Examining Reasons for Bottled Water Consumption: A Case Study in Pensacola, Florida

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Examining Reasons for Bottled Water Consumption: A Case Study in Pensacola, Florida

by

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A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science
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Abstract

Overconsumption in developed economies undoubtedly puts a large strain on the environment, and many would argue that the damage is irreversible. Current uses and rates of consumption of freshwater resources are also deemed to be unsustainable. A large contributor to the high demand for water is the shift in consumer preferences from tap to bottled water. In the last few decades, bottled water companies have set unprecedented records, surpassing all other types of non-alcoholic beverages to become the second largest beverage market next to soda. Bottled water has been on the rise due to its supposed safety, purity and convenience. Municipal tap water companies have little to no incentive for disproving these theories since tap water continues to be used for non-drinking purposes. Meanwhile, bottled water companies are spending millions of dollars in appealing advertisements, which further fuels distrust of tap water providers.

The purpose of this thesis was to determine how consumers understand the differences between bottled and tap water, and how such understandings were linked to individual socioeconomic characteristics, properties of bottled water, knowledge of its environmental costs and advertising and marketing.
Since the city of Pensacola in Florida was recently determined to have some of the worst tap water in the country, it presented an interesting case study for the discussion of bottled water consumption. Two separate neighborhoods, chosen based on average income, were surveyed in Pensacola, and residents were asked about their bottled water consumption and preferences. Topics of inquiry included frequency of consumption, reasons for and against bottled water consumption, and opinions and knowledge surrounding bottled water. The majority of respondents of this study regularly drank bottled water regardless of income. Convenience was the most popular reason cited for drinking bottled water, and taste also emerged as an important property. Respondents did not consider themselves to be influenced by advertising and marketing by bottled water companies. Concerns regarding tap water were related to the safety and taste of water supply. Participants were to some extent aware of the environmental implications of drinking bottled water, yet this knowledge did not keep them from drinking bottled water. This thesis thus shows that making people aware of the environmental and economic costs of bottled water is not sufficient to regaining tap water trustworthiness. Instead, the habits of consumerism which make it convenient to purchase bottled water seem to be implicated in the popularity of bottled water.
Chapter 1

Introduction

The rise of consumerist attitudes and associated overconsumption in the developed West is a major environmental concern. Such consumerism becomes especially problematic when its results include degradation and irreversible depletion of basic natural resources. Among such threatened resources, water is one which seems to warrant the most concern for two reasons. First, while the world’s population has managed to survive on about 1% of the planet’s available water for centuries, current uses of water and rates of its consumption are not sustainable (Shah, 2003). Second, while the delivery of water through taps constituted one form of interference in natural cycles of water availability, the rise of bottled water marks another phase in social modifications of existing access to water. In fact, it could be argued that nothing epitomizes commoditization better than water, with bottled water serving as an especially extreme case of the assignment of economic value to a previously free resource.

The bottled water market has been growing since the middle of the 1970s, and this has especially been the case in the last ten years (Rodwan, 2009). Bottled water companies have recently set unprecedented records in sales,
surpassing all other types of non-alcoholic beverages to become the second largest beverage market next to soda (Hemphill, 2008). Part of this growth can be attributed to perceptions created by bottling companies through advertisements promoting their water as “pristine” and “fresh” emerging from glaciers and mountains. This significant shift in consumer preferences has environmental implications since a portion of the current pressures on freshwater sources could be driven by the needs of bottling companies and could cause irreversible damage. Florida presents an interesting case study in terms of freshwater resources and bottled water. It has the highest number of first magnitude springs in the world and has a significantly low number of problems with the safety of tap water (Samek, 2004). For this reason, Florida’s water resources are thus a major target of bottling companies.

In the U.S., consumers are opting to pay much higher prices for water that comes in a bottle despite access to reasonably priced domestic water. Although U.S. public water systems are arguably the safest in the world, bottled water has become so popular that grocery stores can now sell in-house brands for a smaller cost than premium name brands of bottled water with guaranteed profits because they are undoubtedly just using regular tap water (Miller, 2006). This shift in preference from tap to bottled water has the potential to reduce pressure on governments to improve the infrastructure and technology developed to deliver public water to one’s tap.
Research Questions

The overall objective of this thesis is to understand the consumption of bottled water from the perspective of individual users. This research also seeks to understand bottled water use in terms of comparisons with tap water in order to understand the broader set of choices within which the decision to use bottled drinking water is made. While environmental concerns associated with water consumption and depletion of water resources have been studied to some extent, there seems to be less systematic analysis of how existing tap water systems become a factor in the shift to bottled water. This study thus seeks to gauge the extent to which knowledge of the environmental impacts of bottled water consumption are prevalent among consumers.

Specific research questions of this study are as follows:
A] How are individual and household characteristics related to consumption of bottled and tap water?
B] How do individual consumers explain their preference for bottled water versus tap water?
C] What role do the assumed properties of bottled water versus tap water play in the consumption of bottled water?
D] To what extent do consumers understand the environmental costs associated with consumption of bottled water?

The link between environmental attitudes, knowledge, and behavior is not always straightforward, so that harmful environmental behaviors often continue despite a stated desire to protect the environment or adequate knowledge of the
environmental costs of a particular behavior. Behavioral studies have sought to explain such disconnects in terms of individual characteristics, including age, gender, race, and education. Propensity for consumption is also likely to be linked to household characteristics, like income. In this study, therefore, individual and household characteristics will be utilized as explanations for bottled water consumption.

In order to explain how preference for bottled water is constructed, it is important to evaluate how consumers understand the differences between tap water and bottled water. In the process, the preference for bottled water can be situated within everyday understandings as well as the economic regime which enables access to particular forms of water. One of the ways in which bottled water has been popularized is through investment in advertising. Visual representations, including images of snowcapped mountains and clear lakes, insinuate the purity and freshness of bottled water and its origins in pristine locations. Similar investments in the promotion of tap water trustworthiness are not made by municipal water companies (Parag and Roberts, 2009). As consumers shift to bottled water, there is less pressure on city governments to ensure the quality of drinking water, which then provides further support for individual consumer decisions to shift to bottled water. Awareness of advertising and marketing, thus, is likely to be one of the main ways in which consumers build a relationship with bottled water.

The presumed properties of bottled water, including health, safety, and taste, are likely to be especially significant factors in explaining the shift to bottled
water. Given that drinking adequate amounts of water is an important part of maintaining a healthy lifestyle, drinking bottled water almost naturally becomes part of a healthy lifestyle. This is further accentuated by advertisements that connect enriched bottled water (i.e., Gatorade, Vitamin Water, etc.) to athletic role models. Bottled water is also considered by many to be much safer than tap water. This misconception has developed for a multitude of reasons. Bottled water is often recommended by doctors for people with compromised immune systems, such as those with HIV/AIDS or cancer, and the elderly. Outbreaks of bacteria and carcinogens in tap water that have occurred in several locations in the U.S. (Naidenko et al., 2008) further contribute to the distrust of tap water. The irony is that the difference in standards between tap water and bottled water is not large, and where it is significantly different, it is tap water that is likely to be safer (NRDC, 1999). Another important issue is that of taste. Many counties in Florida have chosen to add fluoride to their water for purposes of decontamination and also in order to strengthen teeth in children. Chlorine is also used as a disinfectant. Neither of these elements receives the highest reviews for the taste they contribute to tap water. Maier et al. (2006) suggest that taste could also be the primary reason why consumers turn to bottled water, which is interesting considering a filter would solve the issue of taste for a fraction of the cost.

There is also the possibility that most perceptions about bottled water are incorrect, and one of the goals of this study is to find out to what extent this is true. According to the Natural Resources Defense Council (NRDC, 1999), most
consumers widely believe that bottled water is better for them due to added health benefits, even as this is not the case. Bottled water is also perceived to be safer than most tap water, when in fact nearly all U.S. residents have access to safe and reliable drinking water.

**Significance**

Florida is in the midst of ‘water wars’, both within the state in terms of distributions of water between north and south Florida, and with neighboring states in the southeast United States. As the consumption of bottled water increases, there is going to be severe struggle for control of water between public and private suppliers. By determining specific reasons for the choice to drink bottled water, possible strategies to decrease pressures to privatize water supply systems and potentially halt depletion of water resources can begin to be formulated. It should also be noted that a large part of Florida’s wetlands have already been drained, and the use of springs by bottled water companies promises to do the same to its groundwater.

The fact that the U.S. leads the rest of the world in the amount of bottled water consumed is a paradox given that water supply systems are already providing good quality drinking water. Miller (2006) finds bottled water to be an adequate choice in geographic regions which lack access to safe drinking water but not as a substitute in the U.S. His opinions are supported by the United Nations Food and Agriculture Organization and the World Wildlife Foundation (Miller, 2006).
The most compelling issue with regard to drinking water therefore is the fact that 1.5 billion people in the world lack access to an adequate water supply (Howard, 2005). By shifting to bottled water, consumers are also shifting from the need to build and maintain tap water supply infrastructures, thus possibly diminishing support for organizations engaged in providing systems and technologies that will allow for safe public water supply for current as well as future generations in both developing and developed regions. It is, therefore, important to understand the reasons for increasing bottled water consumption in order to control wider depletions of freshwater sources as well as lack of investment in tap water supply systems.
Chapter 2
Existing Studies on Bottled and Tap Water Consumption

This chapter outlines the previous studies from which the proposed thesis will draw its theoretical and methodological frameworks. To begin with, the rise in bottled water consumption is documented to describe the scope of the issue. The second section establishes the institutional context for the production and consumption of bottled water, including the marketing strategies of bottled water companies and state-level regulations on water quality. The third section focuses on the assumed properties of bottled water which make it an attractive option for consumers, including associations with health and taste preferences. The fourth section details the environmental consequences of bottled water, leading into the fifth section and a broader discussion of links between environmental attitudes, knowledge, and behavior. This chapter thus provides the background which will be utilized in addressing specific research questions related to bottled water.

Rising Consumption of Bottled Water

The following figures depict the rise in bottled water consumption over the last 30 years. These figures provide a visual representation of the exponential growth of the bottled water industry in a relatively short amount of time. Figure 1
shows United States consumption from 1976 to 1997. Most studies view the year 1976 as marking the start of the bottled water market's exponential growth. In 1997, Americans consumed a little less than 3,500,000 gallons (~13 million liters) of consumption.

![Graph showing United States bottled water market from 1976 to 1997 in gallons](source: NRDC, 1999).

Between 1997 and 2000, the amount of consumption showed further increase, as depicted in Table 1. Table 1 also shows consumption amounts for the rest of the world, by region, from 2000 to 2003. According to this, the United States ranks fourth in bottled water production by volume behind Western Europe, Asia and Latin America. Yet, the U.S. has the highest production value and second highest per capita consumption behind Western Europe.
Table 2: Global Bottled Water Statistics, 2000-2003

<table>
<thead>
<tr>
<th>REGION</th>
<th>Production Volume (million liters)</th>
<th>Production Value (million USD)</th>
<th>Per capita consumption (liters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>West Europe</td>
<td>36,350</td>
<td>44,020</td>
<td>14,600</td>
</tr>
<tr>
<td>Asia</td>
<td>19,900</td>
<td>33,465</td>
<td>3,650</td>
</tr>
<tr>
<td>Latin America</td>
<td>25,150</td>
<td>27,050</td>
<td>5,809</td>
</tr>
<tr>
<td>USA</td>
<td>22,0220</td>
<td>24,463</td>
<td>13,600</td>
</tr>
<tr>
<td>Africa &amp; Middle East</td>
<td>8,720</td>
<td>12,400</td>
<td>1,250</td>
</tr>
<tr>
<td>East Europe</td>
<td>6,010</td>
<td>9,500</td>
<td>1,400</td>
</tr>
<tr>
<td>Canada</td>
<td>820</td>
<td>1,490</td>
<td>310</td>
</tr>
<tr>
<td>Australia</td>
<td>740</td>
<td>695</td>
<td>350</td>
</tr>
<tr>
<td>TOTAL</td>
<td>119,800</td>
<td>153,083</td>
<td>30,819</td>
</tr>
</tbody>
</table>

Source: ICBWA, n.d.

Table 3: Global Bottled Water Consumption 2003-2008

<table>
<thead>
<tr>
<th>Country</th>
<th>Millions of Gallons Consumed in 2003</th>
<th>Millions of Gallons Consumed in 2008</th>
<th>Compound Annual Growth Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>6,269.8</td>
<td>8,665.6</td>
<td>6.7%</td>
</tr>
<tr>
<td>Mexico</td>
<td>4,357.6</td>
<td>6,501.5</td>
<td>8.3%</td>
</tr>
<tr>
<td>China</td>
<td>2,523.6</td>
<td>5,207.7</td>
<td>13.6%</td>
</tr>
<tr>
<td>Brazil</td>
<td>2,842.0</td>
<td>3,775.7</td>
<td>5.8%</td>
</tr>
<tr>
<td>Italy</td>
<td>2,734.2</td>
<td>3,140.5</td>
<td>2.8%</td>
</tr>
<tr>
<td>Indonesia</td>
<td>1,834.7</td>
<td>2,899.5</td>
<td>9.6%</td>
</tr>
<tr>
<td>Germany</td>
<td>2,628.5</td>
<td>2,863.1</td>
<td>1.7%</td>
</tr>
<tr>
<td>France</td>
<td>2,352.9</td>
<td>2,218.4</td>
<td>-1.2%</td>
</tr>
<tr>
<td>Thailand</td>
<td>1,303.4</td>
<td>1,705.6</td>
<td>5.5%</td>
</tr>
<tr>
<td>Spain</td>
<td>1,346.8</td>
<td>1,291.3</td>
<td>-0.8%</td>
</tr>
<tr>
<td>Subtotal</td>
<td>28,193.5</td>
<td>38,268.9</td>
<td>6.3%</td>
</tr>
<tr>
<td>All Other Countries</td>
<td>9,917.3</td>
<td>14,427.9</td>
<td>7.8%</td>
</tr>
<tr>
<td>World Total</td>
<td>38,110.8</td>
<td>52,696.8</td>
<td>6.7%</td>
</tr>
</tbody>
</table>

Source: Rodwan, 2009

Table 2 shows the 10 leading countries based on amounts consumed for 2003 and 2008. This clearly shows, that in terms of country, the U.S. far exceeds other countries in bottled water consumed. It should be noted that in 2008 and 2009, bottled water consumption in the U.S. registered a decline of 1.8% and
3.2% respectively (Rodwan, 2009b). Bottled water companies attributed this decrease to the economy, weather and/or campaigns against bottled water. However, this decrease is not thought to be indicative of a new decreasing trend so that the need to focus on rising bottled water consumption as an indicator of the conflict between consumerism and environmental protection continues to be crucial.

**Factors Determining Consumption of Bottled Water**

Two of the most cited reasons for people switching to bottled water include health and safety. Health refers to the added benefits people perceive they attain from drinking bottled water, and safety refers to consumer’s fear of getting water that is harmful to them. According to a survey conducted by the American Water Works Association (AWWA) in 1993 (see NRDC 1999), 35% of people drink bottled water because they were concerned about tap water safety, 35% drank it as a substitute for other beverages and 12% chose to drink it for both of those reasons. 18% drank it because of taste, convenience, or other reasons.
A majority of bottled water begins as tap water and minerals are added which may or may not have health benefits, but in large amounts will most certainly have adverse affects (Arnold and Larsen, 2006). A study conducted at the University of Birmingham by Ward et al. (2009) consisted of interviewing twenty-three individuals on their beliefs about the overall health of bottled water. The participants of this study were users of a sports complex of the university. Most interviewees believed that bottled water had health benefits that tap water does not, but very few were able to provide concrete evidence to support their
claims. Most participants also trusted bottled water over tap water assuming it has fewer “impurities.” A small percentage of the participants expressed concern about the safety of bottled water. Some made reference to the bottling process while others suggested the leaching of carcinogens. About one-third of interviewees expressed concern about the environmental impacts. Most participants were unaware of any differences between bottled water brands. In the end, convenience, status and cost also played important roles in the decision process. The authors recommend further public education in regards to the concerns associated with bottled water.

The study conducted by AWWA in 1993, mentioned above, included a mass telephone survey and showed that participants were satisfied with the overall safety of their tap water. However, they saw bottled water as a luxury item and were motivated to drink it based on taste, health and safety. According to Rodwan (2009: 13), ‘[t]hough bottled water is frequently compared to tap water, bottled water actually achieved its growth by luring consumers away from other packaged beverages perceived as less healthy than bottled water.’ Although it is now relatively common knowledge that people are dissatisfied overall with taste, smell and/or safety of tap water and therefore prefer bottled water (Parag and Roberts, 2009), more research needs to be conducted on how these specific beliefs are obtained and propagated.

Miller (2006) explores both sides of the bottled water debate and points out possible advantages with bottled water. He states that since water is most frequently bottled directly from its source, it runs a very low chance of
contamination from lingering; whereas treatment of freshwater includes potential contaminated plumbing, excessive amounts of fluorine and/or chlorine as well as processes of contamination in river, wastewater, and rainwater collection. Health concerns also arise from the possibility of broken, damaged or rusting pipes running to, from or within water treatment facilities. This supports the argument that bottled water does have the possibility of being purer than fresh water.

Safety

Concerns about the safety of tap water can be addressed through understanding the ways in which drinking water quality is regulated. Bottled water is regulated by the Food and Drug Administration (FDA), while municipal water is under the discretion of the Environmental Protection Agency (EPA). Being a public entity, tap water is regulated by the EPA and hence uses tax dollars to fund sanitation and infrastructure (EPA, 2005). On the other hand, bottled water is viewed as a food product voluntarily consumed, and is, therefore, regulated by the FDA. Bottled and tap water also have to follow FDA regulations and each state’s Department of Health standards. There are differences between EPA and FDA standards. Three carcinogenic chemicals covered by the EPA, and also mentioned in the IBWA ‘model code’ are naphthalene, methyl tertiary-butyl ether (MTBE) and 1,1,2,2-tetrachloroethane, all of which are disregarded by the FDA. In comparing standards of the FDA to the EPA, one will find that FDA Standards for lead, copper and fluoride are stricter than that of the EPA, yet for the dozens of other standards, FDA is at the same level or below the EPA. There is also a
list of 20 contaminants which must be monitored by the city tap water systems but are not required to be monitored in bottled water (Miller, 2006).

The standards of the EPA are thus higher than those of the FDA, so that bottled water is actually tested less frequently than tap water (NRDC, 1999). In fact, Dasani and Aquafina, the two top selling brands in the country, have been selling filtered tap water for quite a while now. Given that the water systems in the U.S. are some of the best in the world, to find that Americans are choosing to spend excess money when a viable option is available does not make economic sense.

Bottled water companies have their own set of standards. Thus, there is the International Bottled Water Association’s (Bottled Water Code of Practice (IBWA, 2009), but this is solely a recommended guide for bottlers and they are under no obligation to follow it. This ‘model code’ is meant to provide minimum standards for its members. Nestle Waters of North America is a member of IBWA, however, neither Pepsico (Aquafina) nor Coca-Cola (Dasani) are part of the membership. According to the IBWA code, upon request from a consumer, ‘[t]he bottler shall provide to consumers information that demonstrates compliance with applicable federal and state Standards of Quality. Bottlers must provide analytical testing data results generated for the most recent IBWA Code of Practice compliance inspection. No new or additional testing is required under this informational requirement’ (IBWA, 2009). This serves as a guide for bottlers concerning manufacturing, operation, monitoring and labeling. Being a member of IBWA allows companies to put the IBWA logo on their product. It should be
noted that the IBWA checks for contaminants only on an annual basis. IBWA standards, however, are not as stringent as those set by the EPA which have to be met by municipal tap water companies.

The extent to which the better quality attributed to bottled water is more of a perception than reality becomes clear from studies which evaluate bottled water quality. Da Silva et al. (2008) examine the overall water quality of both bottled mineral water and tap water in Maringa City, Brazil. The water was tested according to EPA standards since standards in Brazil are lax in comparison. The results showed that 36.4% of the tap water systems and 76.6% of the bottled water samples contained at least one coliform or indicator bacteria and at least one pathogenic bacterium. Since U.S. tap water purification technology is likely more advanced in regards to treatment, it is significant that the amount of bottled water that was contaminated was more than double that of tap water samples. Since mineral water is usually characterized by its bacterial flora, it should not be surprising that various bacteria are present. The interesting question, however, is whether the same results would be obtained if similar tests were conducted in the U.S.

In a study conducted by the NRDC (1999), more than 1,000 bottles of water and 103 brands of water were tested over a period of 4 years. These waters were purchased from California, Florida and Texas and tested according to EPA standards. It was found that about one-third of the water tested contained some type of contamination. More specifically, 25% of water violated applicable state standards, 20% contained synthetic organic chemicals, nearly 20% were
found to have more bacteria than allowable under purity guidelines, 4% of waters violated the federal water standards and many bottles were found to contain arsenic, nitrates and/or other inorganic chemicals (NRDC, 1999). A recent concern with bottled water safety is in regards to the scare of leaching plastic into water. Ironically, this is the one thing consumers should not be concerned about regarding bottled water. The rate of leaching is incredibly low and while the IBWA recommends only one use per bottle, the slow rate is rarely ever enough to cause any harm (Miller, 2006).

**Taste**

The taste of water is determined by its source and applicable minerals as well as the method of treatment. Magnesium and calcium are examples of two minerals which give water a distinct and often desired taste. However, in large quantities, these minerals can have negative effects. Most bottled water is described as “pure” and “natural” and portrayed with mountains and rivers. However these descriptors and images provide no guaranteed indication of the geographic source of the water. In fact, the EPA states that a majority of bottled water is actually from a ground water source (EPA, 2005). Most bottlers use ozone to disinfect their water. Although it is more expensive than other treatment methods, it does not leave an undesirable taste. Disinfection methods for tap water include chlorine, chloramine, ultra-violet light and ozone. Chlorine and chloramine are used because it is both inexpensive and efficient (EPA, 2005). Unfortunately, the taste of chlorine is a common complaint regarding tap water
taste, so that ‘[e]ven where tap water may be safely potable, many people prefer bottled water, which they regard as superior in taste’ (Rodwan, 2009).

A study done in the U.K. by Fife-shaw et al. (2007) shows that primary concerns related to drinking water are linked to its physical properties (taste, odor, appearance) and secondary concerns are with composition. The high level of dissatisfaction with chlorine is also interesting given that the level of chlorine in tap water is inversely proportional to the level of health risk. As previously mentioned, using a water filter will result in chlorine being undetectable. Thus it is aesthetics as well as health concerns that encourage people to switch to bottled water. As Fife-Shaw et al. (2007: 11) found, ‘[p]eople who felt their water was ‘unsafe’ were also more likely to use treatment devices, whereas the aesthetic qualities of water did not feature as significant determinants of use of these devices though they were significant in the case of bottled water use.’

An analysis of the preference for drinking water, therefore, has to focus on issues of health, safety, and taste in terms of drinking water, as well as the regulations that bring about such properties. In fact, tap water trumps bottled water in terms of regulations, so the increasing preference for bottled water becomes that much more of a necessity to explain.

Marketing Bottled and Tap Water

Bottled water began as a medicinal product. Since it was bottled from springs, it was thought to have healing powers for the purpose of curing those who believed in its power. The first bottled water company was Poland Springs (Cleveland, n.d.); Jabez Ricker acquired the land located in Poland, Maine at the
end of the 18th century. Being on a hillside and next to a spring made it a desirable location for an inn. Neighbors, friends and guests drank from the spring and after some time the water began receiving credit for curing ailments. The rumors of this water spread like wildfire and Ricker seized this opportunity and began bottling and shipping of this water. The business thrived for a while, but eventually went bankrupt and was passed through several owners and now resides with Perrier (Cleveland, n.d.), a French water company whose U.S. branch is Nestle Waters of North America. Until the middle of the 19th century, bottled water was usually found in spas and was therefore only for the elite and it is only recently that bottled water has become an object for mass consumption.

A possible explanation for the short time over which the increase of bottled water consumption occurred could possibly be the explosion of marketing and advertising in favor of bottled water. In 2005, Nestle Waters of North America reported that the average person in the United States consumes twenty times more bottled water than they did 20 years ago (Parag and Roberts, 2009). The reasons for this vary from person to person, but the outcome is the same: bottled water has become the most popular beverage in the U.S. Accompanying the promotion of bottled water by multinational bottled water companies has been the instilling of doubt in the overall quality of tap water. Nestle suggested that consumers feel a sense of safety in consuming bottled water rather than tap water. Over half of the population surveyed in a 2001 water quality survey (Parag and Roberts, 2009) had concerns about the quality of their drinking water.
Figure 3: Marketing of bottled water as pure and natural
(Sources: Coca Cola, Pepsico, Zephyrhills websites)
However, such consumer attitudes are likely to have been shaped by the millions of dollars spent by water bottling companies on advertising the pure, refreshing taste of their product (Figure 3), while also taking advantage of any mishaps in tap water, such as the reoccurrence of MTBE (methyl tertiary-butyl ether), which is used as an additive in gasoline, in thousands of U.S. groundwater sites in 1995 (Miller, 2006).

According to Parag and Roberts (2009: 627), the rising popularity of bottled water ‘suggests the importance of (a) understanding what is undermining the public trust in tap-water providers and the state, and (b) developing policy and other means to rebuild that trust. Nevertheless, the role of trust among stakeholders and its effect on public willingness to drink tap water has not been well explored.’ The authors also argue that tap water companies have done little to encourage trust in tap water, so that incidents of contamination of tap water are well-publicized despite being relatively rare. Given this, the authors argue that ‘[o]pening communication channels with the public in the analysis stage, as well as asking the people what they feel about the risk, may help to build or regain trust’ (631) in tap water.

But recent polls also show that the public has an immense distrust in industry, so the fact that bottled water consumption is as popular as it is, is contradictory (Parag and Roberts, 2009). According to the American Water Works Association (AWWA, 2001), most of the underground water infrastructure is at or close to the end of its expected life span and will need to be replaced within the next few decades. Estimated restoration and replacement costs are in
the hundreds of billions of dollars. These repairs will not only allow for the newest technology and increase efficiency but will be able to meet and exceed the increasing number of standards set by the Safe Drinking Water Act (AWWA, 2001). Unfortunately, the only way to fund these changes is through increased rates and taxes which will undoubtedly be met with great resistance. Ideally, this inevitable rise in rates will encourage municipal water companies to advocate for their services and regain the trust of the public which has been lost for decades. However, whether mandatory increased payments and greater advocacy by water companies will start the necessary shift away from bottled water consumption and back towards tap water trustworthiness is an aspect of the water consumption debate that remains to be examined.

Comparative Costs

The discussion of marketing also raises the issue of differences in cost between bottled and tap water. According to the Splash Report of 2003, the cost of bottled water to consumers is a thousand times more than that of tap water and 60% of bottled water is just tap water put in a bottle (Parag and Roberts, 2009). As Rodwan (2009) points out, ‘[u]nprecedented input costs relating to multiple aspects of beverage manufacturing, including polyethylene terephthalate (PET), aluminum, and fuel, were passed on to consumers in higher prices, which affected all liquid refreshment beverage segments.’ The marketing of bottled water also becomes visible in terms of its constant presence. Thus, not only is it more convenient to carry bottled water, but its wide-ranging availability in vending machines, gas stations, grocery stores, and supermarkets ensures that it is often
Figure 4: Display of Bottled Water in Grocery Store

easier to buy bottled water than search for the nearest water drinking fountain or sink.

Parag and Roberts (2009) cite studies by Mott and Corporate Accountability International to provide a comparison of the costs of bottled water and the costs of investment in tap water infrastructure. Thus they find that the
nation’s water supplies can be protected and treated so that they will be pure and essentially free of toxins, in most cases for the price of one soft drink per day per utility customer’ (630). Moreover, ‘[c]urrently, people in the United States spend $11 billion a year on bottled water, which is half of what cities need to spend on water infrastructure in order to improve water quality’ (630). The NRDC (1999) estimates that people spend anywhere from 240 to 10,000 times more for a gallon of bottled water than they will for the same amount of tap water. This astronomical price difference makes the question of the shift to bottled water even more puzzling. According to Arnold and Larsen (2006), ‘[t]he United Nations Millennium Development Goal for environmental sustainability calls for halving the proportion of people lacking sustainable access to safe drinking water by 2015. Meeting this goal would require doubling the $15 billion a year that the world currently spends on water supply and sanitation. While this amount may seem large, it pales in comparison to the estimated $100 billion spent each year on bottled water’ (3). Thus, between the money spent by companies on promotion of bottled water and that spent by consumers on the product itself, adequate public water systems could be put in place for a large portion of the world reducing dependence on bottled water and lifting a massive amount of pressure off the environment.

**Environmental Implications**

The environmental impact of bottled water consumption is exponentially greater than the consumption of tap water. The environmental implications become greater when extraction of oil and other materials for the processing of
containers and plastics is taken into account. The environmental footprint of bottled water becomes even larger when transportation, packaging and then disposal of the products are included. Neither tap water providers nor bottled water companies are held accountable for the adverse effects of bottled water consumption and its subsequent effects (i.e., disposal). Since the public is not well informed about the environmental problems associated with bottled water, Parag and Roberts (2009) believe that information alone could have a serious impact on consumption. Along the same lines, Rodwan (2009) states that “[c]onsumer concerns about the environment may have affected some buying decisions, particularly as a result of campaigns targeting bottled water.”

Arnold and Larsen (2006) discuss the incessant depletion of resources caused by bottled water companies. The plastic that most bottles are made from is polyethylene terephthalate (or PET) which comes from crude oil. To make enough “bottles to meet Americans’ demand for bottled water requires more than 1.5 million barrels of oil annually, enough to fuel some 100,000 U.S. cars for a year” (Arnold and Larsen 2006: 2) or generate electricity for 250,000 homes for one year (Howard, 2003). These calculations do not even take into account the amount of fossil fuels used to transport the water.

Globally, an estimated 2.7 million tons of plastic are used to bottle water each year. Several studies also mention that between 85 and 90% of bottles end up as waste which could either take up to a thousand years to biodegrade or be incinerated producing chlorine gas and heavy metals. Reports in 2004 showed that almost half of the plastic bottles “recycled” in the U.S. were sent to China.
The harvesting of water that occurs due to these bottling companies is also having serious adverse effects on the surrounding ecosystem.

Botto (2009) conducted a study using a “footprint integrated approach” to compare the overall adverse impacts of six Italian bottled water companies as well as tap water extraction. Italy is the third largest consumer of bottled water in the world and this study covers about 10% of all of the bottled water manufacturers in Italy. In order to provide a wide sample, the companies differed in location, size, volume bottled and diffusion of products within the national territory. This methodology measures the ecological footprint, the water footprint and the carbon footprint. Both the bottled and tap water processes were broken down into four steps: extraction, production and/ or transportation, bottling or storing, and distribution. To evaluate each of the footprints, transportation, materials and energy used were measured. After the calculations were completed for all six of the companies, an average was taken and compared to that of tap water. Tap water values were found to be almost 300 times lower than the average of the bottled water. In the calculation of the carbon footprint, other greenhouse gases besides carbon dioxide were also found. The advertised amount of water used in the production of bottled water was found to be only 1/10th of the actual amount used.

**Impacts on Freshwater Resources**

Groundwater use accounts for more than a quarter of the United States water supply and more than 50% of Americans rely on it for their drinking water (Glennon, 2007). Most of the water used for bottled water supplies is
groundwater. All that a company is required to do in most states is prove that the water withdrawal has a beneficial use. This is in accordance with the reasonable use doctrine. This use of the doctrine has been going on for decades allowing companies to extract as much water as they please - an excellent example of the role played by corporations in the “Tragedy of the Commons” (Glennon, 2007). In their informational packet about bottled water, the Sierra Club mentions water shortages that have been reported near bottling plants in Texas and the Great Lakes region: “The withdrawal of large quantities of water from springs and aquifers for bottling has depleted household wells in rural areas, damaged wetlands, and degraded lakes” (Sierra Club, 2008). Reports estimate that between one and three gallons of water are wasted for every gallon of water bottled (Howard, 2006).

When it comes to laws dictating water use, the country is divided. In the West, water use is determined by the Doctrine of Prior Appropriation; while the East is based on the Riparian Use Doctrine. The current system of laws that dictate water use in the U.S. combine the Prior Appropriation Doctrine and the Riparian Use Doctrine. The Doctrine of Prior Appropriation was established in the middle of the 19th century and simply provided water use on a first come, first serve basis, unless otherwise dictated by the law. This was the case when the abundance of water was much more than it is today. Riparian rights are applicable to natural water bodies. The law dictates that the owner of the land in which the body of water falls may use the water to his or her advantage as long as it does not interfere with the beneficial use to others. The level to which the
use is considered interference can then be broken up further into “natural” and “artificial” uses: natural uses being essential (i.e., drinking) and artificial uses being non-essential. If the water is for a natural use, the owner is entitled to extract all the resource necessary. However, while strict guidelines have been put in place for the use of water for agricultural and recreational uses, no such steps have been taken in regards to the water bottling industry. It appears that, even as bottled water cannot be counted as essential, since water for drinking is considered a “natural” use, a loophole has been created for bottled water companies. Hence, through the purchasing of such properties, these companies are able to exhaust the available resources.

Samek (2004) discusses issues associated with bottling industries and their use of Florida’s springs. Florida contains 27 of the nation’s 78 first magnitude springs (the most in the country) and 70 second magnitude springs. Florida’s high abundance of fresh water springs makes the high bottled water consumption in the state somewhat inexplicable. Florida’s springs are the source for most of its rivers, and provide habitat for a variety of ecological species as well as a variety of recreational activities. Many of Florida’s springs are found within state parks which have been nationally recognized. Despite the fact that many Floridians have grown accustomed to having this water available to them, more and more residents are choosing to drink water from a bottle. The springs are susceptible to depletion and pollution due to several causes: ‘careless use of fertilizer and pesticides for agriculture, landscaping, and golf courses; other pollutants in contaminated storm water runoff; livestock waste, often associated
with the North Florida dairy industry; development in high aquifer recharge areas; leaking septic tanks and underground storage tanks; silt buildup and sedimentation that blocks spring flow’ (Samek, 2004: 574). The over pumping of the aquifer for the purpose of bottling an already available resource is an unnecessary extravagance. Florida is on the verge of a water crisis and is going to have to make important decisions about how to properly allocate this finite resource. As far as common law regarding the Riparian Doctrine is concerned, ‘[w]hether permission of spring water bottling is a violation of the public trust doctrine, or whether it is in the public interest is the controversy over bottling reduced to its simplest form’ (Samek, 2004: 575-576).

Florida’s Department of Environmental Protection (FDEP) seeks to preserve the environmental integrity of the water and air of the state. Chapter 403 of the Florida state statutes deals with the FDEP’s jurisdiction over the state’s surface water, groundwater and wetlands. The DEP has chosen to delegate the power to administer and enforce provisions related to water resources to the Water Management Districts (WMDs). Ultimately, the five WMDs become responsible for problems with water shortages, yet the boundaries outlining responsibility between these groups is not formally defined (Elledge, 1989). This may be a large part of the reason for some ambiguities associated with water management issues. WMDs are governed by the Florida Administrative Code which shapes their responsibility for managing water to ensure a sustainable supply. They are also responsible for issuing consumptive use permits after applicants have proved that their use of water is reasonable
and beneficial. This means that the quantity desired is necessary for both economic and public interest (Olexa et al., 2002).

Gaps in the regulation of freshwater resources have thus been exploited by bottled water companies. The extent to which concern for water resources in Florida corresponds with consumer attitudes towards bottled water needs to be examined in order to understand if such concerns can slow the rising bottled water consumption.

**Environmental Behavior, Attitudes, and Knowledge**

This thesis adopts a behavioral approach to the consumption of bottled water and seeks to provide a detailed examination of the links between behavior, attitudes and knowledge. According to a study performed by Larson (2009), environmental attitudes range from individualistic to collective values and biocentric to anthropocentric orientations. In her words,

“[w]ith respect to management goals, attitudes should be evaluated in relation to associated values including biocentric–anthropocentric orientations and personal (individual)–social (collective) interests. By combining these two dimensions, attitudinal responses are likely to differ toward the following types of management objectives: human-centered goals that satisfy personal self-interests, human-centered goals that serve societal benefits beyond selfish interests, biocentric goals that entail personal interests and biocentric goals that entail altruistic values” (Larson 2009: 888).

Separate from associated attitudes concerning the environment are the behaviors that may or may not follow the attitudes of an individual. Although someone may have deep respect and care for the environment, he or she may not have the means to protect it. On the other hand, an individual may be
indifferent towards the environment but engage in environmentally friendly practices for various reasons.

The link between income and behavior is also a prominent theme in environmental studies. According to Duroy (2005), environmental protection is not directly correlated with economic affluence but is representative of other variables including demographics, psychology, and education. Many environmentalists claim that environmental protection can only be attained when a certain level of economic affluence has been met, implying that environmental protection is a high order need which can only be met when lower order needs have been met. Duroy (2005) disagrees with this statement on the basis that both underdeveloped and developing countries avidly protect the local environment because its condition directly affects their subsistence needs. This thesis will provide further insights into link between affluence and environmental behavior in a developed context.

A number of studies have also sought to link individual socio-demographic characteristics to consumption of bottled water. Fife-Shaw et al. (2007) have stated that consumers without university education, those who have a lower income, and younger consumers tend to be more satisfied overall with their municipal water supply. Older populations were also found to be less likely to pay more for water to avoid future health risks than were the younger consumers. A study conducted by Hobson et al. (2007) evaluated water preferences on the basis of ethnicity, and surveys were given to parents at a pediatric clinic in Salt Lake City, Utah. The population surveyed was mostly Hispanic (80%), and
results showed that 30.1% of parents never drank tap water and 42.2% never gave tap water to their children. Results also showed that Non-Hispanic parents were more likely to both drink tap water themselves and to provide tap water to their children, while a higher percentage of Hispanics thought that drinking tap water would make them sick. Hu et al (2011) have shown that gender and education affect environmental risk perceptions thus shaping choices regarding water consumption. In a national survey with over 5,000 respondents that asked about regional water quality, environmental attitudes, bottled water consumption and demographics, this study found that younger respondents and females were most likely to be the most frequent consumers of bottled water. They explained this in terms of younger people paying more attention to marketing and advertising and women being more aware of health risks. This study also found that environmental perceptions were not reflected in decisions to consume or refrain from bottled water. The extent to which these findings are place-specific or can be generalized to the wider U.S. population can thus be empirically examined through my thesis. Drawing on these understandings, this thesis seeks to investigate how bottled water consumption is related to attitudes towards the environment and knowledge of environmental impacts.
This thesis aims to understand the attitudes and knowledge of individual consumers in order to explain preferences for bottled water. To gather data for this study, respondents from two neighborhoods in Pensacola were interviewed based on an open-ended questionnaire. Data was thus collected on consumption of bottled and tap water, attitudes towards properties of bottled water and knowledge of the environmental implications of bottled water. This chapter details the choice of case studies for this research, the themes of the questionnaire and the processes through which it was administered, and provides an introduction to the individuals and households that comprise the subjects of this study in terms of their consumption of bottled water.

**Case Study: Pensacola, Florida**

The city of Pensacola is located in Escambia County along the coast of the Florida Panhandle and is a major metropolitan area in north Florida. Pensacola becomes an interesting case study for this research because the city has been mired in controversies regarding the quality of its tap water. At the center of this controversy is the Environmental Working Group (EWG), described
on its website as ‘a non-profit, non-partisan organization dedicated to using the power of information to protect human health and the environment.’ In December 2009, the EWG published a National Tap Water Quality Database which included the results of water quality tests conducted on almost 50,000 American utility companies from 2004 to 2009 (EWG, 2009a). These water quality test results had been compiled by EWG from state, health, and environmental departments, that in turn had obtained information from drinking water utilities or associated laboratories.

In its database, EWG rated big city water utilities (cities with populations over 250,000) based on three criteria: total number of chemicals detected since 2004, percentage of chemicals found in comparison to those tested for, and the highest average level for an individual pollutant relative to either legal limits (for regulated chemicals) or national average concentrations (for unregulated chemicals). In the process, Pensacola’s public water supply agency, the Emerald Coast Utilities Authority (ECUA), was named as supplying the worst tap water of the 100 cities studied (EWG, 2009b). Tap water here was found to have 21 chemicals that exceeded federal health guidelines and this was compared to the national average of 4. The EWG also found 45 different chemical pollutants in the tap water, even as the national average for this is 8. EWG’s solution was that drinking water consumers invest in a filtration system to regulate water quality within their household.
Questions were soon raised, however, about the methods and findings of the EWG study. Thus, a report by two scientists from the University of West Florida, Pensacola, argued that the EWG report does not present a valid scientific assessment of water toxicity, nor are its comparisons of utility systems statistically valid. It was an effective political campaign to raise public awareness for the issue of unregulated chemicals in drinking water, but was done at the expense of public confidence in regulation by US EPA, FL DEP and the ability of local utility systems to provide safe potable water (Mohrherr and Snyder, 2010: 2).

It was also noted that while the 21 chemicals mentioned by EWG contravened health guidelines, none of them actually exceeded the EPA's Maximum Contaminant Level limits. According to Mohrherr and Snyder (2010: 2), ‘the object of public utilities is to obtain the lowest risk for potable water relative to cost of service to customers and available technology,’ so that the EWG report was ignoring the mission of the ECUA in holding it to unduly stringent standards.

Officials from the ECUA also contributed to challenging the EWG report. Thus, Executive Director of ECUA, Stephen Sorrell, argued that he was confident, in part due to the study conducted by the University of West Florida, that ‘ECUA’s drinking water is safe and well within the rigorous standards established by the Florida Department of Environmental Protection, whose drinking water standards are among the strictest in the country’ (ECUA, 2009: 4). ECUA has been providing water services since 1981 through an Act which allowed it to ‘own, manage, finance, promote, improve and expand the water and wastewater systems of Escambia County and the City of Pensacola’ (ECUA, 2008). In 1992, ECUA also began offering sanitation services. According to its
2009 Annual Report, the previous year had focused on a recycling program and the building of a water reclamation facility, so that the utility was also moving from water provisioning to water conservation.

In this encounter between a seemingly vigilant environmental organization and an embattled public utilities company, the struggle over tap water took on the dimensions of a struggle between the state and its agencies, and non-governmental organizations that seek to monitor the state on behalf of otherwise uninformed citizens. While both EWG and UWF’s findings have merit, it is the publishing of EWG’s report and the subsequent response by ECUA which makes this controversy public rhetoric and, hence, an interesting location in which to do a case study. It is in this context that individual perceptions on bottled and tap water become important, especially in terms of the extent to which these are influenced by or remain aloof from highly publicized struggles over environmental quality. According to Hu et al. (2011) individual perceptions of local water quality are strongly correlated to decisions to purchase bottled water, and this relationship is sought to be understood in the context of Pensacola’s residents within this thesis.

**Focusing on Two Neighborhoods**

According to the 2000 Census, the city of Pensacola’s population is 56,255 people (U.S. Census Bureau, 2009). In terms of racial composition, 66% of the population of the city is classified as White, 31% Black, and the rest are of other ethnicities. The gender distribution is close to equal, with 53% of residents being female. The average age of a Pensacola resident is about 39 years, and
about 62% of Pensacola’s population has educational qualifications beyond high school. The average household size is 2.27 people, with 60% of the population consisting of families or non-single households.

In order to construct an appropriate sample for data collection, this study began with contacting the Community Development Department of the City of Pensacola. A Neighborhood Coordinator of this department provided a list of three lower income neighborhoods and three higher income neighborhoods in Pensacola that were considered suitable for study. Further information on these six neighborhoods was then sought from the University of West Florida’s Haas Center for Business Research and Economic Development. Two neighborhoods were then chosen to represent the range of income levels in Pensacola and with some consideration for the feasibility of traveling between the two neighborhoods to gather data.

To maintain anonymity, the two neighborhoods will be referred to by pseudonyms as Oak (the higher income neighborhood) and Pine (the lower income neighborhood). As with most of Escambia County, both neighborhoods fall under the region supplied by the Emerald Coast Utilities Authority (ECUA). Information on the socioeconomic and demographic composition of the two neighborhoods was obtained from the University of West Florida as mentioned above and was based on ESRI forecasts for 2009 based on 2000 Census data.

Oak, the higher income neighborhood, has an average income of $92,284. Ninety-two percent of the neighborhood is White, 3% is Black, and the remaining are of other ethnicities. Fifty-four percent of the residents are female. Education
levels are high with around 85% of the residents having some form of college education. The average age of the neighborhood is 48, and average household size is 2.73 people. Pine, the lower income neighborhood has an average annual income estimated at $30,513 for 2009. Eighty-two percent of the residents are Black, 14% are White, and 59% are female. The average age for the neighborhood is around 41 years and average household size is 2.21 people.

While the two case study neighborhoods cannot be considered random samples appropriate for rigorous statistical analysis, they do become appropriate for an analysis seeking an in-depth understanding of individual bottled water consumers in the city. However, even as an effort was made to ensure that the two neighborhoods covered the diversity of income and racial groups in Pensacola, the interview process did not enable all groups to be approached as will be detailed in Chapter 4.

**Description of Questionnaire**

The questionnaire was divided into four sections in accordance with the research questions of the thesis (see Appendix I). The first section asks for information on general demographic and socioeconomic characteristics of both the individual respondent and his/her household. The second section focused on the actual consumption of bottled water and tap water at the individual and household level and on reasons for and against drinking bottled and tap water. The third section sought to gather data on attitudes towards bottled water and tap water on a graduated scale. The fourth section focused on knowledge about environmental, economic and social implications of bottled water.
Given that previous studies have determined a link between individual and household socioeconomic characteristics and bottled water consumption, the questionnaire gathered personal information data on income, race and ethnicity, gender, age, level of education, and family structure all of which may have an effect on consumption (as previously discussed in Chapter 2). The questionnaire measured bottled water consumption in terms of individual frequency of consumption (from daily to never) and source of drinking water for household (tap, bottled, filtered). Data on reasons for bottled and tap water consumption were gathered through direct questions to gather the individual respondents’ immediate views on the matter. Information pertaining to awareness of bottled water advertisements, location of purchases of bottled water, and preference for particular brands of bottled water was also included to gain an idea of how the wider economic context shaped individual decisions. This section also included a question on recycling which provided further insights into the environmental behavior and attitudes of the individual respondent.

Attitudes towards specific properties of bottled and tap water were gathered through a series a statements arranged around reasons for drinking bottled water identified from existing studies on water consumption. Responses were arranged around a graduated scale ranging from completely agree to completely disagree. The purpose of having both direct questions regarding reasons for consumption and attitudes towards statements on consumption is to ensure that the perspectives of the respondent are examined in-depth.
The final section consists of true and false statements about the environmental, economic and social implications of bottled water and seeks to measure the knowledge regarding bottled and tap water possessed by respondents. Responses were, again, gathered through a graduated scale ranging from completely true to completely false. This enabled a linking of environmental behaviors to environmental knowledge. Overall, the questionnaire provided an overview of bottled water consumption, reasons for preferring bottled over tap water or vice-versa, and estimations of the extent to which knowledge about the environmental implications of bottled water has an effect on individual consumption.

**Administering the Questionnaire**

The questionnaire was personally administered to each respondent. Subjects were recruited by going from door to door in each neighborhood. Fieldwork began in May 2010 and was carried out over a period of 7 months until November 2010. In all, 27 trips were made to the two neighborhoods and, as far as possible, every single household was approached to be part of the study. Data was gathered from a total of 60 respondents, 24 from Oak (higher income neighborhood) and 36 from Pine (lower income neighborhood). Based on appearance, the houses in Pine look significantly older than those in Oak. There were several abandoned houses in Pine, while there was only a couple for sale in Oak. Based on personal communication, it seems that the majority of the houses in Pine were built between 1918 and 1954, while most homes in Oak were built in the 1970s and 1980s.
During the summer months, residents were approached at all hours during the day, but in the fall, residents were interviewed in the afternoon hours and no one was approached after dark. The hours that I was able to survey these neighborhoods are a proposed reason for why the sample does not include an even representation from all demographic and socioeconomic groups, and this will be discussed in Chapter 4. While it was more difficult to persuade residents of Oak to participate in this study, those who participated did so wholeheartedly. In contrast, residents of Pine were more easily recruited into the study, but usually chose to speak with me within the threshold of their house.

At the outset of the interview, respondents were assured that their identity would not be revealed in the course of publishing the results. Respondents also had the option to withdraw from the interview at any time of their choosing, or to refuse to answer any questions. I recorded interviews for those respondents who consented to such recording. Written and recorded data were transcribed for each respondent and then manually coded and analyzed. The EWG study was not mentioned while interviewing each resident, but was mentioned in post-questionnaire conversations, when asked, as a reason for why this research was being conducted. Only a small handful of people had heard about the study. It is likely that the BP oil spill in the Gulf of Mexico, which was unfolding at the time of this research, weighed more heavily on respondents’ minds; but, again, was mentioned by only one participant. Neighborhood association leaders however cited that as a reason for not being able to meet with me.
The remaining chapters outline the findings of this study and it should be noted that interview numbers 1-24 were conducted in Oak, and interviews 25-60 were conducted in Pine.
Chapter 4

Drinking Water Consumption by Individual and Household Characteristics

This chapter describes the two main ways in which bottled water consumption is defined within this study. In the process, it details the attributes of the respondents by comparing their individual consumption of bottled water to their individual characteristics and household sources of drinking water with household characteristics. Individual and household consumption is also sought to be described by neighborhood to examine the effects of the neighborhood on consumption. This introduction to respondents seeks to set the stage for the discussion of individual perspectives on bottled and tap water analyzed in subsequent chapters.

Individual Consumption

Individual consumption was measured in terms of frequency of consumption of bottled water and was divided into four categories: daily, a few times a week, a few times a month, and never. As shown in Table 3, 31 of the 60 respondents were daily bottled water drinkers, so that a little more than half the sample ranked very high in terms of consumption of bottled water. The next largest group comprised of respondents who drank only a few bottles a month
and this constituted about a quarter of the respondents. As discussed in Chapter 2, studies of bottled water consumption have reported that individual consumption can be related to individual characteristics and this study will examine this relationship in terms of age, gender, race, and education.

Table 4: Frequency of Bottled Water Consumption

<table>
<thead>
<tr>
<th>Consumption Frequency</th>
<th>Number of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily</td>
<td>31</td>
</tr>
<tr>
<td>A few times a week</td>
<td>7</td>
</tr>
<tr>
<td>A few times a month</td>
<td>15</td>
</tr>
<tr>
<td>Never</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
</tr>
</tbody>
</table>

Age

Respondents were divided into three categories in terms of age: below 30 years, between 30 and 60 years in age, and above 60 years. As depicted in Table 4, the majority of the sample ranged in age from 30 to 60 years (around 62%). Of these respondents, there were 18 (around 49%) who drank bottled water daily, 4 (around 11%) who drank a few bottles per week, 11 (around 30%) who drank a few bottles a month, and 4 (11%) who did not drink bottled water. Distributions in the other age categories were similar, so that there were no stark differences across age groups in terms of water consumption habits. While the
sample cannot be generalized to draw broader conclusions about age and consumption of bottled water, it is worth noting that all of the respondents in the below 30 years category consumed some bottled water.

Table 4: Individual Consumption Frequency by Age

<table>
<thead>
<tr>
<th>Age (in years)</th>
<th>Daily</th>
<th>A few times a week</th>
<th>A few times a month</th>
<th>Never</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>under 30</td>
<td>5</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>30 to 60</td>
<td>18</td>
<td>4</td>
<td>11</td>
<td>4</td>
<td>37</td>
</tr>
<tr>
<td>above 60</td>
<td>8</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td>31</td>
<td>7</td>
<td>15</td>
<td>7</td>
<td>60</td>
</tr>
</tbody>
</table>

*Gender*

The sample for this study consisted of 45 female respondents and 15 male respondents, so that it is highly skewed in terms of gender. My gender and the time of day in which fieldwork was conducted (usually in the afternoons) could be probable reasons for this unevenness. Of the female respondents, 23 (51%) drank bottled water on a daily basis, 6 (13%) drank only a few bottles a week, 12 respondents (27%) drank only a few bottles a month, and 4 (9%) never drank any bottled water. The distribution of consumption was similar for the male respondents. Within this study, a larger proportion of men (20%) than women (8.9%) reported that they do not drink any bottled water at all.
Table 5: Individual Consumption Frequency by Gender

<table>
<thead>
<tr>
<th>Gender</th>
<th>Daily</th>
<th>A few times a week</th>
<th>A few times a month</th>
<th>Never</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>23</td>
<td>6</td>
<td>12</td>
<td>4</td>
<td>45</td>
</tr>
<tr>
<td>Male</td>
<td>8</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>Total</td>
<td>31</td>
<td>7</td>
<td>15</td>
<td>7</td>
<td>60</td>
</tr>
</tbody>
</table>

Race

Of the 60 respondents, 39 (65%) identified as white (this category excludes respondents of Hispanic ethnicity). Of the remaining respondents, 9 identified as Black, 7 as Hispanic (categorized as an ethnicity spanning white and Black races in the U.S. Census), 3 as multi-racial, 1 as Asian and 1 person identified as ‘other.’ The racial composition of the respondents is thus also skewed towards one race. As shown in Table 6, of the 39 respondents who identified as white, 15 (38%) drank bottled water daily, 5 (13%) drank bottled water a few times a week, 13 (33%) drank bottled water a few times a month, and 6 (15%) did not drink any bottled water. Of the 9 Black people interviewed, 6 (67%) are daily bottled water drinkers, 2 (22%) drink a few bottles of water per week, and 1 person (11%) drinks a few bottles per month. All but one of the Hispanic people interviewed (6 respondents out of 7) drank bottled water daily. Based on the respondents interviewed for this study, it would appear that those who identified as non-white and Hispanic drank bottled water more frequently
than white respondents, with 76% of non-white participants being daily bottled water drinkers compared to 38% of white respondents.

Table 6: Individual Consumption Frequency by Race

<table>
<thead>
<tr>
<th>Race / Ethnicity</th>
<th>Daily</th>
<th>A few times a week</th>
<th>A few times a month</th>
<th>Never</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>White (not Hispanic)</td>
<td>15</td>
<td>5</td>
<td>13</td>
<td>6</td>
<td>39</td>
</tr>
<tr>
<td>Non-white</td>
<td>16</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>21</td>
</tr>
<tr>
<td>Total</td>
<td>31</td>
<td>7</td>
<td>15</td>
<td>7</td>
<td>60</td>
</tr>
</tbody>
</table>

**Education**

One of the assumptions of this study was that higher levels of education would relate to more knowledge about the environmental implications of bottled water, and that this knowledge would be reflected in consumption behavior. Level of education was divided into three categories as shown in Table 7: high school (whether or not they graduated), undergraduate (have obtained an undergraduate degree), and graduate (have obtained a graduate degree). The majority of the sample possessed at least an undergraduate degree (all but 6 respondents), 33 of the total respondents had studied up to an undergraduate degree (56%), and 20 respondents had studied up to a graduate degree (34%). (It should be noted that one respondent did not answer this question, so the total number of respondents in this case is 59.) As shown in Table 7, there is not
much variation in frequency of consumption by level of education with a high proportion of both undergraduate and graduate degree holders consuming bottled water on a daily basis (55% and 40% respectively). It should also be noted that within the sample for this study, those whose education was high school or below were less likely to not consume any bottled water at all.

Table 7: Individual Consumption Frequency by Education

<table>
<thead>
<tr>
<th>Education</th>
<th>Daily</th>
<th>A few times a week</th>
<th>A few times a month</th>
<th>Never</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>High School</td>
<td>5</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Undergraduate</td>
<td>18</td>
<td>4</td>
<td>8</td>
<td>3</td>
<td>33</td>
</tr>
<tr>
<td>Graduate</td>
<td>8</td>
<td>2</td>
<td>7</td>
<td>3</td>
<td>20</td>
</tr>
<tr>
<td>Total</td>
<td>31</td>
<td>7</td>
<td>15</td>
<td>6</td>
<td>59</td>
</tr>
</tbody>
</table>

Since the age, gender, race and educational characteristics of the respondents are skewed towards middle aged (30 to 60 years), female, white, well-educated, and daily consumers of bottled water, this study cannot draw any significant conclusions about the relationship between individual frequency of bottled water consumption and individual characteristics. However, two suggestive features of the results in this section can be noted. First, within this sample slightly higher bottled water consumption was found to characterize respondents who identified as younger and non-white. Second, given that the
majority of the respondents were well-educated, having studied up to at least an undergraduate degree, it is interesting to note that access to education, and presumably a wider range of sources of information, does not seem to have reduced their propensity to consume bottled water.

**Household Consumption**

Individual respondents can also be located within their households in order to compare consumption of bottled and tap water. Households were classified into three groups based on the source of their drinking water. Each respondent was asked to name all types of water drunk by them or members of their household, not just the primary source of drinking water. Since more than one type of water usually was listed, totals were not included in tables 9, 10, and 13. It should be noted that 4 respondents did not provide information on type of drinking water supply, so this section is based on 56 instead of 60 responses.
Table 8: Types of Drinking Water Consumed Within Household

<table>
<thead>
<tr>
<th>Type of Water Consumed</th>
<th>Number of Households</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bottled</td>
<td>43</td>
</tr>
<tr>
<td>Filtered</td>
<td>36</td>
</tr>
<tr>
<td>Tap</td>
<td>22</td>
</tr>
<tr>
<td>Bottled Only</td>
<td>8</td>
</tr>
<tr>
<td>Tap Only</td>
<td>2</td>
</tr>
<tr>
<td>No Bottled Water</td>
<td>13</td>
</tr>
<tr>
<td>No Tap Water</td>
<td>34</td>
</tr>
<tr>
<td>All Three</td>
<td>8</td>
</tr>
<tr>
<td>No response</td>
<td>4</td>
</tr>
</tbody>
</table>

As shown in Table 8, the majority of households in this study (43 out of 56 households, 77%) utilize bottled water as one of their sources of drinking water, while only 22 households (39%) utilize tap water. Put another way, while only 13 (23%) of the respondents do not use any bottled water for drinking purposes, 34 of the respondents (61%) utilize no tap water for drinking within their household. It is also clear that bottled water is not the only source of non-municipal water, but that filtering devices are used by 36 households (64%) which is another significant indication of the move away from ‘pure’ tap water.
Household Structure

Since a common stereotype about bottled water is that it is better for children and the elderly, participants were asked who currently resides in their house in order to see if there was any correlation between household structure and types of water consumed. Households were divided into the following categories as shown in Table 9: households with children below 18, households with adults over 60, household with adults over 18, two-person households consisting of a married couple, and single-person households. Among the respondents, there were 22 households (37%) which included children below the age of 18 and 18 households (30%) with adults over the age of 60 (Table 9).

As has been the pattern with individual characteristics, the majority of households in each category consume bottled water (Table 9). However, as the low numbers for bottled only and tap only households show, most households are likely to depend on some combination of bottled, filtered and tap water. Families with children and families with elderly members show about equal proportions of consumption of bottled water. Thus, out of the 22 families with children under the age of 18, nineteen (86%) list bottled water as one of their sources of drinking water, and 15 (68%) drink only bottled or filtered water. Out of the 18 families that have elderly members above the age of 60, fifteen (83%) drink some bottled water, while 10 households (56%) drink only bottled or filtered water. This proportion also holds for two-person households where is might be expected that health reasons do not preclude the drinking of tap water. Thus, 72% of married couple households drink bottled water, while 14 of them (56%)
Table 9: Types of Drinking Water Consumed Within Households by Household Structure

<table>
<thead>
<tr>
<th>Household Structure</th>
<th>Total number of households</th>
<th>Type of Water Consumed</th>
<th></th>
<th></th>
<th>Only Bottled or Filtered (No Tap Water)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Bottled</td>
<td>Filtered</td>
<td>Tap</td>
<td>Bottled Only</td>
</tr>
<tr>
<td>Children &lt; 18</td>
<td>22</td>
<td>19</td>
<td>13</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>Adults &gt; 60</td>
<td>18</td>
<td>15</td>
<td>12</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>Adults between 18 and 60</td>
<td>12</td>
<td>12</td>
<td>8</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Only married couple household</td>
<td>25</td>
<td>18</td>
<td>19</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>One person household</td>
<td>4</td>
<td>4</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>
drink only bottled or filtered water. Again, numbers do not add up to 60 since participants may belong to a household which falls under more than one category (i.e. children under the age of 18 and adults over the age of 60). Overall, household structure by itself does not seem to influence dependence on bottled water for the respondents in this study.

*Household Income*

It is widely agreed that it is difficult to elicit accurate information about income through direct questioning, so that many studies also include a proxy variable to measure income. The problems associated with obtaining income data becomes apparent from the fact that 10 households refused to answer this question, so that Table 10 below which relates household income to source of drinking water reports data for 50 respondents.

Table 10 shows the relation between annual household income and type of water consumed. Most of the respondents in this study belong to a household which earns between $50,000 and $100,000 on a yearly basis. Dependence on bottled water is high across all income categories, and is thus consistent with the results obtained for individual characteristics and household structure. However, given the distribution of respondents across income categories, it is not possible to draw any general conclusions regarding income and dependence on bottled water, except to note that the relatively high income level of the respondents of this study enable them to have a wider choice in terms of source of drinking water.
### Table 10: Types of Drinking Water Consumed Within Household by Annual Household Income

<table>
<thead>
<tr>
<th>Annual Income of Household</th>
<th>Total number of households</th>
<th>Type of Water Consumed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bottled</td>
<td>Filtered</td>
</tr>
<tr>
<td>&lt; $20,000</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>$20,000 to $50,000</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>$50,000 to $100,000</td>
<td>29</td>
<td>25</td>
</tr>
<tr>
<td>&gt; $100,000</td>
<td>13</td>
<td>11</td>
</tr>
</tbody>
</table>

### Bottled Water Consumption by Neighborhood

As mentioned above, the two neighborhoods utilized in this study were chosen to reflect differing levels of income within Pensacola. It is useful therefore to begin by understanding how respondents for this study are distributed in terms of income within the two neighborhoods. As shown in Table 11, the majority of respondents for this study belong to households with relatively high annual incomes. In Oak, most respondents belong to households with an annual income greater than $100,000.
Table 11: Annual Household Income by Neighborhood

<table>
<thead>
<tr>
<th>Annual Income of Household</th>
<th>Oak (higher income)</th>
<th>Pine (lower income)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; $20,000</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>$20,000 to $50,000</td>
<td>0</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>$50,000 to $100,000</td>
<td>9</td>
<td>20</td>
<td>29</td>
</tr>
<tr>
<td>&gt; $100,000</td>
<td>11</td>
<td>2</td>
<td>13</td>
</tr>
<tr>
<td>Did not report</td>
<td>4</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>24</td>
<td>36</td>
<td>60</td>
</tr>
</tbody>
</table>

Incomes greater than $100,000 (11 respondents, 46% of neighborhood) while 9 respondents (38%) belong to households with an annual income between $50,000 and $100,000. In the case of Pine, 20 of 36 respondents (56%) belong to households with an estimated income between $50,000 and $100,000. To the extent that 8 households in Pine earned below $50,000 the neighborhood emerges as lower income in the context of the sample for this study.

In terms of individual consumption of bottled water (Table 12), Pine had the largest number of daily bottled water drinkers (22 respondents, 61% of neighborhood). In contrast, only 9 of 24 respondents (38%) were daily bottled water consumers in Oak. While this may be an artifact of the sampling method, it also shows that within this study, the two neighborhoods are not equivalent in terms of bottled water consumption habits.
Table 12: Individual Bottled Water Consumption by Neighborhood

<table>
<thead>
<tr>
<th>Income</th>
<th>Oak (higher income)</th>
<th>Pine (lower income)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily</td>
<td>9</td>
<td>22</td>
<td>31</td>
</tr>
<tr>
<td>A few times a week</td>
<td>2</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>A few time a month</td>
<td>8</td>
<td>7</td>
<td>15</td>
</tr>
<tr>
<td>Never</td>
<td>5</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>24</td>
<td>36</td>
<td>60</td>
</tr>
</tbody>
</table>

Table 13 depicts the relationship between neighborhood and type of drinking water consumed. Thus, 18 of 24 respondents from the higher income neighborhood (75%) depend on bottled water as one of their sources of drinking water, and the same was true of 32 of 36 respondents (89%) from the lower income neighborhood. In both neighborhoods, therefore, there is a high level of dependence on bottled water.
Table 13: Types of Drinking Water Consumed Within Households by Neighborhood

<table>
<thead>
<tr>
<th>Neighborhood</th>
<th>Total number of households</th>
<th>Type of Water Consumed</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Bottled</td>
<td>Filtered</td>
<td>Tap</td>
<td>Bottled Only</td>
</tr>
<tr>
<td>Oak (higher income neighborhood)</td>
<td>24</td>
<td>18</td>
<td>19</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>Pine (lower income neighborhood)</td>
<td>36</td>
<td>32</td>
<td>20</td>
<td>16</td>
<td>7</td>
</tr>
</tbody>
</table>

Overall, within this study, the two neighborhoods differ in terms of household income distribution and individual consumption of bottled water. However, since this study does not aim to provide statistically verifiable generalizations about bottled and tap water consumers in Pensacola, but is exploratory in nature, the utilization of two neighborhoods represents an attempt to incorporate the diversities of income and race that comprise Pensacola, rather than any deliberate organization of this study around the axes of race and income. Instead, the presence of a large number of bottled water drinkers within the sample for this study enables a more focused examination on the self-perceptions of regular bottled water drinkers.
Limitations of Study

The respondents of this study were predominantly white, female, well-educated, and daily consumers of bottled water. This limited variability in demographics prevents general population conclusions for bottled water consumption being drawn from this study, but supports the use of this study to provide in-depth explanations for the consumption of bottled water.

Attention should also be drawn to interview questions that may not have been conducive to eliciting accurate and honest responses. Thus, the questionnaire gathered data on number of bottles consumed the past day and week, but under-specification of the meaning of ‘bottle’ made this data column difficult to classify and hence this was not reported in the findings. Questions were also asked about the amount spent on bottled water, but again this was not easily specified by respondents. As mentioned earlier, information about income is also not always accurately reported, and many studies, therefore, choose to not ask direct questions regarding income. In this thesis, the choice of case study neighborhoods on the basis of income was one strategy to ensure that a wider range of household incomes could potentially be represented.

The issue of interviewer bias is also important to consider. Given that the questionnaires were personally administered, respondents may have attempted to understand my own stake in the issue of bottled water consumption and attempted to exaggerate their support for or opposition to bottled water. I also sensed some discomfort in terms of the question regarding education level where many respondents seemed eager to claim some college education. Also, given
the positive image associated with recycling, it is likely that respondents were unwilling to own up to their actual disposal habits and may have exaggerated the extent of their recycling as a consequence.

This chapter has detailed the individual and household characteristics of respondents in terms of their consumption of bottled and tap water. With this as background, the next chapter delves deeper into explanations for drinking water consumption habits from the perspective of individual respondents.
Chapter 5

Explaining Consumption of Bottled and Tap Water

This chapter focuses on reasons provided by respondents for consuming or not consuming bottled and tap water. It begins by providing a broad overview of the main reasons provided by respondents for their consumption, or avoidance of consumption, of bottled water. Bottled water consumption is then situated in the broader context of advertising and marketing as experienced by respondents and the specific concerns regarding tap water noted by them.

Reasons for Drinking Bottled Water

As a preliminary to gauging attitudes and knowledge of bottled water, respondents were asked to list their reasons for drinking bottled water. This was an open-ended question posed to the respondents: 'What most encourages you to drink bottled water?' and they could cite as many reasons as they wanted. The reasons cited by them were subsequently arranged into eight main categories: ‘Convenience,’ ‘Health,’ ‘Safety,’ ‘Taste,’ ‘Availability,’ ‘Advertising,’ ‘Image’ and ‘Cost.’ Figure 5 provides a count for the number of mentions made by respondents of each of the reasons. ‘Convenience’ was the most widely cited reasons for drinking bottled water, mentioned by 32 respondents (53% of
respondents). Specific points mentioned under ‘Convenience’ included the ability to carry bottled water while doing daily activities or traveling and the fact that a bottle was a safe receptacle in which to hold water. Thus, one respondent “like[d] the ease of it and […] because [they] can drink some and put the lid on it and put it to the side, [they] do not have to worry about an open glass that can spill” (Interview 38). In another case, a respondent expressed doubts about the supposed healthiness of bottled water, and when asked why she persisted in drinking it, cited ‘Convenience’ as the reason (Interview 21).

The next highest reasons cited were ‘Health’ (16 respondents, 27%) ‘Safety’ (14 respondents, 23%), and ‘Taste’ (13 respondents, 22%). Among those who cited health as a reason were respondents who drank bottled water as a substitute for other beverages such as soda, coffee, or tea. One respondent went as far as stating that “it is recommended by doctors to drink bottled water” (Interview 30). Perceptions of ‘Safety’ associated with drinking water were expressed through distrust of tap water, assumption that bottled water is cleaner, and a belief that since bottled water is produced by a company, it becomes naturally safer to drink. Given concerns about Pensacola’s tap water, it was expected that safety would be a highly mentioned factor for drinking bottled water. Two respondents alluded to lead contamination of tap water, and one respondent mentioned the alkalinity of tap water as a reason for not drinking it (Interviews 26, 27, and 30 respectively). Another respondent is encouraged to drink bottled water because of “what [she has read about …] biomedical hazards being passed in water and diseases and plagues and stuff like that [which is]
what leads [her] to prefer bottled water rather than tap water” (Interview 41). A couple of respondents mentioned that they would choose bottled water when the only other option is a water fountain. The taste of water was also mentioned relatively often as a reason for drinking bottled water. One respondent described tap water as ‘nasty’ (Interview 50) and another mentioned her dislike of chlorinated tap water (Interview 7).

Figure 5: Reasons for Drinking Bottled Water

There were very few mentions of advertising and image as reasons for drinking bottled water. However, one respondent was clearly caught up in the image of bottled water stating ‘It is the norm, and it looks more refreshing to have … someone come over and you are like ‘do you want a bottle of water?’ for me to open my sink and pour them some tap water, you know tap water is … not what
you think of as being good, you know it is a stereotype I guess’ (Interview 37).

Availability was the reason mentioned by respondents who do not normally drink bottled water, except when they are out and about and it is either offered to them or it is the only kind of water available. Only one respondent mentioned the low cost of bottled water as being their reason for drinking it. It should be noted that five respondents were adamant that nothing would persuade them to drink bottled water. In the words of one of these respondents, ‘tap water is fine’ (Interview 12).

**Reasons against Drinking Bottled Water**

Respondents were also asked the converse question: ‘What, if anything, discourages you from drinking bottled water?’ In this case, six reasons could be discerned: ‘Environmental Reasons,’ ‘Higher Costs,’ ‘Tap Water/ Filtered Water is Sufficient,’ ‘Concerns about Safety of Plastics,’ ‘False Advertising’ and ‘Nothing Discourages Me.’ As shown in Figure 6, the majority of respondents (24, 40%) stated that nothing discourages them from drinking bottled water, reflecting the preponderance of bottled water drinkers in this study. Thirteen respondents cited general ‘Environmental Reasons’ as shaping their choice to not drink bottled water, with 8 citing ‘Concerns about Safety of Plastics.’ Two respondents alluded to being aware of the fact that ‘there were so many plastic bottles wasted each year that they could be wrapped around the entire earth several times’ (Interviews 37 and 60). One respondent mentioned that the use of petroleum to produce plastic bottles was ‘a giant waste of petroleum’ (Interview 36). Another respondent stated that she was dismayed by the fact that people often threw
away half-full bottles, thus wasting not just the plastic bottle but also the water (Interview 28).

![Figure 6: Reasons against Drinking Bottled Water](image)

The higher cost of bottled water was mentioned by 13 respondents as a deterrent to their use (22%). According to one respondent, the price of bottled water is, “exorbitant. It costs you a dollar and some cents for a bottle of water when you can get it from your tap. You see the mark up on this, and they get the bottle for maybe a half a cent because they buy in bulk and they don’t even run reverse osmosis on these things, they are just filling it up from the tap. You see how much money they [the companies] are making” (Interview 1). For 10
respondents, tap water or filtered water was enough, and they did not feel the need to specifically consume bottled water. False advertising was mentioned by seven respondents as a reason not to consume bottled water. This includes distrust of the water company, uncertainty about the source of the water and general doubt related to, what seemed to them, to be exaggerated claims made by bottled water companies. Only one respondent mentioned ‘Taste’ as a reason for not drinking bottled water.

The high number of mentions of ‘Convenience’ as the reason for drinking bottled water suggests that the concept of bottled water has actually been marketed successfully, even as respondents did not overtly view advertising and marketing as playing a big role in their water consumption behavior. To follow the notion of ‘Convenience’ further and to understand how bottled water becomes a feasible option, it is important to delve into the role of advertising campaigns, retail venues and brand names, however imperceptibly these may be functioning in the actual choices made by consumers.

**Wider Context of Bottled Water Consumption**

In order to situate the consumption of drinking water within the wider economic context, respondents were asked where they were most likely to come across advertisements for bottled water, where they purchased their bottled water, and whether there was a particular brand of bottled water that they preferred. In terms of awareness of advertising, 22 respondents could not recall seeing any advertisements for bottled water (Figure 7). Out of the 38 who did, 15 (25%) had seen advertisements for bottled water in newspapers, magazines or
other types of printed media, and 13 respondents (22%) came across advertisements on television or the internet. A number of respondents (11, 18%) saw bottled water advertisements in stores where they purchased them.

Figure 7: Awareness of Advertising for Bottled Water

One respondent was especially descriptive stating that they

'[see advertisements] all the time. One would be the vending machine, just like Coke machines or whatever ... Dasani which I think is a Coke product ... the trucks that deliver it are all over the place yeah, you know it seems like in the last decade that they have, whoever they is, have kind of slacked off in advertising. I know in the mid-90s to you know early 2005 or so, we were getting hit hard by bottled water advertising. I remember at the time thinking this is crazy. This stuff is free. Why am I having to pay for it? You know, this does not make any sense. I have never been a fan of bottled water’ (Interview 36).
A large majority of the respondents purchased bottled water from a supermarket or grocery store (Figure 8). Specific locations included Wal-Mart, Target, Publix, Food World, Winn Dixie, Dollar Tree / General, Ever’man Natural Foods (co-operative), and the Commissary (since this is a large military area). Buying bottled water is thus part of everyday shopping routines which is likely to increase the notion that it is a normal part of buying household grocery supplies. Within Pine, the lower-income neighborhood, 16 respondents (44% of the neighborhood) obtained their bottled water as part of grocery shopping at Wal-Mart.
Since bottled water is sold through corporations, it is worth noting if particular corporate brands matter in terms of the kind of bottled water respondents seek to purchase. The question of which brand name was most preferred elicited answers from 49 respondents (Figure 9). The most common answers were ‘whatever is the cheapest’ or ‘whatever is on sale’ (16 respondents). Not surprisingly, Dasani and Aquafina were the most popular specific brands of bottled water named, but it is worth noting that stores brands were also cited by 11 respondents, probably in keeping with the preference for low-cost options. There were three respondents who stated that the brand did not
matter as long as it was a certain type of water; such as, carbonated, mineral, natural spring. These three respondents usually bought the store brand.

While respondents did not rate advertising and marketing as important factors in their decision to consume bottled water, the fact that bottled water can be bought as part of everyday grocery shopping points to the naturalization of the notion that both food and water need to be purchased in supermarkets. It is important in this context to consider what turns consumers against tap water and that is the objective of the next section.

**Tap Water Consumption**

To understand why respondents were possibly turning against tap water, they were asked questions regarding their concerns about their tap water, any changes that they have noticed either recently or over the last few years in tap water quality, and any complaints that they might have heard about the tap water serving their area. Since it is likely that tap water quality differs between the two neighborhoods covered in this study, even as both receive water from the same company, responses on tap water consumption will be discussed at the level of the neighborhood.

In terms of concerns about tap water, the majority of concerns seem to be located within Pine neighborhood where 13 respondents were concerned about whether tap water was safe to drink and 10 respondents had concerns about taste. There were references to radon, fluorine, chlorine, lead and other potentially harmful elements in tap water. One respondent stated that he did not
trust the tap water as much since the recent oil spill in the Gulf (Interview 42).

Another resident stated: ‘I don’t like [tap water] much and the filter can be

touched by bugs or rats or I do not know it is in the pipes. Maybe, I do not like
much the water from the faucets” (Interview 48). One resident had many

concerns about the tap water in Pensacola telling me that blood cancers are

prevalent in the area which are potentially caused by the water, as well as cases

of multiple myeloma in her own family. She had also heard of cases that were

present across the city, due to the benzene found in nearby Superfund sites

(Interview 26). She has a 16-year old daughter who had Hodgkin’s lymphoma

last year. While such fears need not be completely discounted, it is worth noting

Table 14: Concerns about Tap Water

<table>
<thead>
<tr>
<th>Neighborhood</th>
<th>No Concerns</th>
<th>Concerns about Taste</th>
<th>Concerns about Safety</th>
<th>Do not Drink Tap Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oak (higher income, 24 respondents)</td>
<td>11</td>
<td>2</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Pine (lower income, 36 respondents)</td>
<td>12</td>
<td>10</td>
<td>13</td>
<td>7</td>
</tr>
<tr>
<td>Total (60 respondents)</td>
<td>23</td>
<td>12</td>
<td>20</td>
<td>11</td>
</tr>
</tbody>
</table>
that this respondent associates this risk with tap water in particular and not water in general.

Residents of Oak mentioned fewer concerns regarding taste and had some concerns about safety (Table 14). But as one resident put it, taste is not a sufficient criterion to judge tap water quality. According to this resident, 'we don't have very good water. It tastes delicious, the water here tastes good as anywhere, but I know the water here has contaminants" (Interview 2). For one resident, registering concerns was futile, since 'a lot of the bottled water comes from tap water just like Pensacola's tap water, so I just have to go with the flow" (Interview 3). Other residents mentioned that their concerns were ‘minimal, [for example] periods after storms, hurricanes, runoff waters, possible contamination from sewage, etc.' (Interview 10).

When asked if respondents had noticed any changes as far as their municipal water company was concerned, either recently or in the last few years, not one person in either neighborhood could recall any changes. There was a mention of a new payment drop-off system, an outdated annual water report, and talk of using recycled water for sprinklers. Within Pine neighborhood, one respondent was thankful that the city had begun recycling, but apparently does not expect much more from the city (Interview 28). Another respondent mentioned rather dramatically that for her to know whether water was safe to drink or not, it would require someone to run down the streets yelling “do not drink the water” (Interview 29). A few respondents mentioned that they had noticed that co-workers primarily drank bottled water, but they did not elaborate
on this in the course of the interview. Among residents in Oak, one respondent mentioned a group that was raising questions about the fluoride levels in tap

Table 15: Noticeable Changes in Tap Water

<table>
<thead>
<tr>
<th>Neighborhood</th>
<th>Have Noticed Changes</th>
<th>Unsure / Vague Recollection of Changes</th>
<th>Have Not Noticed Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oak (higher income, 24 respondents)</td>
<td>0</td>
<td>2</td>
<td>22</td>
</tr>
<tr>
<td>Pine (lower income, 36 respondents)</td>
<td>0</td>
<td>2</td>
<td>34</td>
</tr>
<tr>
<td>Total (60 respondents)</td>
<td>0</td>
<td>4</td>
<td>56</td>
</tr>
</tbody>
</table>

water (Interview 8). This respondent mentioned the water quality report sent by the water company, but argued that it was ‘so technical that it does not do much good.’ Another respondent had heard about the controversy regarding Pensacola’s water: ‘I am sure they have since they had that bad report 3 or 4 months ago or whatever,’ they are seeking to improve tap water quality (Interview 6). Another respondent stated they had not seen any changes, but had noticed that ‘it seems to be pretty much the claim that they [ECUA] are producing relatively clean water’ (Interview 10).
When asked about what complaints they had heard about the tap water, residents mentioned a few complaints about taste and fluorine. One respondent had also heard about thyroid problems in the area and were told by a naturopath that it was because of the fluorine in the water (Interview 28). The issue of taste again was relatively more prominent in Pine rather than Oak.

Table 16: Complaints about Tap Water

<table>
<thead>
<tr>
<th>Neighborhood</th>
<th>Taste</th>
<th>Contamination/ Other Health Problems</th>
<th>No Complaints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oak (higher income, 24 respondents)</td>
<td>2</td>
<td>0</td>
<td>22</td>
</tr>
<tr>
<td>Pine (lower income, 36 respondents)</td>
<td>5</td>
<td>2</td>
<td>29</td>
</tr>
<tr>
<td>Total (60 respondents)</td>
<td>7</td>
<td>2</td>
<td>51</td>
</tr>
</tbody>
</table>

For the most part, it seemed that tap water, and drinking water in general, was not a large topic of discussion in the two neighborhoods. It seems, therefore, that the decision to consume bottled water is being taken despite the absence of major problems with Pensacola’s tap water. The context within which bottled water becomes convenient and available, therefore, becomes that much more
important, rather than any actual decline in terms of tap water quality. The next chapter follow the issue of bottled versus tap water in a more focused fashion through questions regarding attitudes towards and knowledge of drinking water sources.
Chapter 6

Attitudes Towards and Knowledge of Bottled and Tap Water

This chapter presents findings regarding respondents’ attitudes towards and preferences for bottled versus tap water, and respondents’ knowledge of environmental, economic and social implications of consuming bottled water versus tap water. First, it delves into the specific properties of bottled and tap water that influence respondents’ drinking water choices. By more overtly considering the role of properties of bottled versus tap water, this section enables a more intensive engagement with the specific factors that shape drinking water choices. The next section considers the extent to which respondents were aware of the environmental, economic and social costs of consuming bottled water, in order to provide an insight into how environmental behaviors and environmental knowledge is linked for this study’s respondents.

Attitudes Towards and Preferences for Bottled and Tap Water

As discussed in Chapter 2, consumption of bottled water has been linked to its chemical properties (health, safety, taste) as well as the increased advertising and marketing of bottled water. This section seeks to understand respondent attitudes towards the properties of water and its marketing. As shown
in Table 17, respondents were provided 14 statements regarding their consumption of bottled and tap water and asked about the extent to which this statement reflected their behavior. Respondents could choose from five options to communicate either their agreement or disagreement with the statement. Thus, ‘Strongly Agree’ was assigned a numerical value of 5, ‘Somewhat Agree’ a value of 4, ‘Neither Agree nor Disagree’ a value of 3, ‘Somewhat Disagree’ a value of 2, and ‘Strongly Disagree’ a value of 1. Respondents were also given the option of declining to assign a value to a particular statement. For the purposes of analysis, these statements were divided into the following categories: health, safety, taste, advertising and marketing, convenience, image, and choosing between bottled and tap water. Table 17 provides counts for the number of respondents that chose each option for a statement, as well as the average response for that statement.
Table 17: Attitudes Towards Bottled and Tap Water

<table>
<thead>
<tr>
<th>Attitude</th>
<th>Strongly Agree (= 5)</th>
<th>Somewhat Agree (= 4)</th>
<th>Neither Agree nor Disagree (= 3)</th>
<th>Somewhat Disagree (= 2)</th>
<th>Strongly Disagree (= 1)</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Health</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bottled water contains vitamins and minerals that are good for my health.</td>
<td>10</td>
<td>6</td>
<td>5</td>
<td>21</td>
<td>18</td>
<td>2.48</td>
</tr>
<tr>
<td>Drinking bottled water is part of a healthy lifestyle.</td>
<td>20</td>
<td>6</td>
<td>5</td>
<td>9</td>
<td>20</td>
<td>2.95</td>
</tr>
<tr>
<td><strong>Safety</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bottled water is safer for children, the elderly, and those with compromised immune systems.</td>
<td>13</td>
<td>6</td>
<td>11</td>
<td>7</td>
<td>23</td>
<td>2.65</td>
</tr>
<tr>
<td><strong>Taste</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bottled water tastes better than tap water.</td>
<td>27</td>
<td>10</td>
<td>3</td>
<td>7</td>
<td>13</td>
<td>3.52</td>
</tr>
<tr>
<td>More time and money should be spent on better tasting tap water.</td>
<td>25</td>
<td>11</td>
<td>0</td>
<td>9</td>
<td>15</td>
<td>3.37</td>
</tr>
<tr>
<td><strong>Advertising and Marketing</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advertisements have influence over the amount and types of bottled water I drink.</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td>6</td>
<td>44</td>
<td>1.65</td>
</tr>
<tr>
<td>I often see advertisements for bottled water.</td>
<td>18</td>
<td>11</td>
<td>4</td>
<td>9</td>
<td>18</td>
<td>3.03</td>
</tr>
<tr>
<td>Convenience</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>I am more likely to drink bottled water when I’m not at home.</td>
<td>43</td>
<td>4</td>
<td>0</td>
<td>3</td>
<td>10</td>
<td>4.12</td>
</tr>
<tr>
<td>I am more likely to drink tap water at home.</td>
<td>39</td>
<td>5</td>
<td>1</td>
<td>3</td>
<td>12</td>
<td>3.93</td>
</tr>
<tr>
<td><strong>Image</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drinking bottled water is more sophisticated than drinking tap water.</td>
<td>12</td>
<td>5</td>
<td>2</td>
<td>6</td>
<td>35</td>
<td>2.22</td>
</tr>
<tr>
<td>I prefer drinking from a water fountain to purchasing bottled water.</td>
<td>12</td>
<td>8</td>
<td>2</td>
<td>5</td>
<td>33</td>
<td>2.35</td>
</tr>
<tr>
<td><strong>Choosing between Bottled and Tap Water</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Given the choice between bottled water and tap water, I prefer bottled water.</td>
<td>28</td>
<td>4</td>
<td>1</td>
<td>7</td>
<td>20</td>
<td>3.22</td>
</tr>
<tr>
<td>I will drink tap water only when there is no option to purchase bottled water.</td>
<td>13</td>
<td>8</td>
<td>0</td>
<td>7</td>
<td>32</td>
<td>2.38</td>
</tr>
<tr>
<td>I always prefer bottled water, even when tap water is available.</td>
<td>15</td>
<td>1</td>
<td>0</td>
<td>8</td>
<td>36</td>
<td>2.18</td>
</tr>
</tbody>
</table>
Health

The two statements concerned with health were: “Bottled water contains vitamins and minerals that are good for my health” and “Drinking bottled water is part of a healthy lifestyle.” A majority of respondents disagreed with the notion that bottled water provided good nutrients (39 of 60 respondents, 65%). But an equal number of respondents both agreed and disagreed with the notion that bottled water equated to a healthy lifestyle (26 agree, 29 disagree). Six respondents answered that drinking water itself was part of a healthy lifestyle, so it did not specifically have to be bottled water (Interviews 15, 23, 35, 38, 41, and 60). It appears that bottled water is often used as a substitute for other beverages. While the desire to drink water over another beverage is healthier, the need to have a beverage in a disposable container should shift to the use of water in a re-usable container. Overall, for the majority of respondents, health did not seem to be an important factor in the choice to drink bottled water; which can be compared to 16 respondents mentioning health as a factor that encourages their consumption of bottled water (Chapter 5, Figure 5).

Safety

One statement was linked to the safety of bottled water: “Bottled water is safer for children, the elderly, and those with compromised immune systems.” Half the respondents disagreed with this statement, 19 were in agreement and 11 neither agreed nor disagreed. One respondent said that she used bottled water to mix her infant’s cereal (Interview 37). Another participant answered that ‘children need fluoride and that is in tap water rather than bottled water’
(Interview 60). For one participant, bottled water was purer because it was obtained in a ‘closed environment’ (Interview 40). In contrast, another respondent mentioned that bottled water was ‘the last thing they [children and elderly] want. They [bottled water companies] do not talk about the DDT in the plastic. The bottles are in the truck in 100 degree weather. That’s what [he] do[es] not understand about mothers who nuke their baby’s milk. Once these things are released, they do not go back in the plastic” (Interview 1). Overall, the notion that bottled water consumption was better for vulnerable populations did not seem to be held by many of the respondents in this study. It should also be noted that only 14 respondents mentioned safety as a reason for their choice of bottled water (Chapter 5, Figure 5). Besides awareness of the health implications of plastic water bottles, it is also likely that the distribution of responses was driven by the fact that, among the respondents, only 22 and 18 households included children below 18 and adults over 60, respectively (Chapter 4, Table 9).

Taste

The statements concerning taste were: “Bottled water tastes better than tap water” and “More time and money should be spent on better tasting tap water.” A majority of respondents agreed that bottled water tastes better than tap water (37 respondents, 62%) while 20 respondents (33%) disagreed with this statement. Similarly, 36 respondents (60%) wanted more effort to be expended towards producing better tasting tap water while 24 respondents (40%) disagreed with this. It seems, therefore, that taste is a significant issue within this study in terms of factors determining the choice of bottled versus tap water. As one
respondent put it, 'I just don't like the taste of tap water. And I know that bottled water is filtered' (Interview 43). However, while a majority of respondents agreed with taste being an issue in their choice of bottled water, only 13 respondents mentioned taste when asked more directly about the reasons they drink bottled water (Chapter 5, Figure 5).

Three respondents mentioned geographic location as a factor in terms of the taste of tap water. According to one respondent, more effort should be spent on improving the taste of bottled water because in ‘many places they don’t have deep wells like we do; they have reservoirs, We have exceptional tasting water here’ (Interview 1). In the words of another respondent, 'I grew up in a place where they had excellent tap water and I've been to places that have crappy tap water [mentions a place in Louisiana], so it depends on where you live. [In Pensacola], it's good' (Interview 3). A third respondent mentioned her experiences in Georgia and made a distinction between well water and city water, with city water tasting better than well water (Interview 23).

**Advertising and Marketing**

Attitudes towards advertising and marketing of bottled water were reflected in the following statements: “Advertisements for bottled water have influence over the amount and types of bottled water I drink” and “I often see advertisements for bottled water.” Most respondents strongly disagreed that advertisements have any influence over their choice of bottled water, with 44 respondents (73%) choosing this option. In fact, this statement obtained the lowest average score of 1.65. An equal number of respondents agreed and
disagreed with the notion that they were aware of advertisements for bottled water (29 agree, 27 disagree). Responses to whether they were influenced by bottled water advertisements included: “Maybe if it is like a flavored water like in my magazines, I have seen those and they are kind of interesting to me” (Interview 39); “yes, [advertisements] let me know what is available” (Interview 40), and ‘Probably not, I think I would drink them regardless” (Interview 59). One respondent was more specific about how advertising influenced her bottled water consumption, responding ‘I do have to agree. That is why I drink smart water because Jennifer Anniston drinks it’ (Interview 33). Previously, only 2 respondents had mentioned advertising and marketing as a reason for drinking bottled water (Chapter 5, Figure 5), so the findings here are consistent with those reported earlier. While respondents were of the view that advertising and marketing do not influence their decisions, chances are they are actually influenced, even as they may not be aware of it. Most respondents stated that they buy whatever brand is cheapest or on sale, which is advertisement in and of itself. This shows that advertising and marketing have become a normal, yet, unrecognizable part of our life.

Convenience

The following questions reflect the respondents’ opinions on the convenience associated with bottled water: “I am more likely to drink bottled water when I’m not at home (e.g. while traveling, in restaurants, in hotels, in theme parks)” and “I am more likely to drink tap water at home.” A majority of the respondents strongly agreed that they were more likely to drink bottled water
when not at home (43 respondents, 72%) and drink tap water when at home (39 respondents, 65%). However, it should be noted that the statement regarding the drinking of tap water at home does not imply that respondents prefer to drink tap water over bottled water at home, but merely that the location where they are more likely to be drinking tap water is within their home. The average score of 4.12 and 3.93 obtained for these two questions was the highest among all statements showing that there was a high degree of agreement with the two statements. This meshes well with the mentioning of convenience as the most popular reason for consumption of bottled water as reported earlier ([Chapter 5, Figure 5]).

**Image**

Two questions reflected issues of image associated with consuming bottled water: “Drinking bottled water is more sophisticated than drinking tap water or water out of a water fountain” and “I prefer drinking from a water fountain to purchasing a bottle of water.” Given their reference to water fountains, these statements can also be considered reflective of concerns over the safety of water. Most respondents strongly disagreed with both statements. Thus, 35 respondents (58%) did not consider bottled water to be more sophisticated, and 33 respondents (55%) would not prefer a water fountain over bottled water. However, given that many respondents laughed or smirked at the statement regarding the sophistication associated with bottled water, they did agree that this was a popular stereotype, but for their part did not agree with it. Yet, despite opposing the stereotype in the context of bottled water’s supposed sophistication,
when faced with an actual choice regarding drinking water, many respondents were in agreement that water fountains were not a desirable option. It seems, therefore, that the stereotype regarding water fountains was maintained. As one respondent mentioned in the context of the earlier statements on taste: ‘Depends on where you are at because there are certain water fountains at work that taste horrible, I won’t even drink from them. But then there are others that have no taste at all’ (Interview 36).

Choosing Between Bottled and Tap Water

Three statements directly juxtaposed the choice of bottled water with tap water. These were: “Given the choice between bottled water and tap water, I prefer bottled water,” “I will drink tap water only when there is no option to purchase bottled water” and “I always prefer bottled water, even when tap water is available.” Thirty-two respondents (53%) agreed with the statement that bottled water was their preferred choice if they were given a choice between bottled and tap water, while 27 respondents (45%) disagreed with this statement. Thirty-nine respondents (65%) disagreed with the statement that they would drink tap water only in the absence of bottled water, while 21 respondents (35%) agreed with this statement. In a rewording of this statement, 44 respondents (73%) disagreed with the notion that they would always prefer bottled water. For all three statements, agreement denotes support for bottled water. Thus, the average of 3.22 for the first question shows a tendency to prefer bottled water, but this is countered by the average of 2.38 and 2.18, respectively, for the other two questions. It is likely that the first question was understood as a more ideal
choice and the other two questions were viewed as referring to ‘real’ choices being made in everyday contexts.

Overall Discussion of Attitudes towards Bottled and Tap Water

In this section, convenience and taste have emerged as prominent factors in the preference for bottled over tap water. This both strengthens and nuances the reasons for consumption of bottled water discussed in Chapter 5 as it becomes clear that location (outside home versus within home) often drives the choice between bottled and tap water, and that taste is often used as a proxy to determine the quality of drinking water. One suggestion that this study could make, therefore, is that more attention should be paid to the taste of tap water in order to make it more palatable to consumers. It is worth noting that the respondents of this study were not completely convinced of the health benefits of bottled water, so that health concerns did not loom large in terms of their attitudes towards bottled water. Instead, respondents mentioned concerns regarding the plastics used for bottling water. Another important finding here is that respondents did not link their consumption of bottled water to advertising, so that the commercial context within which bottled water becomes the preferred drinking water choice does not seem to most respondents to be an important aspect driving their choices.

Environmental Knowledge of Bottled and Tap Water

The links between behavior and knowledge is one of the central questions in environmental science and policy studies which seek to understand the extent to which lack of knowledge relates to negative environmental behavior, so that
improvements in knowledge could be key to changing such behaviors. This section, therefore, seeks to understand the extent to which respondents are aware of the environmental, economic and social implications of consuming bottled water. As shown in Table 18, respondents were provided 8 statements which described a characteristic or consequence of bottled water production and they were asked to designate this statement as either true or false. Respondents could choose from five options: ‘Completely True’ which was assigned a numerical value of 5 during the coding of the data, ‘Somewhat True’ which was assigned a value of 4, ‘Neither True nor False’ which was assigned a value of 3, ‘Somewhat False’ which was assigned a value of 2, and ‘Completely False’ which was assigned a value of 1. Respondents were also given the option of declining to provide an answer to a particular statement. For purposes of analysis, these statements were divided into the following categories: cost, safety/regulations, environmental issues and false advertising. Table 18 provides counts for the number of respondents that chose each option for a statement, as well as the average response for that statement. The statement column also mentions whether the statement is actually true or false to compare it with the average response obtained in this study. In the case of these statements, therefore, responses can be designated as correct or incorrect.
Table 18: Knowledge about Bottled and Tap Water

<table>
<thead>
<tr>
<th></th>
<th>Completely True (= 5)</th>
<th>Somewhat True (= 4)</th>
<th>Neither True nor False (= 3)</th>
<th>Somewhat False (= 2)</th>
<th>Completely False (= 1)</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cost</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The cost of an annual supply of bottled water is about a hundred times more than that for the same amount of tap water. <em>(True)</em></td>
<td>27</td>
<td>23</td>
<td>8</td>
<td>0</td>
<td>2</td>
<td>4.31</td>
</tr>
<tr>
<td><strong>Safety/ Regulations</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>There are stricter regulations for bottled water than for municipal tap water. <em>(False)</em></td>
<td>6</td>
<td>5</td>
<td>13</td>
<td>12</td>
<td>24</td>
<td>2.27</td>
</tr>
<tr>
<td>The safety risks associated with tap water increase as amount of chlorine in the water decreases. <em>(True)</em></td>
<td>14</td>
<td>11</td>
<td>21</td>
<td>6</td>
<td>8</td>
<td>3.15</td>
</tr>
<tr>
<td><strong>Environmental Issues</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over pumping of aquifers for the purposes of bottled water has led to lowering of the water tables. <em>(True)</em></td>
<td>14</td>
<td>19</td>
<td>18</td>
<td>5</td>
<td>4</td>
<td>3.42</td>
</tr>
<tr>
<td>The production of bottled water requires an equal or greater amount of water to be wasted. <em>(True)</em></td>
<td>11</td>
<td>12</td>
<td>29</td>
<td>4</td>
<td>4</td>
<td>3.39</td>
</tr>
<tr>
<td>The production of plastics used to make water bottles in the U.S. requires the utilization of millions of barrels of oil. <em>(True)</em></td>
<td>28</td>
<td>18</td>
<td>10</td>
<td>2</td>
<td>2</td>
<td>3.77</td>
</tr>
<tr>
<td><strong>False Advertising</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bottled water comes from natural sources and is therefore purer and fresher than tap water. <em>(False)</em></td>
<td>6</td>
<td>8</td>
<td>4</td>
<td>16</td>
<td>26</td>
<td>2.39</td>
</tr>
<tr>
<td>Over half of bottled water sold in the U.S. is actually tap water. <em>(True)</em></td>
<td>20</td>
<td>24</td>
<td>6</td>
<td>4</td>
<td>6</td>
<td>3.98</td>
</tr>
</tbody>
</table>
Cost

The statement pertaining to cost was: “The cost of an annual supply of bottled water is about a hundred times more than that for the same amount of tap water.” Most of the respondents marked this statement as true (50 respondents, 83%) which is the correct response. This suggests that concerns regarding cost of bottled water dominate the minds of consumers leading to fears about being overcharged for water that should (naturally) be available free of cost. Previously, 13 respondents had picked cost as a factor which discouraged them from drinking bottled water (Chapter 5, Figure 6) and this section shows that the concern about costs is likely to be more widespread than initially reported. Yet, there was also some amount of doubt related to this statement as 23 respondents considered it to be somewhat true, being unsure whether the cost was actually a hundred times more.

Safety/ Regulations

Two statements focused on the issue of safety and regulations: “There are stricter regulations for bottled water than for municipal tap water” and “The safety risks associated with tap water increase as amount of chlorine in the water decreases.” The majority of the respondents were of the view that regulations for bottled water were not stricter than regulations for municipal tap water. On the whole, therefore, the respondents viewed this statement as more false than true. However, as mentioned in Chapter 2, EPA regulations for tap water are stricter than FDA regulations for bottled water, so that this statement is completely false.
Thus, it is instructive that only 24 respondents (40%) actually picked the correct option. Regarding the link between chlorine and tap water safety, most respondents were not able to give a clear answer either way (21 respondents, 35%). This might reflect the dual character of chlorine which while proving to be extremely useful in terms of reducing the health risks of public water has also been linked to health problems due to chlorine's reactivity with water pipes and ingestion into the body. It may also be a consequence of the link between chlorine and the unpleasant taste of tap water, so that respondents who privilege taste might be equivocal about the value of chlorinating tap water.

Environmental Issues

Three statements were connected with specific environmental implications of bottled water: “Over-pumping of aquifers for the purposes of bottling water has led to lowering of the water tables,” “In order to produce one bottle of water, an equal or greater amount of water is wasted,” and “The production of plastics used to make water bottles in the U.S. requires the utilization of millions of barrels of oil annually.” Thirty-three respondents (55%) considered that bottled water was leading to depletion of aquifers, rating this statement as either completely or somewhat true. Respondents were less certain of the amount of water utilized to produce one bottle of water with 29 respondents (48%) rating this statement as neither true nor false. Respondents were more certain about the link between oil and bottled water production with 46 (77%) rating this as completely or somewhat true, and 28 (47%) rating this as completely true. However, 10
respondents were unable to take a firm position on this statement. On the whole, therefore, while respondents tended towards classifying the statements correctly, they showed an appreciable amount of doubt regarding the extent to which these statements were completely true.

*False Advertising*

The statements in this category allude to the strategy that is often used to sell bottled water (notions of bottled water as emanating from a pure sources) and the reality of the sources from which bottled water is usually obtained (municipal water supplies). The statements were: “Bottled water comes from natural sources and is therefore purer and fresher than tap water” and “Over half of bottled water sold in the U.S. is actually tap water.” Forty-two respondents (70%) considered the statement regarding the purity of bottled water sources to be somewhat or completely false. This matches the previous finding that respondents viewed themselves as less influenced by advertisements for bottled water.

Respondents were much more certain about the fact that bottled water was in many cases actually tap water in a bottle and 44 respondents (73%) viewed this statement as completely or slightly true. This statement however is not completely true since it is estimated that about 20% to 60% of bottled water sold is actually just tap water. However, by going with the higher end of the estimate, this statement enabled an insight into the extent to which respondents were willing to support the notion that their tap water was not very different from
bottled water. Yet, this also contradicted the previous finding that many respondents distinguished between bottled and tap water on the basis of taste.

Disposal of Plastic Water Bottles

The theme of environmental implications of bottled water was followed in a separate question whereby respondents were asked about whether they recycled their water bottles. Given that recycling is usually viewed as good environmental behavior and is being popularly promoted as such, it is likely that respondents were more likely to answer that they recycled plastic bottles. It is important to note that several respondents mentioned that recycling is fairly recent in this area. Thirty-four of the respondents (57%) stated that recycling was one of their
methods of disposal and 25 respondents (42%) chose recycling as their only mode to dispose of plastic bottles. The 10 respondents who refill and reuse plastic bottles are also participating in a form of recycling. Twenty respondents stated that they also throw away some of their plastic bottles with 10 respondents owning up to practicing no recycling. The majority of respondents, therefore, showed environmentally-friendly behavior in terms of disposing plastic water bottles which is in agreement with their relatively accurate appraisal of the environmental implications of bottled water.

**Overall Analysis of Environmental Knowledge**

Based on their ability to mark statements as either true or false, most respondents had some knowledge about the environmental, economic and social implications of bottled water; though, they did not have the ability to do so with a high level of certainty. Thus, statements that should have been marked completely true or false (e.g. whether there were stricter regulations for bottled water and whether bottled water came from natural sources) were often marked as somewhat true or somewhat false instead. In some cases, the majority of the respondents chose to go with the neutral option, not being able to designate the statement as either true or false (e.g. link between safety of tap water and chlorine, amount of water used to produce bottled water). Thus, even as respondents were not completely unaware of the negative implications of drinking bottled water, there is still much to be done about building more
awareness of the environmental, economic and social implications of bottled water.

Given that it was mentioned by one respondent (Interview 26), it should be noted that National Public Radio had run a program critical of bottled water at around the same time that this research was being conducted (NPR, 2010). This program discussed the American obsession with bottled water, examining how a resource that was once cost very little to consume had now become the basis of a billion dollar industry, regardless of the fact that safe available drinking water was readily available in the U.S. The value of such news programs to spreading awareness about environmental and social ills is clear. It is also clear that such knowledge by itself is not sufficient to produce change in consumer habits.
Chapter 7

Conclusion

The increasing consumption of bottled water within the U.S. is a significant issue of environmental concern because it reflects the increasing commodification and privatization of natural resources and dilutes support for improving the services of public tap water agencies. This study has examined individual perspectives on bottled and tap water in order to understand how preferences for bottled water emerge within immediate, everyday contexts. The city of Pensacola becomes an especially interesting case study since its tap water supply has been at the center of controversy – vilified by the Environmental Working Group as one of the worst in the country, and strongly supported by the public Emerald Coast Utilities Authority and researchers at University of West Florida as meeting required health and environmental standards while continuing to be affordable. Overall, this thesis found that while water quality does seem to be an issue in the preference of bottled versus tap water, the consumption of bottled water is also likely to be driven by the fact that the buying of water can be easily combined with grocery shopping.
In terms of the link between individual and household characteristics and the consumption of bottled water, this study cannot provide more general conclusions due to the size and composition of its sample of respondents and the voluntary method through which they were recruited. With these caveats in mind, a few major findings specific to this study can be reported. A larger proportion of residents of the lower-income neighborhood (Pine) were more likely to drink bottled water more frequently, suggesting that the demand for bottled water is relatively inelastic. Meanwhile, residents of the higher-income neighborhood (Oak) appear to have more trust in their tap water. This contradicts assumed positive links between income and bottled water consumption, and suggests problems related to the age and quality of tap water infrastructure in each of the neighborhoods since Oak is a newer neighborhood than Pine. An especially interesting finding was in terms of race, where non-white races presented a much higher preference for bottled water over tap water, similar to Hobson et al.’s (2007) study of a non-white race trusting bottled water over tap. In terms of age, almost half of the working age group (30-60) drank bottled water daily while those above 60 years of age were more likely to not drink any bottled water. This supports previous studies that show that older adults were less likely to pay for water (Fife-Shaw et al., 2007; Hu et al. 2011). In terms of gender, a higher proportion of the men in this study opted to stay away from bottled water consumption. While the percentage of males and females who drink bottled water daily was the same, the fact that men were more likely to not drink bottled
water partially agrees with Hu et al.’s (2011) finding that men are less likely to
drink bottled water frequently. A slightly higher proportion of those who had
higher education (beyond the undergraduate degree) tended to be less frequent
consumers of bottled water which also aligns with previous research.

In terms of explanations provided for individual preferences of bottled and
tap water, over half of the study population explained their bottled water
consumption as a means of convenience. Health, safety and taste were all
properties considered regularly amongst bottled water consumers, but secondary
to the convenience that bottled water provides. Previous research suggests that
convenience may be a factor explaining rising consumption and this study builds
further support for this. Close to half of the sample stated that nothing
discouraged them from drinking bottled water. However, the most common
reasons for being put off by bottled water are its high cost or environmental
implications. In Ward et al.’s (2009) study about perceptions on the health of
bottled water, they had found that convenience and cost played major roles in the
decision making process. Despite the wide array of opinions in favor of bottled
water over tap water, a majority of bottled water drinkers buy bottled water based
on price thus preferring to buy store brands, rather than brands more likely to
have undergone filtration beyond that provided by tap water or advertised as
obtained from a natural source. Aquafina and Dasani, each, were only mentioned
by 7 respondents, which is surprising since they are the two top selling brands in
the country. Tap water was avoided by many of the households in this study.
Reasons given for this included both safety and taste of tap water. Parag and Roberts’ (2009) study also found that consumers are, more often than not, dissatisfied with their tap water, However, very few respondents were aware of or professed to understand information on tap water quality provided by their municipal supplier nor does drinking water seem to be a matter of collective discussion within these neighborhoods.

When presented with the various stereotypes associated with bottled and tap water, taste emerged as an important issue in respondents’ attitudes towards bottled water and even more so towards tap water, which supports Rodwan’s (2009) findings of preference for the ‘superior’ taste of bottled water over that of tap, even when tap water is thought to be safe. Convenience was also a major issue driving choice of drinking water at home or outside it, with a majority of respondents stating that they were more likely to drink bottled water when outside the home and tap water while at home. On the other hand, respondents did not consider marketing and advertising as influencing their attitudes about bottled and tap water. Considering the explosion of advertisements in favor of bottled water over the last couple of decades, it is unlikely that bottled water consumers have not been shaped by these.

At first glance, the sample as a whole did understand the environmental costs associated with the consumption of large amounts of bottled water. However, respondents were, more often than not, rarely completely sure of their knowledge, which is evident by the large numbers of responses in the somewhat
true, somewhat false and unknown categories as opposed to certain knowledge that statements hold or lack complete validity. Based on the relative understanding of the issues associated with bottled water, it appears that knowledge is not enough. Hu et al (2011) and Larson (2009) also found that perceptions and attitudes were not always reflected in actual environmental behavior. This points to the ways in which environmental awareness is overridden by convenience in consumption of bottled water and the processes through which this is constructed is a useful topic for further research.

Thus, the main finding of this thesis is that an automatic link cannot be assumed between knowledge of environmental costs and forms of environmental behavior. Within this study, individual consumption of bottled water was high despite respondents being somewhat aware of the environmental and economic costs associated with bottled water. Given that convenience appears to be the main reason for increased bottled water consumption, enabling a shift from bottled water to tap water may not be just a matter of education or improving tap water infrastructure. Instead, new paradigms need to be developed which allows for new habits to be formed. Existing habits of consumerism have become linked with individual perceptions of habits that are deemed more convenient within everyday contexts. Bottled water consumption is an excellent context in which to initiate a paradigm shift regarding assumed connections between consumerism and convenience, made even more significant by the fact that bottled water exemplifies the more extreme forms of consumerism in the U.S. being an
unnecessary commodity with seriously adverse environmental and social implications.
List of References


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http://www.ecua.org/default.asp


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Appendices
Appendix I: Questionnaire

Part I: Personal Information:
age, gender, race, education, family structure, income

Part II: Bottled and tap water consumption

• What types of water do you drink? What types of water do members of your household drink? (bottled, filtered, tap)
• How often do you drink bottled water?
• How many bottles of water did you drink: in the past day? in the past week?
• On average, how much money do you spend on bottled water each week?
• Do you drink ONLY bottled and/or filtered water?
• Do your children drink ONLY bottled and/or filtered water?
• Where do you purchase your bottled water?
• What brand do you drink most often?
• Where do you see advertisements for bottled water?
• How much attention do you pay to where your water comes from? How important is it to you?
• What do you do with a bottle of water when you are finished with it?
• What most encourages you to drink bottled water?
• What, if anything, discourages you from drinking bottled water?
• What are your concerns, if any, of tap water in your area? How safe do you feel drinking it and serving it to your kids/family?
• Have you noticed any changes (better or worse) in your community with regard to tap water quality over the last several months or years?
• What do you feel is the most common complaint about your tap water?
Part III: Attitudes towards bottled and tap water:

To what extent do you agree or disagree with the following statements? (Choose from strongly agree, somewhat agree, neither agree nor disagree, somewhat disagree, and strongly disagree.)

- Bottled water contains vitamins and minerals that are good for my health.
- I am more likely to drink bottled water when I’m not at home (e.g. while traveling, in restaurants, in hotels, in theme parks).
- Drinking bottled water is part of a healthy lifestyle.
- Advertisements for bottled water have influence over the amount and types of bottled water I drink
- Given the choice between bottled water and tap water, I prefer bottled water
- I am more likely to drink tap water at home
- I will drink tap water only when there is no option to purchase bottled water
- Bottled water is safer for children, the elderly, and those with compromised immune systems.
- I prefer drinking from a water fountain to purchasing bottled water.
- Bottled water tastes better than tap water.
- More time and money should be spent on better tasting tap water.
- I ALWAYS prefer bottled water, even when tap water is available.
- Drinking bottled water is more sophisticated than drinking out of a water fountain
- I often see advertisements for bottled water.

Part IV: Environmental knowledge of bottled and tap water

To what extent are the following statements true or false? (Choose from completely true, somewhat true, neither true nor false, somewhat false, completely false.)

- The production of plastics used to make water bottles in the U.S. requires the utilization of millions of barrels of oil annually.
- The cost of an annual supply of bottled water is about a hundred times more than that for the same amount of tap water.
• There are stricter regulations for bottled water than for municipal tap water.
• Bottled water comes from natural sources and is therefore purer and fresher than tap water.
• In order to produce a bottle of water, an equal or greater amount of water is wasted, compared to what is bottled.
• The safety risks associated with tap water increase as amount of chlorine in the water decreases.
• Over pumping of aquifers for the purposes of bottled water has led to lowering of the water tables.
• Over half of bottled water sold in the U.S. is actually tap water.