketing such as demonstrating the simplicity and profitability of the program through news coverage. Articles about their successful business experience in Durham, NC are very useful content materials to strengthen credibility of the GTG program in other areas, thus attracting more local restaurants managers to join and even promote GTG. In addition, posting stories or videos from successful business owners who joined GTG on social media can also attract more attention and reach potential partners/customers from all backgrounds and various ages.

*Strategy 2: Expand the program to corporate dining centers and cafeteria*

Unlike campus or smaller towns, urban centers have rich resources of office workers. Companies located in the city center can be a significant but untouched space for GTG to expand. GTG can offer a corporate subscription option, placing drop bins at major companies so that their employees can check out and return GTG to-go containers more conveniently at dining halls or cafeterias of their working place, instead of using GTG only at participating restaurants. Considering the large number of office workers during weekdays, there could be substantial cuts to the cost of buying single-use to-go boxes for companies with mass GTG adoption. This is one of the advantages that other small cities or communities cannot enjoy from the current program.

*Strategy 3: Redesign the program to meet different customers' needs*

Since big cities tend to embrace people from all walks of life and backgrounds, their income level and eating habits can vary dramatically. In order to offer more flexible choices for different people, GTG should consider redesigning the program's membership fee structure to provide a tiered subscription price. Besides an annual or monthly membership fee, it can offer an alternative option for one-time customers to purchase the GTG box whenever they need one. In this way, people with less take-out frequency can also enjoy the benefits of the GTG program and hopefully evolve into a more frequent user after the convenient experience. Furthermore, offering different box sizes to package different kinds/size of food is another chance for GTG to differentiate itself and attract a broader range of customers.

*Strategy 4: Map out a reasonable route and schedule to reduce transportation cost*

If scaling up in urban centers, the complexity of everyday logistics will likely increase. With the intention of drawing more restaurants on board, GTG needs to plan ahead the ideal geographical area of potential businesses. Locating major restaurants in the busy city center may encounter traffic congestion during peak times, while choosing restaurants in sparse area may also increase the transportation costs. Additionally, it is essential to consider a suitable collection approach in the urban center. Unlike operations in Durham, bicycles would not be efficient enough to collect and re-deliver all returnable to-go containers in big cities due to the larger scale of operations. Otherwise, restaurants will need to have more space to store the GTG containers and that will be a challenge for them. GTG can either consider other deliver approaches or try to divide all participating restaurants into smaller cycles and collect containers on a carefully designed route and weekly schedule.

*Strategy 5: Leverage local resources to form business partnerships*

Under circumstances where the city has similar recyclable to-go container programs (i.e. San Francisco Go Box), GreenToGo may consider forming local partnerships rather than pure competition. Other than selecting a completely different operation area from other competing businesses in the city, GTG can establish partnerships so that they can collaboratively raise public awareness and acceptance of such sustainable containers by fully utilizing their respective strengths and resources. If the partnership is able to gain positive program reputation among a broader range of communities in the urban center, both GTG and other business will benefit from the increased customer base and realize their common sustainability goal to a larger extent. Moreover, leveraging city regulatory advantage (i.e. San Francisco's ban on Styrofoam containers) or seeking policy support can be of great value to the expansion of GTG to bigger cities.

**LIMITATIONS AND BIASES**

We attempted to cover a broad range of customers and restaurant owners with our time and resources. In terms of scope, our survey was targeted at customers who visited the 28 participating GTG restaurants in Durham, which only represents a small portion of the whole

population of restaurant visitors. GTG restaurants had different levels of involvement in distributing the survey which resulted in varying levels of participation from their customer bases. Some restaurants distributed the survey link on social media, some displayed fliers, some distributed paper surveys, and some did a combination of these things. A few GTG restaurants did not wish to participate because they did not want to bother their customers, or some restaurants never responded to us. Though we tried our best to distribute survey materials and paper surveys by directly dropping them off at supportive restaurants or posting survey link on GTG newsletter and social media, we did not have the chance to cover all GTG restaurants.

There may be some bias in our results because many respondents are probably already interested in these issues. The restaurants that participated in the survey are already involved with GTG and may already have a very environmentally friendly clientele. We may have missed surveying potential consumers who are interested in joining the GTG program at other restaurants that are currently not on board with GTG. The restaurants that were surveyed are local restaurants which may have a different clientele than national chain restaurants and may bias the results of this study towards scaling up GreenToGo for chain restaurants (Auty, 2006).

Furthermore, we conducted 5 interviews with participating restaurants owners/managers so far in order to understand their perceptions of the program. Overall, in spite of the limitation of survey and interview amount, we believe the responses we gathered are sufficient to form an analysis that can help GTG identify the barriers of both consumers and restaurants to joining the program and provide useful suggestions. For further study, the GTG team can consider expanding survey and interview population if they want to have a more thorough analysis of the consumer attitude towards GTG program.

In addition, our strategy recommendations on expanding GTG business are mainly based on literature research and case studies on the Internet, yet we were able to interview and learn from Go Box which has been doing a similar program in Portland and San Francisco. We can further update and improve our strategy on scaling up GTG if we are allowed to gain more first-hand experience.

In the end, our case study of the GreenToGo program can only contribute part of the solutions to the bigger single-use plastics problem in the world today. Since we only focus on the to-go containers, there remain other plastics usages such as plastic bags, cups and straws that people would use on a daily basis. The global single-use plastics consumption has reached over

355 million metric tons, while styrofoam food and beverage containers make up approximately 17.6 million of that combined total (“Global Plastics Production,” 2017; Chandra et al., 2016). We also need to notice that our target is a specific demography who often eat out and are willing to use to-go containers for food leftovers, so the goal of reducing the global consumption of single-use plastics cannot be achieved solely by changing their consumer behaviors of using to-go box. Therefore, in this case, our project is limited in the scope of the research topic and population.

## **RECOMMENDATIONS AND FUTURE WORK**

Our suggestions for successful continuation of the program in Durham and its implementation elsewhere can be used to more efficiently reduce single-use plastic consumption within the food industry. We suggest that GreenToGo continue to improve its business model by remedying customers’ and business owners’ concerns about the program. Primary concerns of business owners often involved doubts around the program’s current marketing strategy and fear regarding customer perception of the GreenToGo boxes. Customers expressed that they would like to see GreenToGo come to more of their favorite restaurants, they would like more container shapes to accommodate foods like pizza and soup, and that they felt the education about the program on both the customer and business sides needs to be improved. GreenToGo should continue expansion to continue bringing GreenToGo to customers’ favorite restaurants to make the program more wide-spread, incorporate more container shapes and sizes to provide subscribers with variety, and improve education for both customers and restaurant employees. We also recommend that they focus future expansion on hot spot areas of population growth in Durham, specifically Downtown Durham and East Durham, to reach a larger population of potential subscribers. GTG should also strategize ways to reach a wider demographic population.

To continue to improve the program and collect more information about GreenToGo subscribers, future studies should provide other language options for customer surveys (e.g. Spanish), offer the survey for a longer period of time, and conduct in-depth interviews with previous GTG subscribers to discuss in depth why they no longer subscribe.

Last but not least, it is time for GTG to consider expanding their business to other cities, and we recommend GTG take different strategies and adjust the fee structure when they scale up: 1) for university campuses, GTG should promote the benefits of the program and work

collaboratively with school dining halls and student groups; 2) for smaller towns, GTG should target communities with a high population density; 3) for urban centers, GTG can offer corporate subscription option, place more drop bins around office buildings and build business partnerships to fully utilize local resources.

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## APPENDICES

### Appendices A: Literature Review

<b>Article</b>	<b>Author</b>	<b>Title</b>
1	Antonides, G.	Sustainable Consumer Behaviour: A Collection of Empirical Studies
2	Asmuni, S., Hussin, N. B., Khalili, J. M., and Zain, Z. M.	Public Participation & Effectiveness of the No Plastic Bag Day Program in Malaysia
3	Boztepe, A.	Green Marketing and Its Impact on Consumer Buying Behavior
4	Cornelissen, G., Pandelaere, M., Warlop, L., and Dewitte, S.	Positive Cueing: Promoting Sustainable Behavior by Cueing Common Environmental Behaviors as Environmental
5	Dijksterhuis, A., Smith, P. K., Van Baaren, R. B., and Wigboldus, D. H. J.	The Unconscious Consumer: Effects of Environment on Consumer Behavior
6	Joseph, N., Kumar, A., Majgi, S. M., Kumar, G. S. and Prahalad, R. B. Y	Usage of Plastic Bags and Health Hazards: A Study to Assess Awareness Level and Perception about Legislation Among a Small Population of Mangalore City
7	Lamb, W.C.	End Use Packaging: A Survey of Customer Perception of Recycling and Environmental Impact of Packaging Materials
8	López-Murcia Martín, J.	Social perceptions of single-use plastic consumption of the Balinese population
9	Madara, D. S., Namango, S. S., and Wetaka, C.	Kenya Consumer-Perception on Polyethylene-Shopping-Bags
10	McCarty, J. A., Shrum, L. J., and Lowrey, T. M.	Environmental Consumer Behavior
11	Minton, A. P., and Rose, R. L.	The Effects of Environmental Concern on Environmentally Friendly Consumer Behavior, An Explanatory Study
12	Nizam, N. Z., Mansor, N., Yahaya, S. N., and Ahmad, A.	Consumers Buying Trend on No Plastic Bags Campaign at Shopping Mall in Malaysia
13	Peighambari, K., Sattari, S., Kordestani, A., and Oghazi, P.	Consumer Behavior Research: A Synthesis of the Recent Literature
14	Straughan, R.D. and Roberts, J.A.	Environmental Segmentation Alternatives: A Look at Green Consumer Behavior in the New Millennium
15	Ylitalo, L. B. and Gerdin, P.	Sweden Case Study of No Plastic Bags in Grocery: The Influence of Different Factors on

		Consumer Attitudes towards an Environmental Initiative
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## Appendices B: Customer Survey Materials

### Appendix B1. Customer Survey (Paper Version)

#### Customer Opinions on GreenToGo

We are graduate students at Duke University's Nicholas School of the Environment working with GreenToGo, a Durham initiative to reduce single-use plastic. Results from this survey will be used to improve and expand GreenToGo's reusable takeout container program. You have the opportunity to be entered to win a gift card if you fill out the survey and provide your email at the end!

The survey should take you around 3 minutes to complete. Please be aware that your participation in this research is voluntary and you have the right to withdraw at any point during the survey. Please be assured that your responses will be kept completely confidential. By taking this survey, you are acknowledging your participation in the study is voluntary, you are 18 years of age or older, and you are aware that you may choose to terminate your participation in this survey at any time and for any reason. Your thoughts and participation are greatly appreciated!

If you have any questions, please contact Heather DePouw at [heather.depouw@duke.edu](mailto:heather.depouw@duke.edu).

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The following questions serve to help us understand customer's restaurant visiting habits.

1) How many times did you eat out in the past month? (Eating a meal somewhere else other than home or other than eating a home-cooked meal. This includes ordering takeout.)

- None
- Once or twice (1-2 times)
- A few times (3-6 times)
- Every couple of days (7-15 times)
- Almost everyday (15+ times)
- Everyday

2) Why do you eat out? (Choose all that apply)

- Convenience
- Lack of time to prepare a meal at home
- Lack of kitchen facilities in home
- Don't want to plan a meal
- To be with other people
- Forgot to bring a meal
- Faster to eat
- More food choices
- Try something new
- Cheaper
- Other: \_\_\_\_\_

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The following questions serve to help us understand the attitudes and opinions of restaurant customers in Durham, NC.

3) If a local restaurant or bar used waste-reducing products, such as reusable to-go containers, would you frequent this business more often?

- Yes
- No
- Not Sure

4) Answer to which degree you agree or disagree with the following statements.

	Strongly Agree	Somewhat Agree	Neutral	Somewhat Disagree	Strongly Disagree
Reducing trash in my community is very important to me.	<input type="checkbox"/>				
I think about the environment when making purchasing decisions.	<input type="checkbox"/>				
I can make an impact by reducing the amount of disposable products that I use.	<input type="checkbox"/>				

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This section serves to help us understand your knowledge of GreenToGo in Durham, NC.

5) Have you heard of GreenToGo?

- Yes. If yes, go to the next question.
- No. If no, GreenToGo is a reusable takeout container service in Durham, NC that was founded by Don't Waste Durham. To use the service you become a member, go out to eat, check out a takeout container, and then return the box to any participating location. **If no, please skip to question 14.**

6) How did you hear about GreenToGo?

- Friends/family
- Co-worker
- Facebook
- Twitter
- GreenToGo Website
- Advertisement
- Tabling event

7) Do you currently have a GreenToGo subscription?

- Yes
- No, but I have in the past
- No, I have never used GreenToGo. If selected, skip to question 11.

8) How often do/did you check out boxes with your GreenToGo subscription?

- A couple times a week. If selected, skip to question 11.
- At least one a week. If selected, skip to question 11.
- A couple times a month
- About once a month
- Every few months
- Not at all

9) What stops you from checking out GTG boxes more often? (Open response)

10) What would need to change about GTG for you to use your subscription more frequently? (Open response)

11) How do you feel about the price of GreenToGo? (A year-long subscription is currently \$2.08 per month)

- The price is very low
- The price is a little low
- The price is perfect
- The price is a little high
- The price is very high

12) How willing are you to pay the current subscription price for GreenToGo? (A year-long subscription is currently \$2.08 per month)

- Very willing, my GreenToGo subscriptions provides a great value
- Somewhat willing, my GreenToGo Subscription is an okay value
- Not willing, GreenToGo is not a good value
- Not willing, I would not use GreenToGo

13) Which restaurants would you like to see use GreenToGo? (Open response)

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The following questions are so we can learn a little bit more about Durham restaurant customers.

14) Are you a resident of Durham County?

- Yes
- No

15) What is your ZIP code? (Open response)

16) With which gender(s) do you most closely identify?

- Female
- Male
- Transgender
- Gender non-conforming / Non-binary
- Other: \_\_\_\_\_
- Prefer not to say

17) Please select the age range that you fall in.

- 18-29
- 30-39
- 40-49
- 50-59
- 60-69
- 70-79
- 80+

18) Choose one or more of the following that you consider yourself to be (select as many as apply):

- American Indian or Alaska Native
- Asian
- Black or African American
- Hispanic/Latino
- Native Hawaiian or Pacific Islander
- White/Caucasian
- Other \_\_\_\_\_

19) Information about income is very important to understand. Would you please give your best guess?  
Please indicate the answer that includes your entire household **income in (previous year)** before taxes.

- Less than \$10,000
- \$10,000 to \$19,999
- \$20,000 to \$29,999
- \$30,000 to \$39,999
- \$40,000 to \$49,999
- \$50,000 to \$59,999
- \$60,000 to \$69,999
- \$70,000 to \$79,999
- \$80,000 to \$89,999
- \$90,000 to \$99,999
- \$100,000 to \$149,999
- \$150,000 or more

20) Are you in anyway affiliated with GreenToGo or have been in the past? (Employee, volunteer, etc.)

- Yes
- No

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**Conclusion**

21) Do you have any additional questions, comments, or concerns? (Open response)

22) Would you be interested in being entered to win a gift card to a GreenToGo participating restaurant of your choice? If so, please provide your email. If not, leave blank. (Open response)

**Thank you for completing the survey!**

If you would like to learn more about GreenToGo please visit their website: <https://durhamgreentogo.com/>

# TAKE OUR STUDENT SURVEY!

INTERESTED IN CARRY OUT AND  
CONSUMER WASTE?

PLEASE VISIT THE FOLLOWING  
LINK OR SCAN THE QR CODE!

<https://bit.ly/2stvMdz>



Takes 3 minutes to complete.  
Respondents will be entered into a  
drawing for 1 restaurant gift card.

This restaurant  
is a proud  
supporter of  
a greener  
Durham!



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This restaurant is a proud supporter of a greener Durham!



Enter for the chance to win a restaurant gift card!

<https://bit.ly/2stvMdz>

FOLLOWING LINK OR SCAN THE QR CODE!  
CONSUMER WASTE? PLEASE VISIT THE  
INTERESTED IN CARRY OUT AND

**TAKE OUR SURVEY!**

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Appendix B5. Survey Advertisement Tri-fold Poster

**TAKE OUR SURVEY!**

*GreenTO-GO*

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<https://bit.ly/2stvmdz>

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*GreenTO-GO*

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## **Appendices C: Owners/Managers Interview Script**

### Durham Restaurant Owners/Managers Interviews

#### Oral Consent

My name is (insert researcher name here), and I am a student at Duke University's Nicholas School of the Environment. My team and I are working with GreenToGo, a Durham initiative to reduce single-use plastic. Results from this interview will be used to improve and expand GreenToGo's reusable takeout container program.

With your permission, I would like to interview you for about 15-20 minutes. The questions are not about private matters. I am interested in your thoughts about the GreenToGo initiative in Durham, NC.

I would like to tape record the interview to make sure that I have all your answers and so that I can listen to you without taking notes. I will use the tape to write down our conversation and then I will erase the tape.

During the interview, I will not ask for your name, so no one can connect your answers to you. If there is a question you would prefer not to answer, just let me know and we will move on to the next one. It is also perfectly fine if you decide you are ready to end the interview.

Do you have any questions for me now? You can ask questions any time during our interview.

#### Interview Questions

1. Why did you choose to join the GreenToGo program?

What interested you in the initiative?

What are your thoughts about sustainability and consumer waste?

How important are these concepts to you on a scale of 1-10?

What business choices do you make to support sustainability or reducing waste?

2. How did you hear about GreenToGo?

Did customers initially ask for it?

Did you hear from other businesses?

Did GreenToGo reach out to you?

3. What do you think customers think about the program?

How do you know?

Is there a positive attitude around it?

4. Describe the process a customer goes through when getting a GreenToGo box at your restaurant. (Please explain step by step)
5. What type of containers do you offer for take out? When people ask for a to-go box do you offer a GreenToGo box first or is styrofoam/ single- use food packaging the typical go-to option?
6. Do you advertise using GreenToGo?
  - If so, how do you advertise the program?
  - Do you ask takeout customers if they are GreenToGo members? If not, why not?
  - Do you promote using GreenToGo in your company newsletter or social media?
7. How do the staff at your restaurant feel about GreenToGo?
  - How much do you think they know about it and how it works?
  - How did you get your staff up to speed on the new program?
  - What are the challenges in making sure everyone knows about the program?
8. What makes getting involved in the GreenToGo program challenging?
  - Do you feel there were barriers to joining?
  - Did you have initial reservations?
  - Was it difficult for your business?
9. What do you think would deter others from participating?
10. What were some challenges that you discovered after using the program for a few months?
11. If you could change one thing to improve about the program what would it be?
  - Lack of other box sizes and shapes
  - The pick-up process
  - The cleaning process
  - Availability of checking out boxes
  - Cost
  - Adding a customer loyalty feature
  - Other (explain)
12. What has been the biggest benefit to your business from using GreenToGo?
13. What do you wish you knew if you were starting over now?
  - Can you offer an advice to other businesses?

14. Do you feel GreenToGo's marketing materials are efficient? What do you think would help customers use the boxes more often?

15. Where do you see GreenToGo heading?

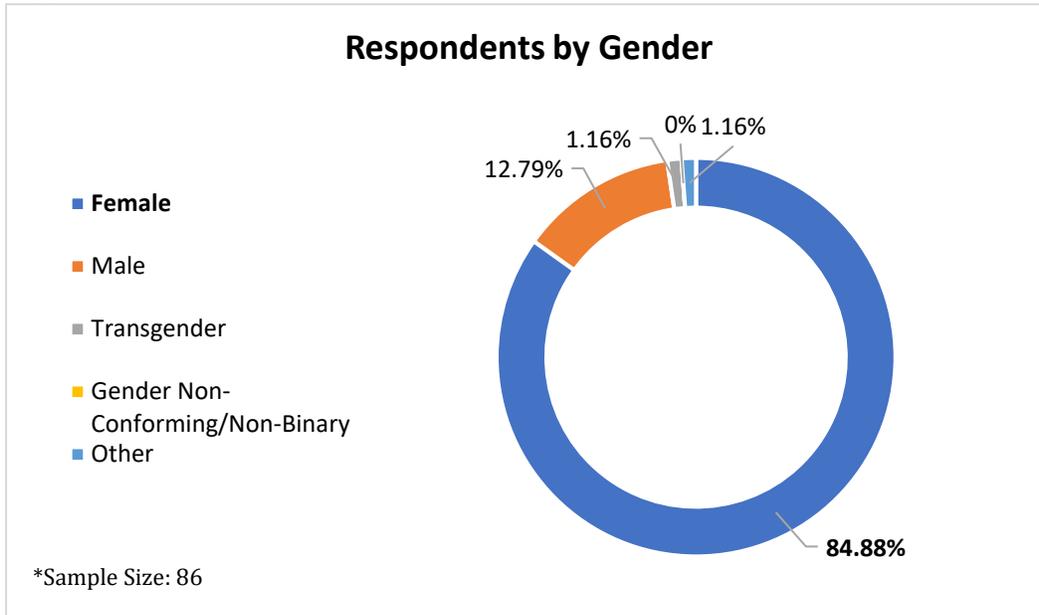
Room for expansion into other communities/ university campuses/ even countries?

16. Will you continue to use GreenToGo in the future?

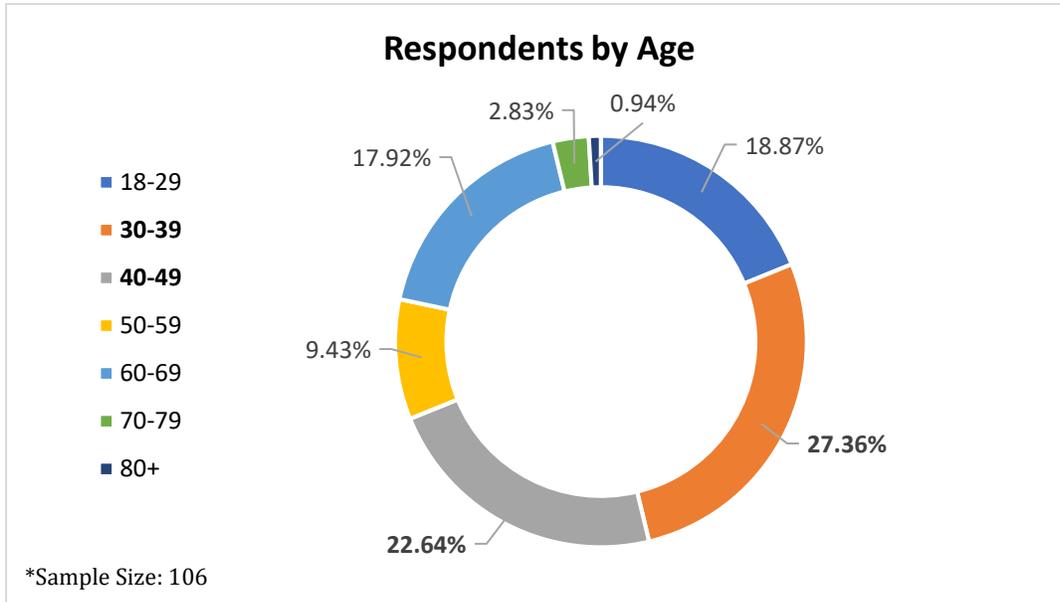
What would influence this decision?

## Appendices D: Survey Results

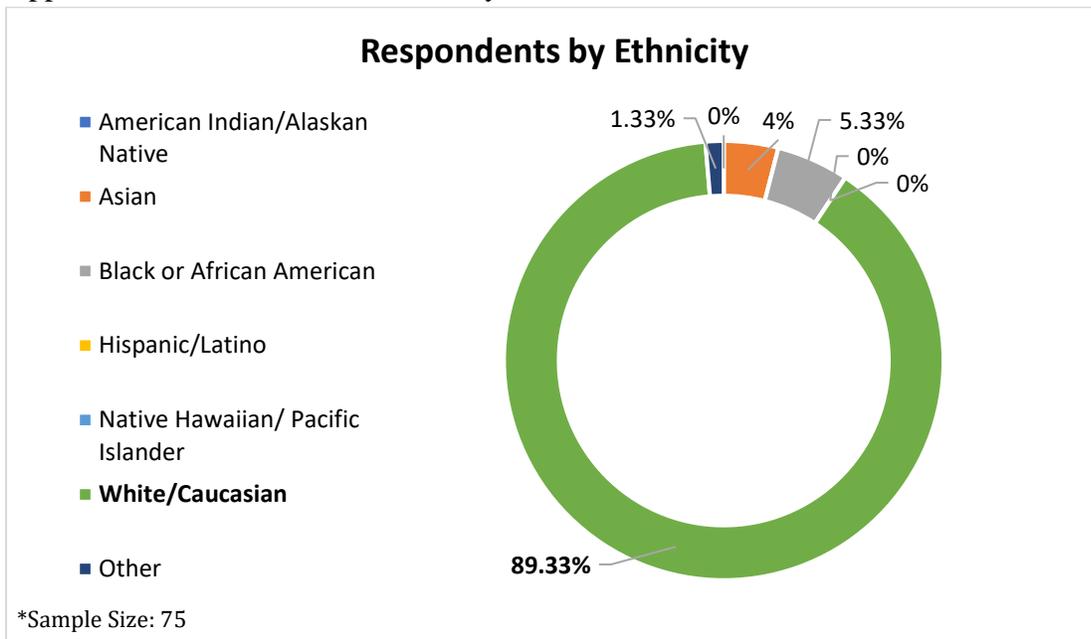
### Appendix D1. Breakdown of Gender



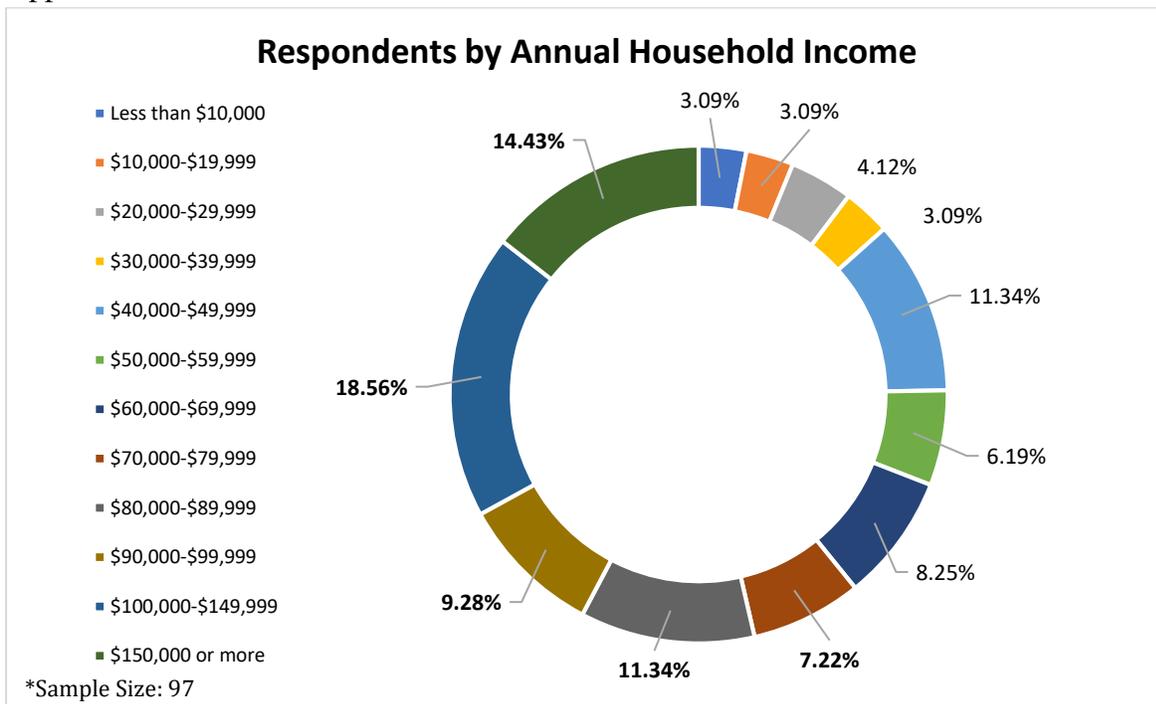
### Appendix D2. Breakdown of Age



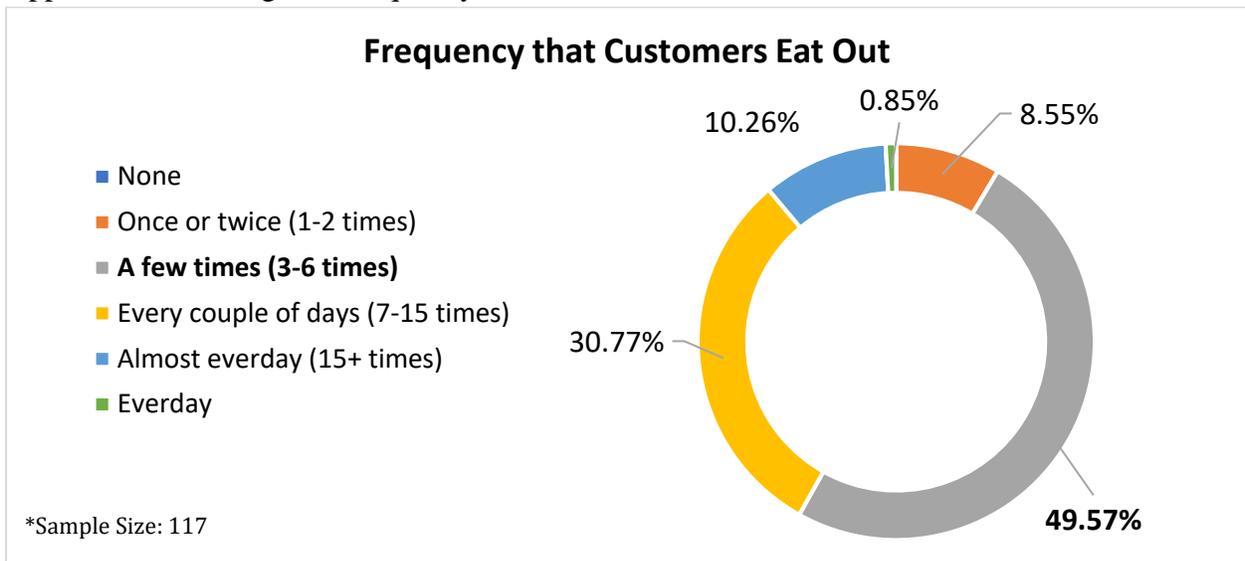
### Appendix D3. Breakdown of Ethnicity



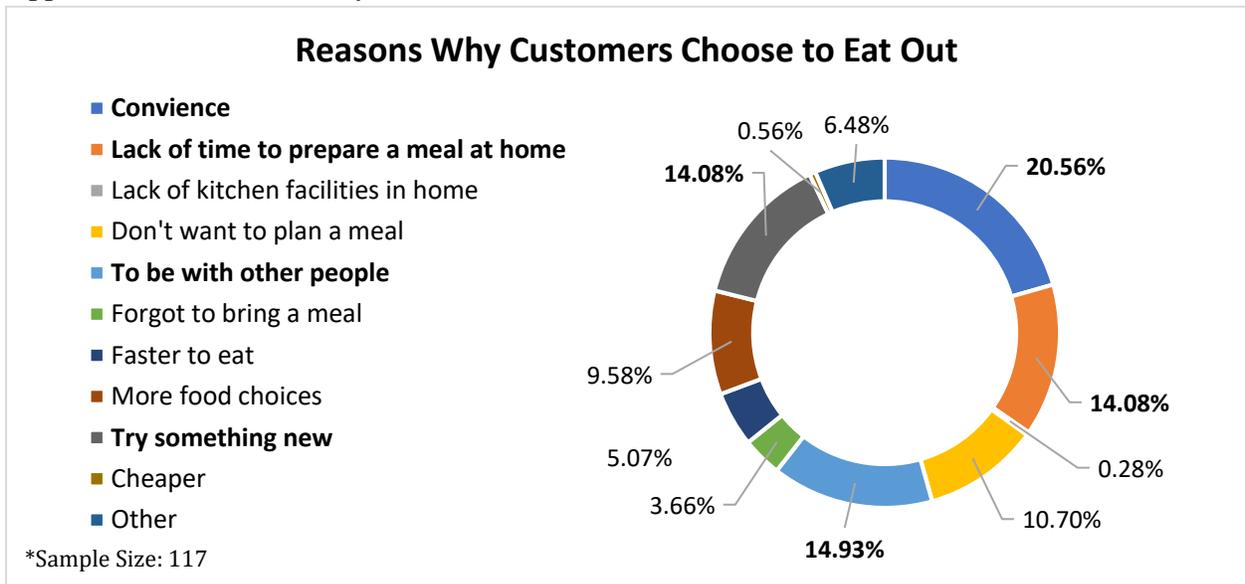
### Appendix D4. Breakdown of Income



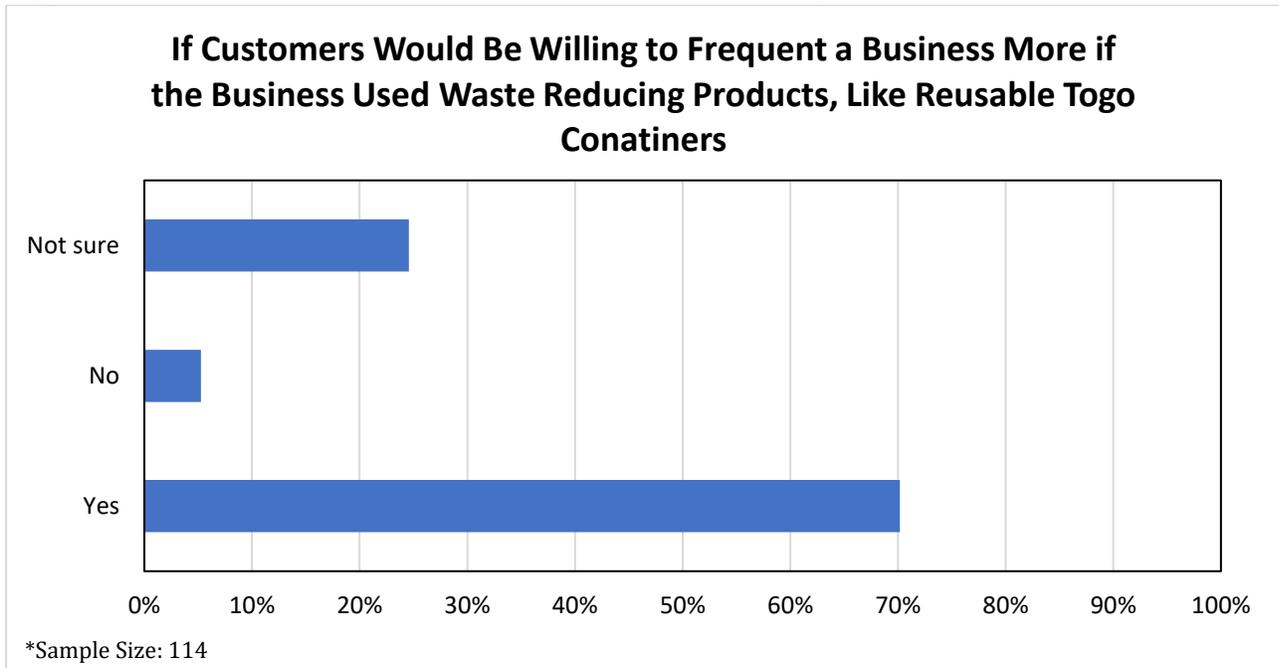
Appendix D5. Eating Out Frequency



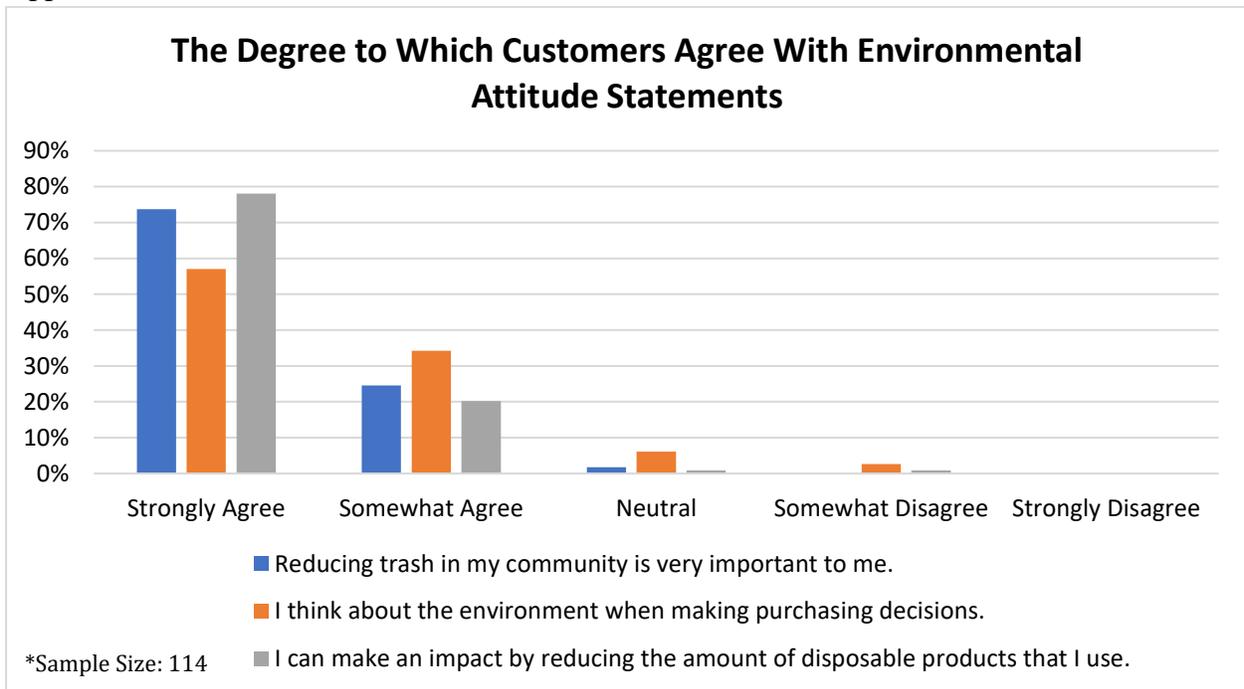
Appendix D6. Reasons Why Customer Eat Out



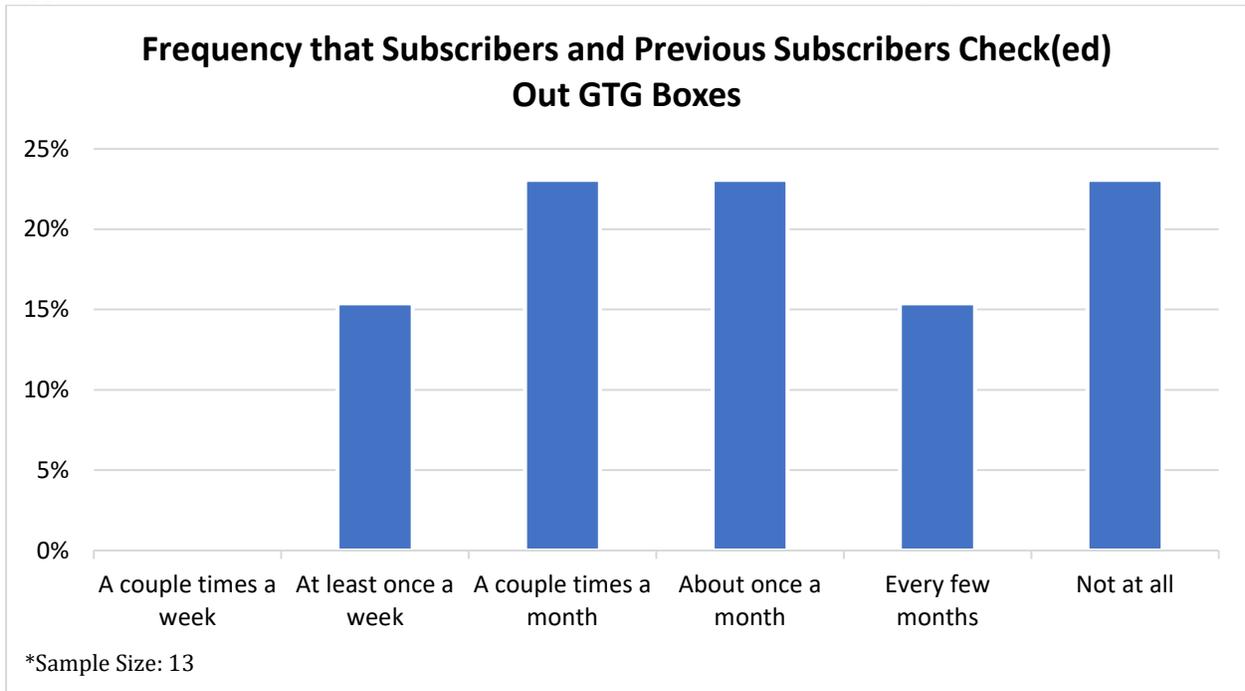
Appendix D7. If Businesses Were to Use More Waste-Reducing Products



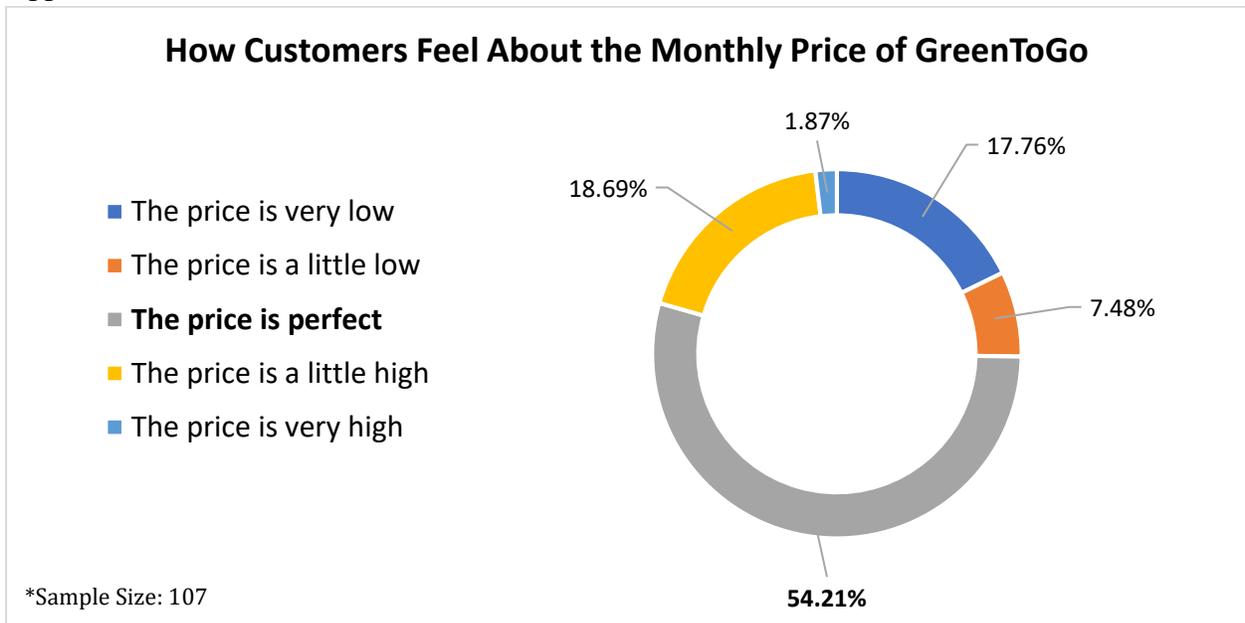
Appendix D8. Environmental Attitudes



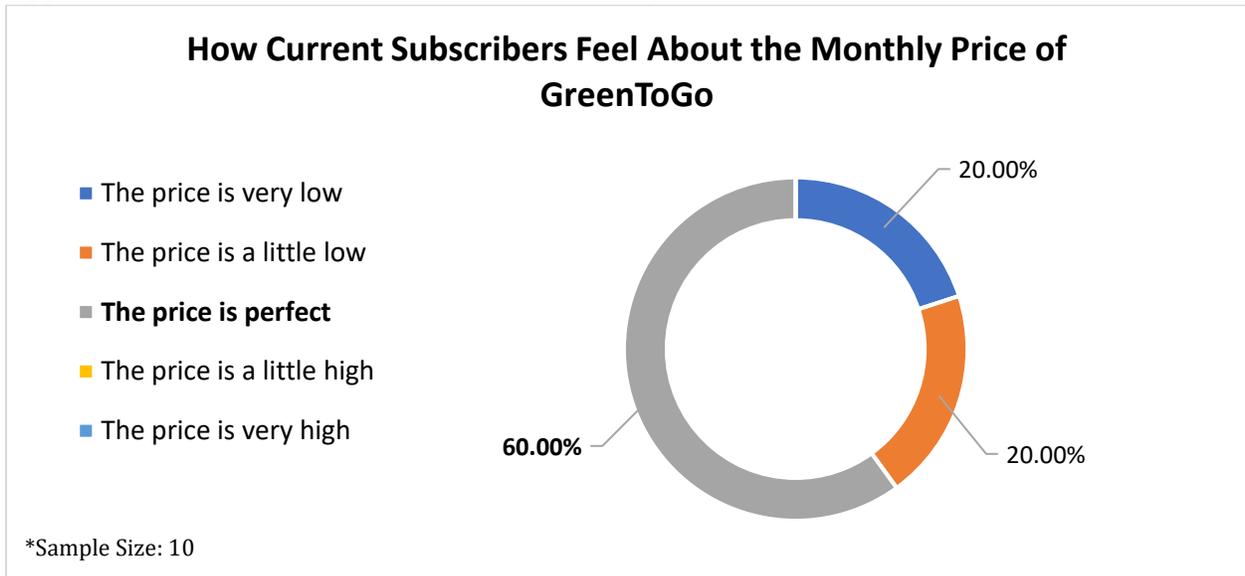
Appendix D9. How Often Subscribers and Previous Subscribers Check(ed) Out Boxes



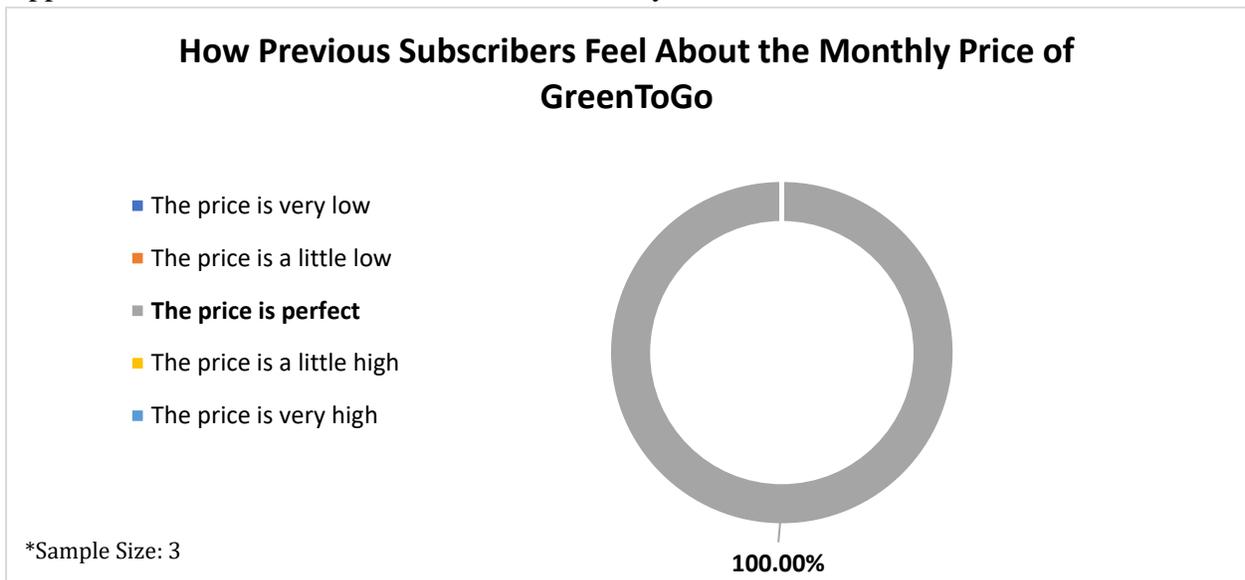
Appendix D10. Price of GreenToGo



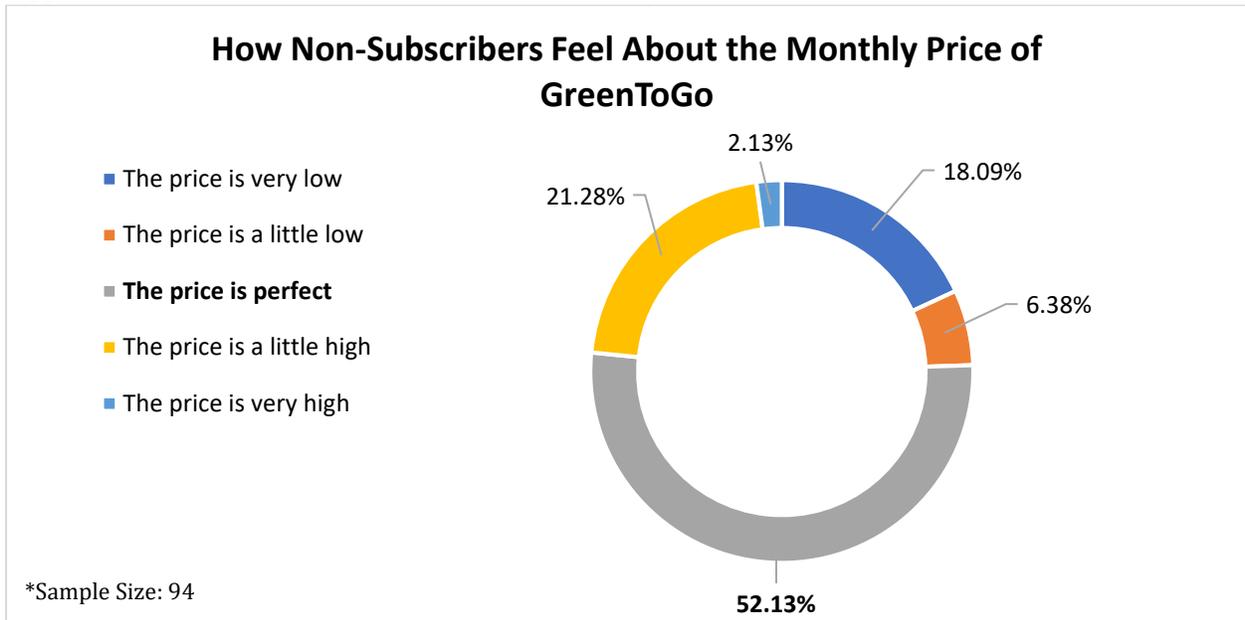
Appendix D11. Price of GreenToGo Broken Out by Subscribers



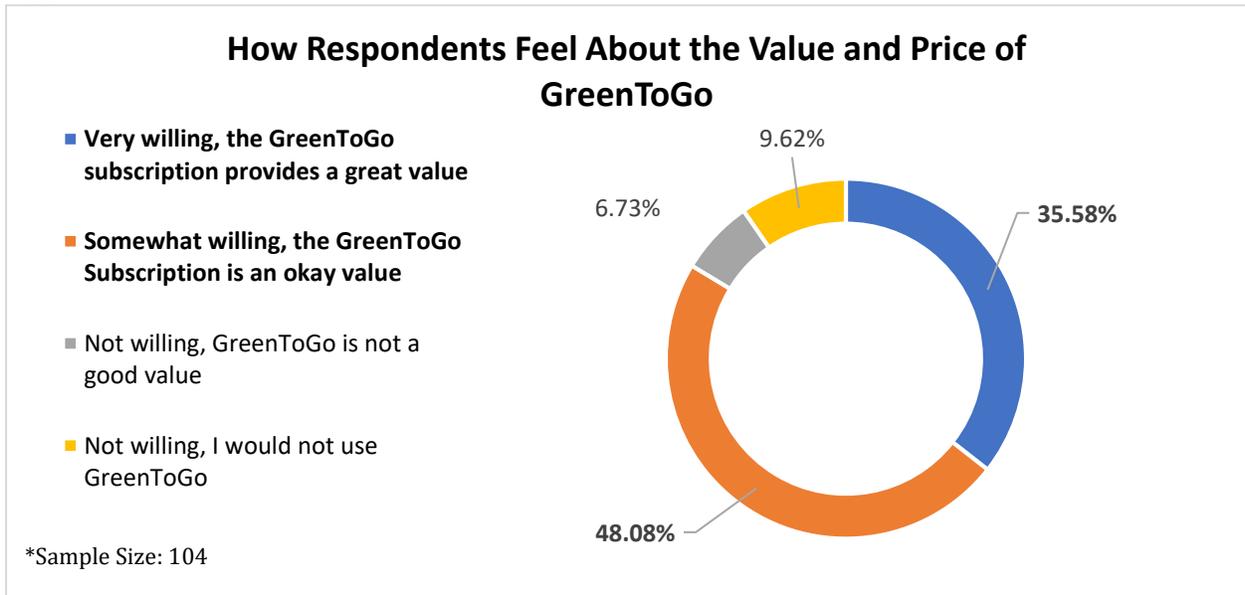
Appendix D12. Price of GreenToGo Broken Out by Previous Subscribers



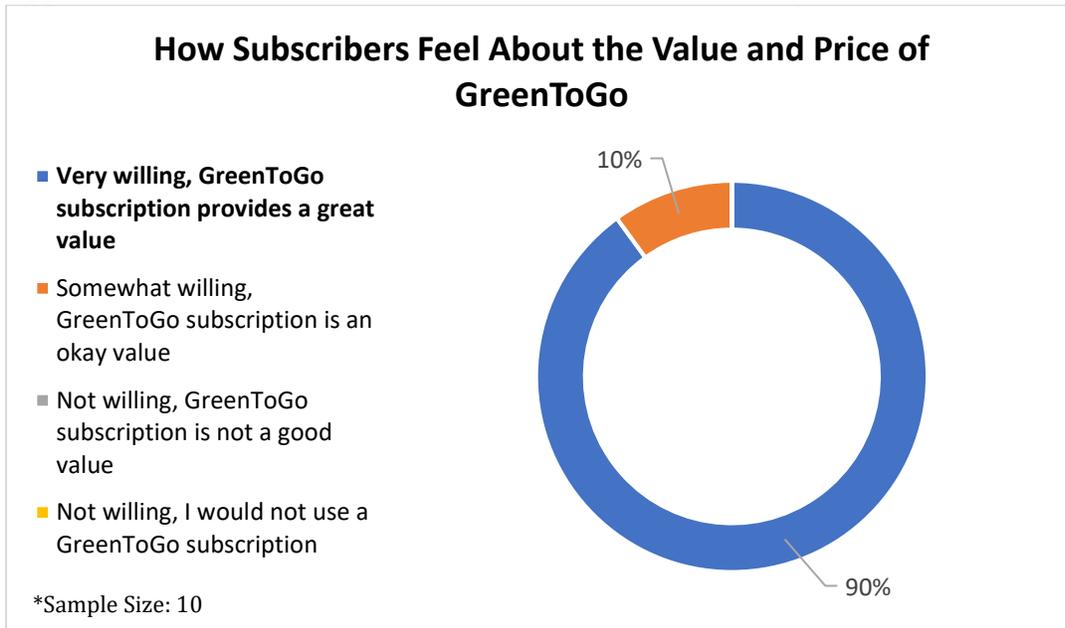
Appendix D13. Price of GreenToGo Broken Out by Non-Subscribers



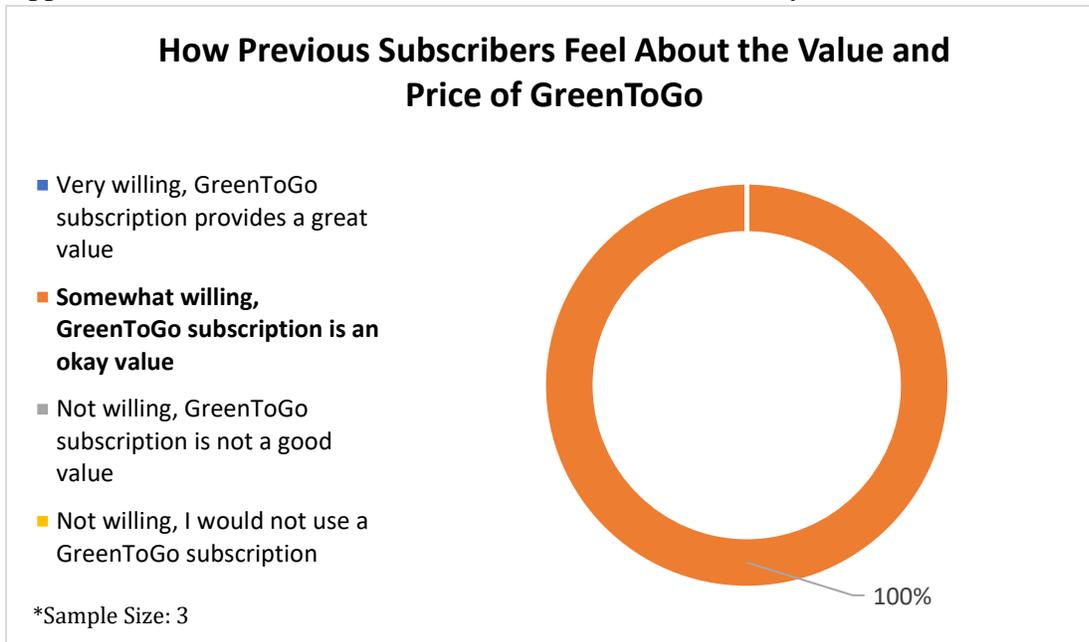
Appendix D14. Value and Price of GreenToGo



Appendix D15. Value and Price of GreenToGo Broken Out by Subscribers



Appendix D16. Value and Price of GreenToGo Broken Out by Previous Subscribers



Appendix D17. Value and Price of GreenToGo Broken Out by Non-Subscribers

