STUDENT ATTITUDE AND ACTION REGARDING THE SINGLE-USE PLASTIC SHOPPING BAG ON THE UNIVERSITY OF ALABAMA CAMPUS

by

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ABSTRACT

This research explores discrepancies between attitudes and behaviors of students on the University of Alabama campus regarding the single-use plastic shopping bag. A survey was developed and administered to 162 students on campus to assess attitudes and behaviors related to plastic bags, reusable shopping bags, and related human-environmental issues. Research focused on worldwide approaches to problems associated with the single-use plastic bag, consumer and environmental perceptions related to the topic, attitude and behaviors toward plastic bags and recycling, the climate of sustainability at the University of Alabama, and human-environmental impacts of the plastic bag. The research background in conjunction with the data collected indicated these findings. First, students' dominant attitude toward single-use plastic bags is not consistent with dominant behavior or how they use plastic bags, and present stimuli in many retail environments are strong enough that students generally use plastic bags despite conflicting attitudes. Second, though surveyed students are aware of problems associated with the plastic bag, these items are a valued part of some students' shopping experiences. Finally, a store discount for using reusable bags when checking out may be the best stimulus to derive consistency between student attitude and student behavior regarding single-use plastic shopping bags at the University of Alabama. The proposed plan developed specifically for The University according to data findings, included methods for increasing both recycling rates for plastic bags and use of the reusable shopping bags on and around the campus.

DEDICATION

This work is for my family. Scott, my husband, was the most supportive, influential, and encouraging person aiding me in this achievement. The hard work and sincerity that he applies to every aspect of his life combined with his selfless devotion to his wife and children have made completion of this thesis and my degree possible. Our girls, Emma Lou and Ellie Quinn, have been super motivators for completing this stage of my education as well. It is my hope that when they are ready to read this paper they will find it an interesting bit of history that many people of Earth were once so wasteful as to use and throw away many bags each and every time they took a trip to the store.

LIST OF ABBREVIATIONS

ACC	American Chemistry Council
EPA	Environmental Protection Agency
GHG	Greenhouse Gas
HEP	Human Exemptionalism Paradigm
NEP	New Environmental Paradigm
NRDC	Natural Resources Defense Council
Q	'Q' followed by a number indicates the specific survey item or 'question' referred to on the Plastic Bag Survey (see Appendix B).
RQ	'RQ' followed by a number in the methodology chapter indicates specific questions I hoped to answer through this thesis.
UA	The University of Alabama
UK	The United Kingdom
UNEP	United Nations Environmental Program
US	The United States

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CHAPTER 1

RESEARCH BACKGROUND

Introduction to Research

Currently, changes are occurring worldwide regarding plastic shopping bags which have been referred to as the single most ubiquitous manufactured item on Earth. For 3,400 years humans have used cloth bags for shopping, but in the last 30 years the single-use plastic shopping bag has taken over (Carmichael, 2006, pp. 30-31). It is estimated that California alone uses 19 billion plastic shopping bags per year (Wood, 2010) while a commonly quoted estimate for the nation is 100 billion bags a year (Wisconsin Department of Natural Resources, 2009). Worldwide, humanity is using some 500 billion a year which equates to a rate of 1 million bags every minute (Carmichael, 2006, p. 30). Attempts and success to pass legislation to change patterns of production and use of the plastic bag have occurred in California and other cities in the United States (US), but change regarding plastic bag use has not arisen in Alabama, Tuscaloosa, or at the University of Alabama. However, the topic may be of interest to UA. Across the nation, universities have begun green initiatives aimed at reducing environmental impacts of their campuses, and UA is no exception. Plastic bags are one of many different types of materials collected by UA for recycling. In addition, future reduction or even elimination of single-use plastic shopping bags within the university community could provide benefits to UA and the surrounding community.

To begin, in the literature review I provided an overview of different approaches governments and businesses around the world have taken toward the plastic bag, and I reviewed other implications of the plastic bag in relation to humans and the environment. For data collection, surveys were used to investigate attitudes and behaviors regarding plastic bags held by students at the university. Through this research I attempt to paint a comprehensive picture of the contemporary, worldwide issues regarding the plastic bag while more specifically gathering data on how students at UA relate to this topic and what the findings might mean for the University.

Around the World

Policy implementation regarding use of the plastic shopping bag is occurring around the world in order to address associated problems of waste accumulation, resource waste, and energy implications. In 2009, Achim Steiner, UN Under-Secretary-General and United Nations Environmental Program (UNEP) Executive Director suggested that, "…[single-use plastic bags] should be banned or phased-out rapidly everywhere-there is simply zero justification for manufacturing them anymore, anywhere (UNEP, 2009)." Depending on the country, solutions involve bans or taxes, but there is a push for recycling in the US.

In Bangladesh, tangible problems have arisen as a direct result of plastic bag litter (Ritch, Brennan, & MacLeod, 2009). In 2002, Bangladesh banned plastic bags from Dhaka, the capital city, after plastic bags clogged city drains resulting in two floods (Spivey, 2003). In March 2007, the ban expanded to the entire country. Evidence indicated that plastic bags clogging drain ways intensified the floods of 1988 and 1989 during which as much as two-thirds of the country

was submerged (Ritch et al., 2009). Bans were chosen over other less stringent policies because of the intensive flooding in urban areas and issues of human health due to the related increased risk of water-borne disease (Williamson, 2003). In Mumbai, the Indian government also chose to ban plastic bags in response to drainage problems (Ritch et al., 2009).

Nation-wide bans have been implemented in China and Uganda too. People of Uganda are encouraged to use the traditional method of carrying goods in banana leaves though fines are only imposed on business and industry violations, not individual infractions ("Drastic plastic," 2007). In China, a ban on free plastic bags in supermarkets and shops became effective in 2008. On the government website, a Chinese circular posted, "While convenient for consumers, the bags also lead to a severe waste of resources and environmental pollution because of their excessive use and low rate of recycling ("Asia: Plastic," 2008)." According to Arlene Pan, a Chinese student in the Geography department at UA, almost everyone in the city of Nanchang in the Jiang Xi province where she is from uses their own reusable bags rather than buying plastic. However, when she came to the US she soon began using plastic because it is easy to do here.

The typical plastic bag in supermarkets is 18 microns thick. In South Africa, all plastic bags less than 30 microns thick have been banned due to pervasive littering. In fact, plastic bags are commonly referred to by South African citizens as the "national flower" due to the frequency with which these windblown oddities are seen strewn about and entangled in branches of trees and bushes (Williamson, 2003). The ban met a great deal of resistance in the industrial sector because South African industry does not have the manufacturing capability to produce bags thicker than 24 microns (Ritch et al., 2009). Policies are controversial in other countries as well. After three years, a complete ban in Taiwan was retracted. Now, Taiwanese customers must bring their own bags for shopping or they may buy cloth, nylon, or thick plastic bags for what is

equivalent to one to two US dollars from the store (Lam & Chen, 2006). According to a UA professor from Ghana, Seth Appiah-Opoku, not only are single-use plastic shopping bags found littered across the land in Ghana, but also the little plastic baggies often used in the US for packing lunches or leftovers are strewn across Ghana due to problems of waste infrastructure and the fact that water is often sold on the streets in these small plastic bags.

Taxation has been a primary method in Europe for attempting to curb plastic bag use (Ritch et al., 2009). In Italy, a tax of .0051 Euros in which the cost is not incurred by the consumer has had no affect on consumer behavior since 1988. In Denmark, a weight based tax has decreased plastic and paper consumption by 66%. Again, the cost is not absorbed by the consumer, so no subsequent change in behavior occurred (Ritch et al., 2009). In Ireland in 2002, a direct tax to the consumer of 15 Euro cents per bag resulted in a 94% reduction of plastic bag use in that same year. The 3.5 billion dollars of extra revenue incurred within that first year of the new policy was applied to environmental project funding (Ritch et al., 2009).

In the US, legislative changes have only occurred at the city level. On September 2, 2010 a bill which proposed a ban on plastic shopping bags state wide was rejected by the California State Senate (The Associated Press, 2010), but in December 2010, the San Jose City Council banned single-use plastic bags in retail shops. Paper bags may still be used by retailers, but the customer must purchase them. The campaign received major support from the nonprofit Save the Bay. This is the largest ban in the state and may be clearing a path for other cities in northern California to follow (Liggett, 2010). Bans have also occurred in Oakland, Fairfax, Malibu, and Palo Alto, CA; Washington D.C.; and 30 Alaskan towns. Some Canadian towns have implemented or are considering bans as well (Wisconsin Department of Natural Resources, 2009). More bans and taxes will likely follow and most likely this topic will eventually strike

close to home wherever that may be. In Washington D.C. a tax of 5 cents in stores per plastic bag has cut use by an estimated 60% since imposition of the law in 2010 suggesting that even a small penalty could have a major impact on Americans regarding plastic bags.

However, legislation for a 20 cent tax in Seattle in 2009 was rejected and similar efforts in Florida have gone nowhere (Greenblatt, 2010). Currently, the American approach to the plastic bag has primarily focused on efforts to increase recycling rates rather than reduce consumer use (American Chemistry Council [ACC], 2008). Indeed, the EPA currently labels plastic bags a recycling problem, not a litter problem like many other governments, but in 2009 it was discovered that plastic bags made up 50% of the debris clogging the Anacostia River in the District of Columbia (SourceWatch, 2009), while a primary reason for recent events in California is the number of bags polluting San Francisco Bay.

Though the bill to pass a statewide ban in California failed, the measure was not without support including the governor, Arnold Schwarzenegger, and nonprofits like Save the Bay (Wood, 2010). Bill Magavern, director of Sierra Club California, indicated that the passage of such a bill would lead to similar actions in other parts of the country and this is one reason stake holders in the plastic industry fought so adamantly against it (Wood, 2010).

Businesses in the US have made changes as well, including the pharmacy CVS and the retail giant Target (Horovitz, 2009). Two grocers that do not use plastic bags in their stores are Trader Joe's and Whole Foods Market (Verespej, 2009). Target, the fifth largest retailer in the country, did a test run of 100 stores and the incentive, a 5 cent discount for each reusable bag the customer uses, decreased plastic bag use by approximately 50%. The Target program went company-wide and nation-wide on November 1, 2009 (Horovitz, 2009). Problems and concerns surrounding this phenomenon will be described in the following sections of this chapter.

Perceptions

Currently, humans are facing a plethora of problems resulting from our modern lifestyles that compromise the integrity of the environments in which we live, work, and play. As a result, *green* phrases, such as *go green*, the *greener choice*, and the *green market* have found their way into mainstream media and public consciousness. Some might even claim that the plastic bag initiatives are just a green fad in the US. Certainly, many more profound human-environmental issues than the plastic bag come to mind, such as global climate change and alternative energy sources. However, it is not an exaggeration to say that single-use plastic bags are being used excessively by most Americans on a daily basis. Widespread reduction in plastic bag brought about by the increase in use of reusable bags for shopping could be a powerful tool for bringing more sustainable consumption practices to the forefront of American consciousness.

In the last decade especially, the idea of reducing waste by bringing reusable bags to supermarkets has crept into the marketing realm and the ideas and behavioral practices of a growing number of people (Cherrier, 2006; Lam & Chen, 2006). In an article from 2003, a customer describes an experience in which he brought his own bags from home for toting purchased goods. The cashier searched for barcodes on the reusable bags while the bagger asked why a person would want to bring his own bags (Williamson, 2003). I had a similar experience in October 2010 at a Winn Dixie grocery store. I told the cashier and bagger that I did not want any bags because only about five items were being purchased and the reusable bags were forgotten in the car as is so often the case. A seemingly perplexed manager who was bagging asked, “Are you sure [you don’t want bags]?” and “Are you into recycling?” What is interesting about this example is that upon checking out I was literally surrounded by reusable bags at the

beginning and end of the checkout line that the store was selling decorated with bright images of various types of produce and flowers. To that particular manager, the bags seemed to be just another item for sale, not a tool for improving sustainability. Regardless of company intentions, the experience implies that more than an avenue for changing behavior, these reusable bags may be stimuli that encourage impulse purchasing. Consider this statement from an article on the Natural Resources Defense Council (NRDC) website:

> Our grocery stores strive to create a perfect "climate of consumption," where nothing impedes the consumer from impulse to purchase, explains Allen Hershkowitz, a recycling expert at NRDC. 'For stores, it's not just a cost issue; it's about them making the customer's experience as convenient as possible (Williamson, 2003).

Ritch et al. (2009) suggest that consumers may want to make the greener choice, but they do not want to do it alone, preferring instead that government and business make the green choice the easy choice.

Plastic bags have both economic and environmental implications of which both will be described in the following sections. Plastic bags do not necessarily have to be viewed as an environmental problem or a problem of humanity. They are sometimes viewed as a nuisance at the household level. In this quote referencing questioning looks from others when carrying reusable bags, Williamson (2003) indicated that virtually all Americans can relate to plastic bags as a problem.

> If I tell people, "I use these to help keep plastic out of landfills," I get an *oh-you're-one-of-those-types* look. But if I simply say, "I already have such a huge pile of plastic bags at home," the response is more sympathetic: "Oh, I know just what you mean!" Everyone, it seems, is afraid of that impending avalanche behind the pantry door.

Plastic bags are everywhere and affect everyone through both chemical pollution and littering which will be discussed more in sections to follow. Plastic bags also have an oxymoronic, dichotic nature about them in which they are convenient and useful household items while also being cheap and worthless nuisances. A preliminary survey, found that 90% of grocery store customers using single-use plastic shopping bags would support a tax to help reduce use (Carmichael, 2006, p. 32).

Though the US EPA does not see plastic bag litter as a major problem due to an advanced waste disposal infrastructure (Spivey, 2003), a short walk will, more often than not, lead to observation of a plastic bag stuck in a puddle or being carried along with a breeze. While plastic bag litter is not as common in the US as South Africa, described in the previous section, similar sights are common enough in the US that the average American could easily imagine what this litter problem in other countries might look like without actually observing it. Williamson (2003) articulated the ubiquity of the plastic bag while also sarcastically associating trash with beauty:

> The film *American Beauty*, which features a long, poetic clip of a plastic bag swirling on an eddy of air, snagged five Academy Awards…But as a product -- as something created and then unleashed to become seamlessly integrated into the lives of millions of people around the world -- there is a strange allure to them, just as a pathologist can admire the structure of a particularly virulent and contagious virus.

Likewise, it is conceivable that a littered plastic bag here or there is viewed positively by the average American. Geographer Yi-fu Tuan writes of numerous cities in the US with nicknames, depicting things that are not necessarily positive phenomena, which "…reflect and exaggerate the basic values and myths of America…a nation that takes pride in its industrial prowess (Tuan, 1974, p. 203)." These nicknames include Auto City, Beer City, Cash Register

City, Pretzel City, Insurance City, and Shoe City (Tuan, 1974, p. 203). Considering these examples, 'Welcome to *Plastic Bag City, USA!*' is not a far stretch.

Despite links between plastic bags, plastic use in general, industrial progress, resource consumption, and improved living conditions for Americans and much of the rest of the world, new attitudes toward the environment and resources are emerging. Harper (2004, p. 164) describes a social paradigm as a set of beliefs that implicitly shapes and organizes perceptions of peoples' functioning within the world. Within sociology a paradigm was recognized and labeled the Human Exemptionalism Paradigm (HEP). Beliefs within the HEP include the notion that humans are more powerful than forces of the environment and therefore exempt from biological and physical variables that provide limitations within nature (Harper, 2004, p. 64). Considering Western worldviews and worldwide expansion of industrial civilization the HEP remains a factor behind environmental perceptions and business activities. Nevertheless, the New Ecological Paradigm (NEP) has more recently been recognized and labeled within sociology. Worldviews of the NEP include an emphasis on the finiteness of our biophysical world and a cause effect relationship within nature that humans are subject to despite exceptional characteristics that human beings possess (Harper, 2004, p. 65). Environmental sociologists often work off of the fundamental idea "that alterations to bio-physical systems overtime will inevitably have social consequences, and vice versa (Taylor, Bryan, & Goodrich, 2004, p. 41)." Likewise, Schnaiberg's discussion of the environment and society relationship suggests that:

> There will always be a conflict between the economic expansionist goal of societies and the physical/biotic base that provides the raw materials for this expansion…It is a zero-sum game where the more you take or use, the less there remains, as detailed by the second law of thermodynamics (Taylor et al., 2004, p. 42).

Though principals of sustainable development seem straightforward, actually accomplishing more sustainable development is not so simple when economic development, environmental protection, and social welfare are factors that must be considered. Reducing plastic bag numbers may be a viable step toward improved sustainability within the packaging world (Ritch et al., 2009).

Just as evidence of a change in the way humans view their relationship with their environment is indicated in the paradigm shift from the HEP to the NEP described previously, changes in behavior toward the plastic bag may not only become symbolic of the larger picture of sustainability, but also help to change the relationship between humans and their waste in general. Plastic bags are only a small proportion of the 200 million tons of solid municipal waste more commonly referred to as garbage that Americans produce each year which has consequences for human-environmental health (Harper, 2004, p. 4). For instance, in the US an estimated 25 to 75% of ground water is contaminated by multiple sources of waste, including leaks from underground storage tanks, sewage systems and landfills (Harper, 2004, p. 4).

If we are indeed part of our Earth, not masters of it, changes in our relationship and responsibility for waste might highlight that neither are we masters of our waste and that the current human-waste relationship creates profound negative implications for human life (Highmore, 2006, pp. 271-272). Whisking trash out of sight does not make the trash or its consequences disappear.

Interestingly, plastic bags do indeed take up a small amount of space in landfills, but they are related to excessive consumerism and impulse buying which contributes to a larger proportion of the total amount of garbage. The materialistic nature of humans and their relationship to waste are interesting topics to explore. According to Tuan (1974, p. 6), humans

are primarily a visual animal. Primates are more adapted to pick out static details than other mammals because of the static nature and diverse shapes, colors, and textures of fruits, seeds, and shoots in forest environments. Therefore, humans, like other primates, may tend to perceive their environment as a collection of things rather than pattern relationships (Tuan, 1974, p. 7). In modern society, humans perceive space as bound and static, an absolute space for putting a collection of stuff (Tuan, 1974, p. 11). Perhaps a combination of factors including human beings' natural interest in colors, texture, and shapes; a tendency "to segment the continua of nature (Tuan, 1974, p. 15);" and the ability to drawdown resources has resulted in highly materialistic and consuming lives that produce excessive waste of which its existence is often denied by shipping it out of sight and out of mind. The single-use plastic shopping bag further encourages impulsive purchasing while also disregarding the notion that an individual should take responsibility for or at least be conscientious of the amount of trash he or she produces. These human tendencies of environmental perception described by Tuan have interesting implications in the relationship between human behavior and: the plastic bag, consumption, and waste. Changing rate of use of single-use plastic bags is one way that Americans may decrease waste volume and begin to take more active responsibility for the waste produced on the individual level (Highmore, 2006, p. 271).

Attitude and Behavior

Within the academic discipline of social psychology, it is commonly accepted that attitudes and behavior are related. It seems intuitive that attitudes influence behavior, but the opposite is also true. Behavior can influence attitude. For example, a behavior such as participating in a river cleanup as part of a class requirement might change a person's previous

attitude toward an environmental problem. People may adjust their attitudes so that they are congruent with their behaviors or a person's attitude toward an object or concept may govern the related behavior (Smith & Mackie, 2003, p. 291).

Cognitive dissonance is a term used to describe a conflict between behaviors and beliefs or attitudes which results in feelings of discomfort within an individual. Interestingly, cognitive dissonance theory suggests that people often change their attitude not their behavior to resolve cognitive dissonance regarding an issue of personal importance (Smith & Mackie, 2003, p. 299). For example, according to Smith & Mackie (2003, p. 299) soldiers returning from Chinese prisoner-of-war camps were found to have changed their attitudes towards communism to adjust to their situations expressing that while communism might not work in North America, it "is a good thing for Asia (as cited in Schein, 1956; Segal, 1954)." Of course, it is highly plausible that the plastic bag debate is not of significant importance to the average person because it is such a commonplace phenomenon that is unlikely to trigger emotional significance.

Also, for an attitude to have an altering affect it must first come to mind (Smith & Mackie, 2003, p. 325). The Scottish Consumer Council identifies consumer interests as an integral component for expansion of environmentally sustainable consumption and development. Principals used as guidance toward environmental sustainability include access, choice, information, and representation regarding goods and services (Ritch et al., 2009). Unfortunately, according to Tuan (1974, p.239), "Man's capacity for self-delusion is great" and "verbal expressions of attitudes are seldom very revealing in themselves." For example, the National Consumer Council in the United Kingdom (UK) found that though 30% of consumers think about issues of the environment, only 3% made consumer decisions based on that information (Ritch et al., 2009). Perhaps people tend to be concerned about the environment, but it is not an

attitude at the forefront of a person's mind while shopping or conducting day to day activities. Because shoppers are not actively thinking about negative affects plastic bags have for humans and the environment while shopping, present behavior regarding single-use plastic bags will continue.

According to LaPiere (1934, p. 230), "By definition a social attitude is a behavior pattern, anticipatory set or tendency, predisposition to specific adjustment to designated social situations, or, more simply, a conditioned response to social stimuli." Behavior towards plastic bags may change if policies help reduce the significant social stimulus that plastic bags currently provide in stores in the US. Too many factors beyond personal control might also cause a conflict between attitude and behavior (Smith & Mackie, 2003, p.324). Current practices within the plastic industry and store marketing may provide stimuli that are too significant for the shopper to overcome despite potential conflicts between attitude and action regarding the single-use plastic shopping bag.

Consequences of Plastic

Excessive use of the plastic bag has caused many problems to humans and our environments. These bags take somewhere between 400 and 1,000 years to break down (Aldred, 2008). So, in human terms, they are here to stay. Marine habitats and wildlife in particular have been damaged by general plastic debris. According to the nonprofit Center for Marine Conservation, plastic bags are among the top 12 types of trash found most often in coastal cleanups, and marine mammals, seabirds, and sea turtles become entangled in the bags. Sea turtles, mistaking them for food such as jellyfish, can die from starvation due to intestinal blockage (Spivey, 2003).

Figure 1. Stomach Contents of a Green Sea Turtle Featuring Plastic Bag Remnants (Source: Barnea, 2008)

The Blue Ocean Society for Marine Conservation reports that each year over a million birds and 100,000 marine mammals and sea turtles die either from eating or getting entangled in plastic and that an estimated 50% of all marine litter is some form of plastic (Mieszkowski, 2007). Plastic accounts for 90% of all floating litter in the oceans (Aldred, 2008), and plastic consumption is a problem for an array of marine life from very small to very large animals. Small invertebrates like barnacles can eat tiny bits of plastic bags so the toxins within them can begin at the bottom of the food chain. On the other hand, a filter-feeding minke whale in Normandy was found to have 800 kilograms or 1,763 pounds of plastic bags and other plastic packaging in its stomach (Carmichael, 2006).

It would be difficult to say just how many plastic bags fill the waters of the world though an excessive amount may be found in a beached whale. In just a couple of hours a single volunteer with the Lake Merritt Institute in Oakland, CA easily collected two dozen plastic bags out of the lake using nets with long handles (Mieszkowski, 2007). Perhaps in the case of litter every little bit of cleanup helps. However, the director of Lake Merritt Institute, Dr. Richard Bailey, is most concerned about waterlogged bags that sink to the bottom where many species

important for ecosystem health, such as shrimp, shellfish, and sponges live. The bags pulled out by volunteers show just how big the problem actually may be (Mieszkowski, 2007).

While a given American may or may not be concerned with coastal debris and the welfare of marine wildlife, food web contaminates may be more likely to raise concern among citizens. Plastic bags don't biodegrade; they photo-degrade meaning they breakdown into smaller and smaller toxic bits contaminating soil and waterways and entering the food chain when animals, primarily marine animals, accidentally ingest them either directly or indirectly (Ruch, 2007-2008). Small bits of photo-degraded bags resemble plankton which is a primary food source for many marine animals (Wisconsin Department of Natural Resources, 2009).

Plastic bags and the printing inks for bag graphics are composed of toxic chemicals linked to changing hormone levels in animals. In humans and other animals, these irregular hormones may be passed from the mother to child via the womb and breast milk and also stored in body fat tissue which can lead to damage to nervous and immune systems (Ritch et al., 2009). Chemicals used in plastics have a habit of finding their way out of everyday products and into the environment and ultimately into living organisms, not excluding humans. The Earth's filtering capabilities are more numerous and much larger than human bodies. "It's not the environment that's contaminated so much," wrote Dr. Bruce Lanphear, director of the Cincinnati Children's Environmental Health Center. "It's us (Walsh, 2010)." A recent study by the Centers for Disease Control and Prevention found traces of 212 environmental chemicals in Americans - including arsenic, cadmium, and pesticides. Evidence is beginning to link chemical contamination to many contemporary health problems that have been increasing over the last fifty years as well, including obesity, diabetes, autism, and attention-deficit/hyperactivity disorder (Walsh, 2010). A study conducted in the US in 2004 found 287 different industrial

chemicals with an average of 200 chemicals circulating in the bodies of 10 different newborn babies. Of the 287 total chemicals found, 180 are proven carcinogenic in humans and animals, 217 are proven toxic to brain and nervous systems, and 208 are proven causes of birth defects or abnormal development in animals. While this study is not necessarily making the plastic connection, the study makes a striking point, "We are the environment; there is no separation. If a chemical is 'out there' it may also be 'in here' [in our bodies…] (Greene, 2007, p. 11)." Therefore, issues of the environment are significant not in terms of the Earth, but in terms of human well being. The Earth can and will adjust to changes, humans may not always be so lucky.

Another concern for many Americans is the price and consumption of nonrenewable natural gases. Water, energy, and refrigeration are used to manufacture plastic bags with ethylene gas which is derived from crude oil (Spivey, 2003). The Irish plastic bag ban implemented in 2002 decreased plastic bag use by 90% which equates to saving almost 5 million gallons of oil over five years in that country. In the US a 90% reduction in plastic bag use would have saved 400 million gallons of oil over the same five year period or approximately 12 million barrels of oil each year (Ruch, 2007-2008; Barnea, 2008).

Information seems to support the idea that plastic bag pollution is a problem for much of the world, the US included, because of the problems associated with marine contamination. However, in the US due to efficient waste management infrastructure many more bags go to landfills. According to the Wisconsin Department of Natural Resources (2009) consumers reuse plastic bags as trash liners or pet waste bags, but a large number also end up in landfills without being reused. In landfills, the bags may also cause problems by interfering with moisture distribution and leachate flow.

Recycling of plastic bags is becoming an increasingly popular way of addressing associated human-environmental consequences. Recycling of petroleum-based plastic bags is becoming more feasible, but currently many barriers exist. According to the ACC (2008), plastic bags can be made into many products, such as building and construction products, low-maintenance fencing and decking, and more plastic bags. However, when plastic bags are turned into plastic construction materials, fencing, decking, and playground equipment this is actually an example of down-cycling meaning these new materials can never again be recycled (Mieszkowski, 2007). Eventually, the down-cycled materials will go to a landfill. In the US, one company, Trex, buys about 1.5 billion bags per year or half of the used plastic bags available for recycling. While approximately 3 billion bags may be available for recycling each year, Americans use 100 billion bags a year. At about 3% current recycling rates are low. The problem is that with the current infrastructure and the recycling market, creating new polyethylene plastic bags is less expensive than recreating a plastic bag from used plastic bags (Mieszkowski, 2007). Plastic bags are actually viewed as a nuisance at many recycling centers often causing machinery to shut down when the bags become entangle in the gears (Williamson, 2003; Mieszkowski, 2007). Nevertheless, there is a growing demand for recycled plastic bags and the demand is higher than the supply (Spivey, 2003). In 2002, all programs for recycling of plastic materials in New York City had to shut down. Cities commonly have difficulty affording recycling vendors' fees. To counteract such barriers, the EPA is developing "product stewardship" projects which distribute the cost of recycling to all parties involved including manufacturers, governments, and consumers. Plastic recycling was resumed in New York in 2003 with vendors' fees at 5 dollars a ton compared to the previous 65 dollars a ton for mixed metal and plastic recyclables (Spivey, 2003).

What is there to Lose?

While there is little debate that current rates of use for the single-use plastic shopping bag is environmentally damaging, different stakeholders within the sectors of government, business, and public have different concerns and solutions for addressing associated problems. Reducing or banning plastic bags involves economic changes and those with plastic industry connections will be most affected. For example, when China banned free plastic bags in shops and supermarkets in 2008, Suiping Huaqiang Plastic, the country's largest plastic bag manufacturer shutdown, thereby costing 20,000 people their jobs (Aldred, 2008). According to the ACC, Plastics bag manufacturers directly employ more than 2,600 people in the state of Texas alone while reusable shopping bags are primarily imported ("What You," n.d.) and often made with crude oil derivatives as well. Single-use plastic shopping bags used in the US are manufactured here (Wood, 2010).

The Progressive Bag Alliance founded in 2005 is a group whose membership includes the four largest plastic bag manufacturing companies in the US. The group changed its name to Progressive Bag Affiliates and the web page now links visitors to the ACC web page (ACC, 2010) which represents the leading companies in the business of chemistry, including plastics (ACC, 2010). All four members of PBA have pledged to manufacture their bags with 40% recycled material by 2015 (Verespej, 2009). Within the plastic industry, recycling is the preferred method for addressing problems of the plastic bag, and plastic is viewed by many as more environmentally friendly than paper bags for many reasons (ACC, 2008). Senior director of packaging for the ACC, Keith Christman, stated that plastic bag manufacturing uses 40 to 70% less energy than paper, and emits less than half the greenhouse gas (GHG) emissions

(Barnea, 2008). An increase in recycling of plastic bags, well above the current rate of about 3%, could create jobs without having to reduce job numbers in the manufacturing sector.

For decades plastic bags have served as an integral part of the average household functioning by ferrying all types of goods to and from the home. Only recently consumers and civic authorities became aware of problems associated with excessive use (Potty, 2010). Plastics in general and plastic bags specifically have also improved world hygiene and health. Currently, plastic bags provide a hygienic method for carrying goods out of stores without risking the chance that food related germs that may have contaminated those bags will be brought back into the store. There are few studies on this issue, but one survey indicated that 97% of people using reusable bags had never washed them and 50% of the reusable bags tested carried significant levels of *E.coli* (Potty, 2010). Proper washing and continued plastic bagging of meats might be a solution. However, this issue should not be overlooked.

How consumers will replace plastic bags is another viable concern. Paper bag production involves more environmental consequences than just higher energy consumption and higher GHG emissions. The paper bag industry uses old growth, biodiversity-rich Canadian forests or some of the last native woodlands of the Southeastern United States as primary production resources. The timber companies replace these valuable resources with simple and fragile ecosystems of monoculture forests while the paper industry also uses more water than any other industry on Earth (Williamson, 2003). Replacement of paper for plastic could be counterproductive. Plastic bags make up less than half of 1% of the municipal solid waste stream in the US (ACC, 2009), and the volume of paper versus plastic is significant. Two thousand plastic bags weigh 30 lbs; 2,000 paper bags weigh 280 lbs. Paper bags are less

efficient in terms of transportation costs and take up more space in landfills (ACC, 2009). Of course, paper in a landfill is more biodegradable than plastics, but GHG emissions for plastic bags are half of what the emissions are for composted paper bags (ACC, 2009).

Furthermore, many countries, including the US, have not passed national policies to curb plastic bag use, while some countries with plastic bag legislation have experienced criticism regarding effectiveness of the policies in terms of reducing waste. In Taiwan, people now buy plastic bags four times thicker than traditional single-use plastic shopping bags though use and reuse statistics for these new bags are not established. Lam and Chen (2006) found the thicker reusable plastic bags to be used by 12% of customers. On the other hand, Taiwanese consumers are supportive of reusable canvas. When designer Anya Hindmarch's "I am not a plastic bag" bag came out in stores there were instances of hospitalized injuries related to stampedes in which riot police were needed to control the crowds of people attempting to buy these limited edition totes (Mieszkowski, 2007). This fairly absurd but striking example may provide further evidence that more than serving as a solution to excess waste, reusable bags are marketing tools aimed at promoting impulsive consumer purchasing for company profits.

CHAPTER 2

RESEARCH METHODOLOGY

Research Questions

Since the introduction of plastic bags to check out lines in 1974, the single-use plastic shopping bag has become a common household item serving many different functions to many different people all across the Earth. It is a *bag of all trades,* including conveyor of goods from business to customer and from person to person, trash bin liner, pet waste receptacle, lunch bag, and dirty clothes hamper to name some of the infinite uses.

On the surface, plastic bags may appear a fairly simple and inconsequential topic. However, the literature suggests otherwise. Pervasive use of the item is worldwide, and the US uses more plastic bags than any other country. Efforts to reduce the number of plastic bags used within a given community like the University of Alabama may be a step in the right direction.

Research Question (RQ) 1: Is this a viable area of improvement for reducing waste and improving sustainability at UA?

Problems directly and indirectly related to the ubiquity of the plastic bag are also worldwide. These problems include, but are not limited to the clogging of urban waterworks infrastructure, health problems for humans and other animals due to chemical exposure, animal deaths as a result of ingestion, excessive littering particularly in bodies of water like San

Francisco Bay and in countries where waste infrastructure is less developed like Ghana and South Africa.

RQ 2: Are students aware of the negative consequences single-use plastic bags cause for humans and the environment?

As a result of many problems related to excessive use of the plastic bag, nations, companies, and individuals around the world have begun to push for use of the reusable shopping bag as an alternative. Various methods have been used in many different countries with varying degrees of success.

RQ 3: What methods or incentives, if any, do UA students support that would help reduce the numbers of plastic bags used in the UA community?

RQ 4: Are UA students aware of this topic as a national and global issue?

In the US reusable shopping bags are commonly for sale at checkout lines in grocery stores and other retailers. However, the literature suggests that these bags may be something the consumer impulsively purchases and then forgets rather than a tool for helping customers to use fewer single-use plastic bags.

RQ 5: How many students on campus are using or attempting to use reusable shopping bags?

The plastic bag may seem like a trivial human-environmental topic. However, certain tendencies of environmental perception suggest that plastic and reusable bags may have more powerful connections to our psyche than we would expect. Plastic bags are commonplace in the daily lives of most Americans, and therefore they have strong symbolic potential. For example, bags may serve as symbols of industrial prowess or may represent an idea or a company. In addition, they allow human beings to fulfill their materialistic need to collect things in the environment more proficiently than two hands allow.

RQ 6: Are plastic bags an important aspect of the subjects' shopping experience?

Finally, in the US recycling is a method supported by the US government and the plastic industry for addressing problems of the plastic bag. Currently, a common estimate for the number of plastic bags recycled is 3%. One reason for the low rate of recycling is that currently recycling the bags costs more than manufacturing new ones from raw materials.

RQ 7: Is recycling or any other strategy a data-supported approach for reducing plastic bag waste on campus?

The research questions above were developed in relation to summarized findings from the literature review written above each question. The research questions are aimed at addressing the overall attitudes and actions of students regarding the single-use plastic bag with the hope of forming a viable plan of action that will fit the needs and characteristics of the UA community. Potential discrepancies between attitude and behavior on this subject matter are suspected. Many people presently express concern about environmental problems including plastic bag use, but behaviors do not always reflect expressed attitudes of environmental stewardship.

RQ 8: If a discrepancy between attitude and behavior is found, is it a strong enough motivator that students would support an incentive or law to reduce plastic bag use?

Research Goal

The goal of this research project is twofold. First, I seek to develop an overview of student attitudes and behavior regarding single-use plastic shopping bags on the UA campus. Second, according to findings regarding student attitudes and behaviors toward plastic bags, I

seek to suggest a viable strategy for reducing plastic bag waste and improving overall sustainability practices on campus.

Research Methods

The primary investigative instrument is a one-time survey administered to university students. Students were surveyed in four different undergraduate classes taught by two different teachers within the Geography Department at UA through paper-based surveys in order to address the goal, objectives and questions listed above. According to Nordstrom, Richards, Wilson, Coe, & Fivek (2000, p. 32), the age group of 13 to 16 years old includes those who broaden their ethical concerns and their ecological appreciation for animals and the natural environment (as cited in Kellert, 1985), suggesting that survey participants in the present study should have established views on the subject matter if they are aware of the topic and have given it some prior thought. If established attitudes do not seem to reflect a behavior consistent with the expressed attitude, I seek to develop a strategy with a potential for success based on theories of cognitive dissonance which was discussed in Chapter 1 under the "Attitude and Behavior" section.

This research involves a survey based approach. The statistics collected in this research may be used for investigating contingent relations between specific localities regarding particular social phenomena. In this case, the social phenomena are behaviors and attitudes of students toward the plastic shopping bag, and the locality is the University of Alabama. Findings cannot be generalized to other locations. However, at any university a unique relationship exists between the university and the surrounding community in which "successful universities can promote economic, social, and cultural vitality" in the cities with which they reside (Freeland,

2005). In addition, the data collected have comparative value, and these phenomena have yet to be documented within this campus community.

The Plastic Bags Survey (see Appendix B) was used to measure attitudes and behaviors related to present use of the single-use plastic shopping bag by UA students. A test run of the survey was conducted on about 20 graduate and undergraduate student volunteers to make sure no logistic or linguistic problems had been overlooked. Adjustments were made based on volunteer feedback, but responses of the preliminary surveys were not included in research findings.

Because the primary investigation within this study involved participation of human subjects, it was necessary to work in accordance with university policy. Ethical training and testing were completed online by the researcher and researcher's advisor according to university policy, and permission to use human subjects for the conduction of this investigation was sought and approved as IRB#: 10-OR-391 by the University of Alabama Institutional Review Board. After administration and collection of the surveys, a data code table was created. Responses were entered into Microsoft Excel (see Appendix C) according to the data code table and the data were analyzed.

CHAPTER 3

RESEARCH FINDINGS

Introduction

This chapter involves an analysis and description of research results. Convenience sampling of students on campus produced 162 respondents. Volunteers were taken from four classrooms encompassing two different 100-level geography courses which are a few of a handful of classes that students may take to fulfill general education requirements within the College of Arts and Sciences at UA. Therefore, the group of volunteers sampled may be fairly representative of the student body in general without having collected information regarding students' academic backgrounds and interests. The only demographic information collected was the volunteer participant's age cohort (see Appendix B, Item 1) and sex. Males made up 50.9% of the sample, 49.1% were females. All participants were 18 years of age or older. The vast majority of students, 95.1% were 18-22 years of age. One respondent indicated an age of 26+, while 4.3% were 23-25 years of age. In addition, an observation of 79 shoppers exiting two different Publix stores in the area, one adjacent to campus and one across the Black Warrior River in Northport found a total of 6.3% of shoppers using reusable shopping bags of which 40% were males.

Most students surveyed, 72.2%, were aware of plastic bags as contemporary issue of debate. Therefore, the researcher may assume that most participants had given this topic some

consideration prior to participation in the research. However, almost 28% of participants were not aware that plastic bags are a national and worldwide topic; therefore, that 28% may or may not pay attention to news. However, the reusable bags sold in stores has not brought the attention of some students toward this topic. Perhaps these items for sale go unnoticed or may be just another item for sale rather than a tool for reducing plastic bag numbers for a significant number of people. Walmart is the number one retailer in this country. An observation of checkout lines at Walmart in Northport, AL in November 2010 found no reusable bags for sale, while they are at the beginning of each line at Northport grocery stores, Winn Dixie and Publix. Nevertheless, Walmart did introduce their reusable shopping bag in 2007 and has since reduced plastic waste in several countries by 15-46% according to the Walmart website (Walmart Corporate, n.d.). With two Walmarts in this community it is possible that students do much of their grocery and other necessity shopping at these Walmarts and have not noticed reusable bags current popularity.

Regarding general environmental concern on a rating scale of 1-5, 1 being 'not important at all' and 5 being 'extremely important," the most popular response on the survey was 3. Of the respondents, 42.6% chose 4 or 5 meaning that environmental issues are either 'important' or 'extremely important.' However, the popularity of 3 as an answer choice creates questions. Do the majority of respondents in grey (see *Figure 2* below) lean toward the lower or higher end of the scale? More information is required. Specific percentages for each rating on the scale are shown. Shades of green were chosen to represent the percent of students giving environmental issues importance in their lives while grey was chosen to indicate possible neutrality, indifference, or undecided. One student out of the 162 participants chose 1 or 'not important at all'. This survey item had the second lowest response rate of all 15 survey items with 7

participants who did not circle a response. It was the last survey item and the scale allowed more room for individual interpretation with a format different from other survey items.

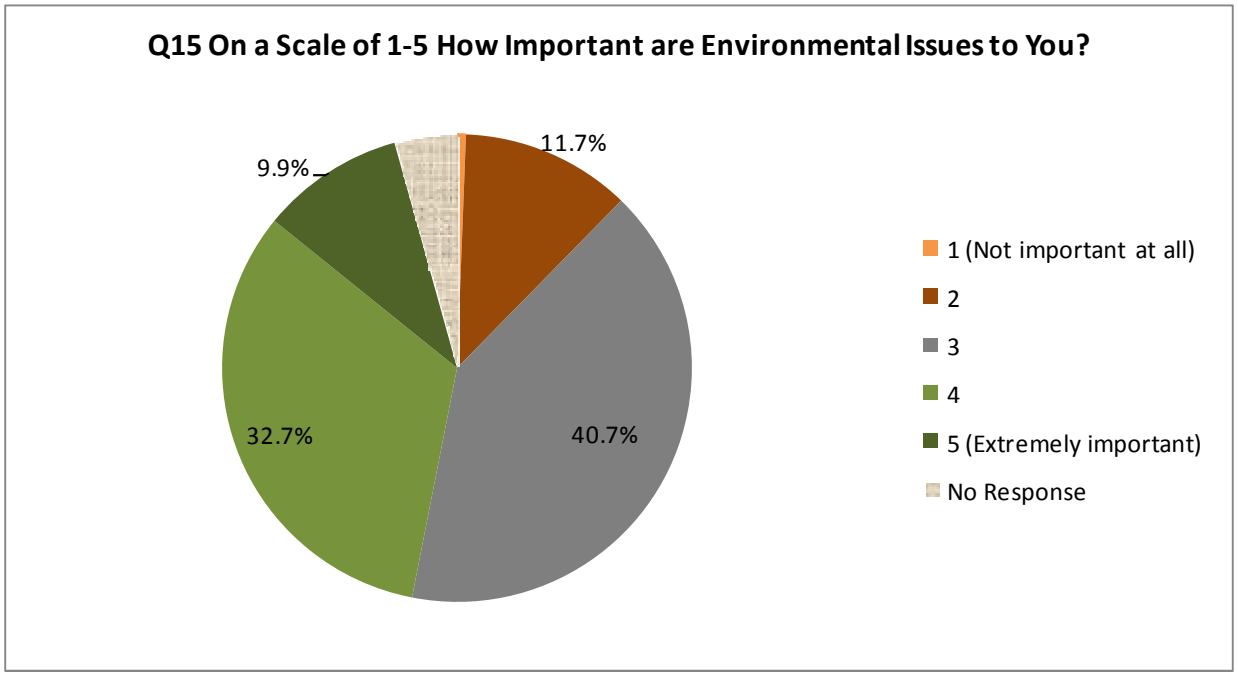

Figure 2. Importance of Environmental Issues in Students' Lives

Attitude and Behavior

Students' dominant attitude toward single-use plastic bags is not consistent with dominant behavior or how they use plastic bags. Approximately 77% of students or three out of every four students indicated that plastic bags *do* have notable negative consequences for humans and the environment. The word 'notable' was emphasized in the survey question so that participants who do not feel that plastic bags are a problem would be more likely to answer based on their own feelings rather than what they feel is the answer according to outside influences, such as the researcher or the media. While a majority of students indicated that plastic bags are harmful to humans and the environment an even larger majority, 90.6%, of students, use plastic bags more often than reusable. Response rates for these two questions can

be compared below in Figure 2. The color green was chosen to highlight the discrepancy between 'green attitude' and 'green behavior.'

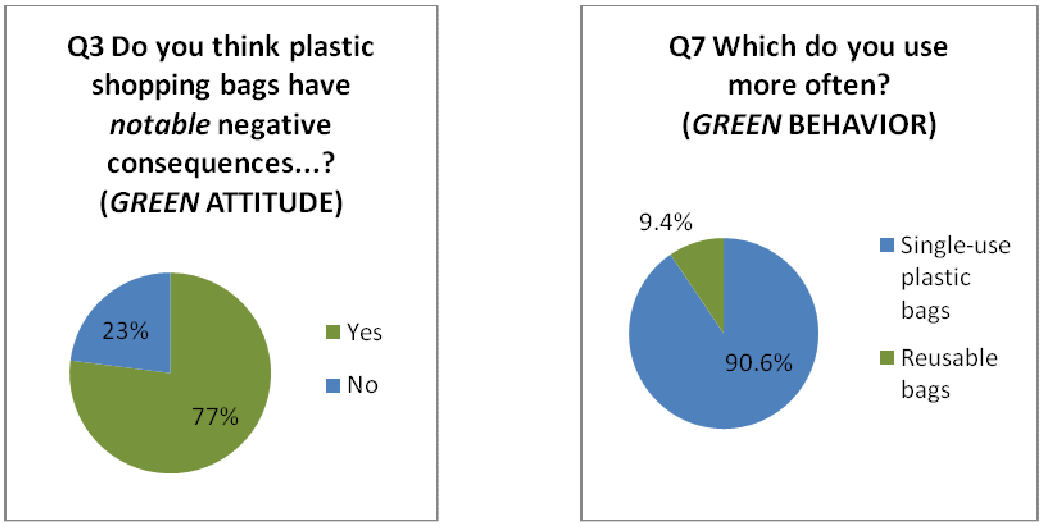

Figure 3. Attitude versus Behavior

Of those students who use reusable shopping bags more than single-use plastic shopping bags, 33.3% were male. A similar survey study conducted by the city of Flagstaff, Arizona found that 73% of local shoppers use single-use plastic bags. The higher percent of respondents using reusable bags in Flagstaff than UA at 27% and 9.4% respectively (City of Flagstaff, 2007) could have many different explanations including sampling methods, survey design, biases, or regional characteristics.

Question 4 from the survey offered interesting results. The item was included to assess research participants' attitude toward plastic bags on a more individual basis independent of obvious environmental considerations and potential biases based on the survey topic. The phrases 'do you view' and 'your shopping experience' were chosen to emphasize the importance of the individual's own preferences while shopping regardless of any environmental connections (See Appendix B, Item 4 for exact wording). Nevertheless, the researcher expected that almost all students surveyed would indicate that plastic bags are an *unnecessary* aspect of shopping

since choosing *necessary* would imply that there are no alternatives for carrying goods out of a store. Of the study participants, 34.4% indicated that plastic bags are a necessary component of their shopping experiences while 65.6% majority feel plastic bags are unnecessary for shopping. Written comments to this survey item conveyed that while many students realize they are not *necessary*, they are *convenient*. Therefore, plastic bags are probably valued to some degree by many of the 65.6% of students who indicated the phenomenon as unnecessary as well.

Similar to Q4, Q13 from the survey was included to help eliminate research biases and focus on consumer preferences rather than environmental issues. In addition, the wording was derived from a New York Times article which stated that the California State Senate rejected a bill proposing to ban plastic shopping bags after a debate which focused on the imposition of too much state regulation on matters of personal choice (The Associated Press, 2010). A majority of students or 53.5% indicated that they would not feel a violation of personal choice as a consumer if bags were banned from shopping centers. However, because 46.5% of the respondents or close to half of the students indicated concerns over right to personal choice in relation to this topic it seems a legitimate argument.

Taken together, results from Q3, Q4, and Q13 may more truly represent the attitudes of students at UA regarding single-plastic shopping bags. For example, though 23% of students feel that the plastic bags do not cause notable consequences to humans or the environment, an even higher number of students, 34.4%, indicated that plastic bags are necessary for shopping despite fairly obvious alternatives while 46.5% of respondents feel that they would feel a violation of personal rights if these items were banned from stores. From the opposite point of view, as the focus of survey items shifts away from general concerns for the environment and humanity and toward individual and consumer preferences the percent of students responding

environmentally also decreases from 77 to 65.6 to 53.5 (see Figure 4 below). Perhaps as Smith and Mackie (2003, p. 325) suggest, an attitude will not affect behavior unless it has a strong presence at the forefront of a person's conscious mind. Generally, people probably do not have environmental issues on their mind when making consumer based choices. However, the majority of respondents for these questions represent attitudes that correspond with a congruent behavior to reduce plastic bag numbers.

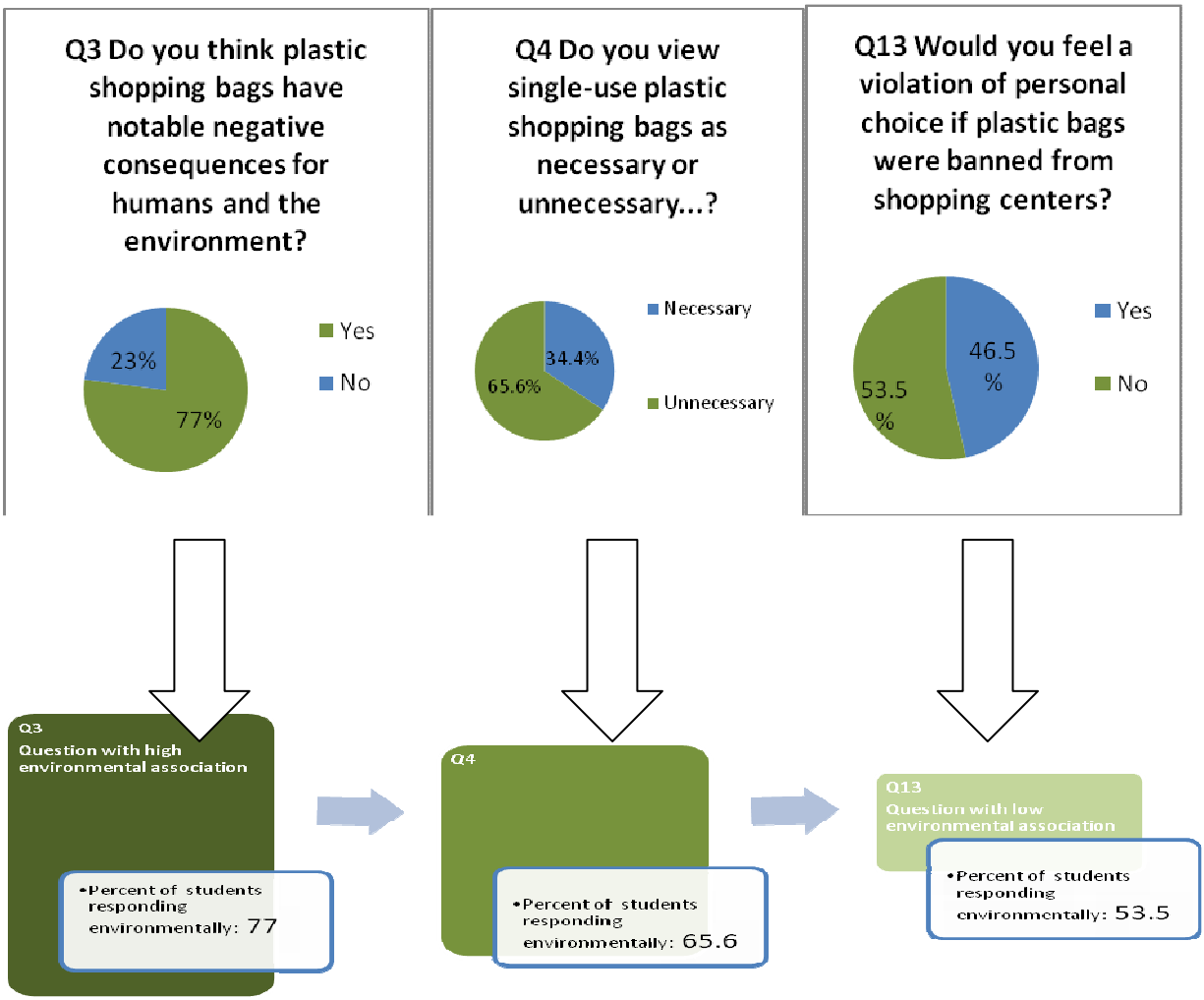

Figure 4. Environmental Association of Question *and* Percent of Environmentally Conscious Responses

In the UK, a survey with an item similar to Q13 found that 13% of shoppers feel supermarkets have a duty to supply free bags to customers (Benjamin, 2007). This number was much lower than the 46.5% of UA students who would feel a violation of personal choice if plastic bags were banned from shopping centers.

As mentioned, the data shows inconsistencies between attitudes and actions regarding the plastic bag. However, attitudes are commonly poor reflectors on how people behave in real life circumstances as LaPiere (1934) concedes in his classic study on attitude versus action. What surveys often reveal is an ideal response or attitude to symbolic situations. In real life, how people behave depends on a plethora of stimuli, motivators, consequences, and individual differences. A moral premise, such as making the responsible choice for the good of people and the environment, is not a strong enough motivator to change behavior for most people (LaPiere, 1934).

Data collected indicated that 44.1% of respondents had bought a reusable shopping bag with the intent of using fewer plastic shopping bags, while 55.9% had not. A little less than half of the students indicated that they have bought reusable bags with the intent of using fewer single-use plastic shopping bags. Regardless, more than 90% of students use plastic bags more often than reusable. Buying or owning reusable shopping bags is not a strong enough stimulus to change plastic bag behavior. However, the data show that students are in favor of incentives to help curb this behavior and most likely they also recognize that the behavior will not change in the absence of stronger motivators. A store discount is the most widely student supported method. Monetary incentives have been successful in this regard in other countries.

Only 3.9% or 6 of the 154 participants who completed this survey indicated a ban as the only option supported for reducing plastic bag numbers. Four of those six students also felt that

environmental issues are extremely important in their lives. Students who chose a ban only or a ban in combination with other options were 13.6%. Seven of the sixteen students who indicated that environmental issues are extremely important in their lives would also support a ban on plastic bags. A substantially higher number of UK shoppers reported that they would support a ban on free plastic bags at 61% (Benjamin, 2007). However, perhaps the 13.6% of UA students supporting a ban would have been higher if I had used the wording 'a ban on free plastic bags' rather than a complete ban (See Appendix B, Item 12, Option a, for exact wording).

A store discount which could reduce the number of plastic bags used with no cost to the consumer was the most popular option chosen. Students who chose a store discount as the only supported option was 61.7% with 77.9% choosing a discount only or a discount in combination with other choices. In the comment section for this survey item, one respondent indicated that he/she was aware that Target already has such a program in place while several other comments indicated awareness of various policies in European jurisdictions. Students in support of charging for plastic as the only option or charging in combination with other methods were 9.7% and 24.6% respectively. More students indicated that they would not support any of the measures than those who supported all of the options at 7.1% and 5.2% respectively. By and large, only 11 of the 154 students who answered this survey item opposed the proposed options which encompass methods that have been used with varying degrees of success nationally and worldwide. Results are depicted below in Figure 5.

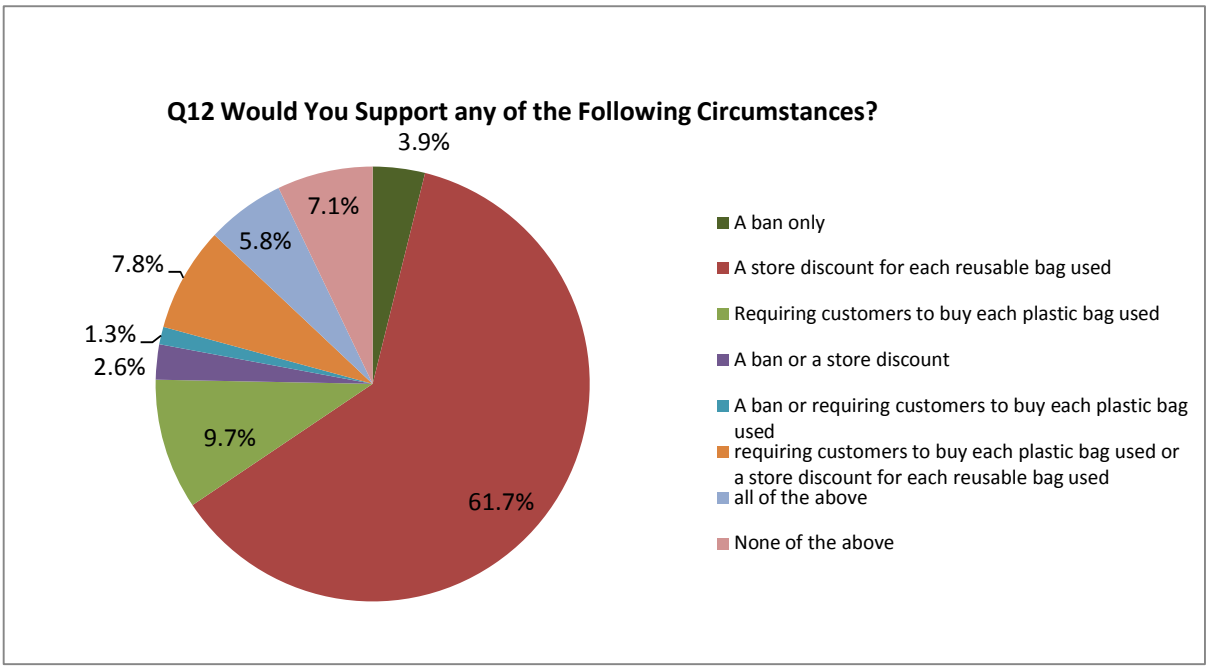

Figure 5. Support for Reducing Plastic Bag Numbers

Question 6 touched on energy implications surrounding this topic. 76.1% of students indicated that using crude oil for manufacturing plastic bags is a problem, while 23.9% do not feel that it is a problem. More information as to why students chose yes or no for this survey item would make the data more valuable. However, some written comments expressed concern over nondiscriminatory use of nonrenewable resources.

According to data for Q10, 82.9% of respondents indicated that they would like to use less plastic in their lives. It was expected that the number would be even closer to the 77% of respondents who indicated that plastic bags pose negative consequences to humans and the environment. This item was included to touch on the broader topic of plastics. However, the number is somewhat confusing without addressing *why* and *how* people would like to use less plastic. Why did approximately 11% of surveyed students indicate that plastic bags are *not* notably consequential to humans or the environment, but *would* like to use less plastic in their

own lives? Answers are beyond the scope of this project. A cross tabulation of Q10 and Q3 is shown below in Table 1.

Table 1: *Cross Tabulation of a Desire to use less Plastic with Views on the Consequences of Plastic Bags*

Q10 Would you like to use less plastic in your life?	Q3 Do you think plastic bags have *notable* negative consequences for humans and the environment?		
	Yes	No	Total
Yes	113	17	130
No	8	19	27
Total	121	36	157

In a study investigating the relationship between perceptions of environmentally responsible consumerism and environmental attitudes, motives, and behavior it was found that respondents were most concerned about product toxicity and least concerned about product packaging in relation to environmentally responsible consumerism (Ebreo, 1999). Again, it is also possible that the topic of plastic bags seems too trivial to the average person. One survey participant indicated in a written comment that there are more important environmental issues to address.

Humans' environmental perception of scale may be an important concept to address. Most humans interact with their environments based on a finite and limited scale of reference (Tuan, 1974, pp. 14-15). Anything too big or too small in relation to humans does not register in terms of an emotional bond or significance (Tuan, 1974, p. 15). For example, many people would kill an insect without thinking twice, but accidently running over a raccoon with a car might evoke feelings of sympathy for many people. Likewise, an area of a town may be imaginable to the mind's eye, the country unimaginable; 500,000 dollars conceivable, a billion inconceivable (Tuan, 1974, p. 15). The list could certainly go on and perceptions of scale do vary on an individual basis. For plastic bags, everyday personal perception and experience may be clouding the reality. The collection of bags in our pantries seems almost weightless, but a bagger at the grocery store who handles the shipped in boxes may begin to have a clearer picture

of the sheer volume of only a fraction of the phenomena. Remember, humans on Earth use an estimated 500 billion plastic bags every year (Carmichael, 2006). What does that really mean? It is difficult to imagine, but it is something that can be put into some perspectives. While plastic bags are obviously relatively inexpensive to produce, hence their ubiquity, they cost more to recycle or properly dispose of and there is an unimaginable amount literally scattered across the planet. This all seems excessive considering there are alternatives.

Recycling

Plastic bags are the main way students at the University of Alabama carry purchased goods. Recycling has the support of many in addressing the problem of the plastic bag. Among students surveyed, approximately 50% indicated that their plastic bags are stored for reuse or recycling, less than half or 43.7% store some of their bags and throw some away. Two or 1.3% of the respondents reported that they do not use plastic bags, and the remaining respondents, 8 of the 158 students who completed this survey item or about 5% simply throw away their plastic bags after putting away groceries and other items.

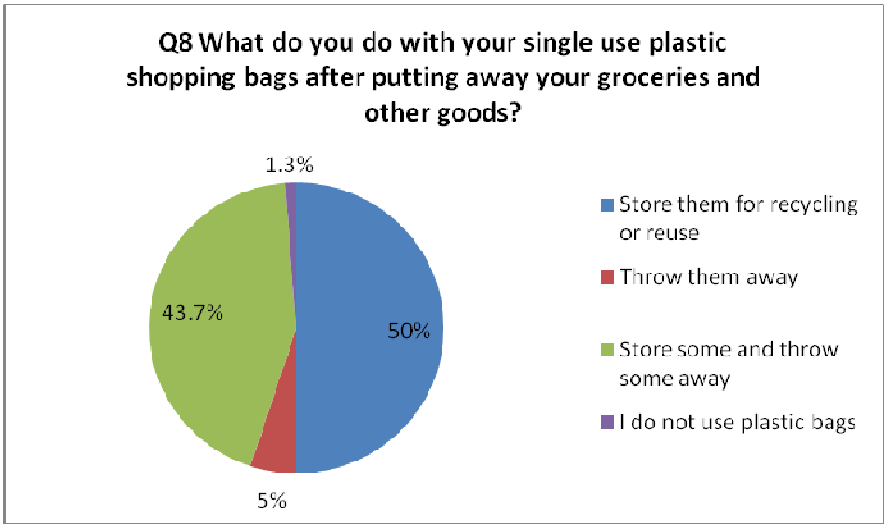

Figure 6. What Do Students Do with their Plastic Bags?

Virtually all plastic bags that are reused end up in the landfill. Because so many students indicate that they store some plastic bags and throw some away, most likely many plastic bags are going to the landfill without first being reused as well. In the UK, a survey conducted by the British Market Research Bureau found that as many as 11% of shoppers throw away their plastic bags after putting away their groceries (Benjamin, 2007). Additionally, how many students actually bring plastic bags to local collection sites for recycling? Opportunities are available, but may not be known to many students. The University Recycling Center collects plastic bags along with plastic types 1-7 for recycling, and major grocery stores in the area including three Publix stores and two Walmarts have bins conveniently place at the front of stores for easy drop off. A couple of students commented on survey items related to recycling. One student indicated that he or she brings plastic bags to the university recycling center while two other students wrote that they were unaware that stores collected plastic bags for recycling, but would now take advantage of the opportunity. Only 13.5% of students reported that they actually take plastic bags to a local collection site for recycling. The recycling rate among students is striking and certainly an area where much improvement could be made given the views expressed by students and the recent success of the university recycling center.

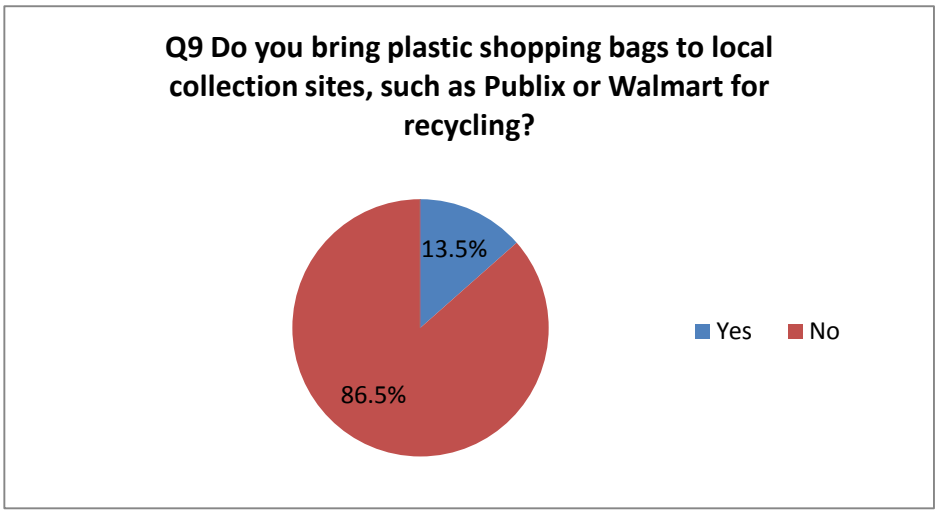

Figure 7. Participation in Plastic Bag Recycling Opportunities

Twenty percent of local shoppers in Flagstaff, Arizona indicated that they recycle their single-use plastic bags. However, due to lack of the appropriate information these participants were doing more harm than good because all 20% recycled by putting the bags in the city collection bins. At the time, Flagstaff did not recycle plastic bags, so these citizens were actually unknowingly contaminating the recycling stream (City of Flagstaff, 2007). Similar to the national pattern and consistent with statements of the EPA, recycling rates are also low among UA students.

Table 2 below is a cross tabulation of Q9 with Q8 to show more detail regarding disposal, storage, and reuse of plastic bags versus participation in manufactured recycling opportunities.

Table 2: *Cross Tabulation of Recycling with Plastic Bag Storage, Disposal, and Use*

Q9 Do you recycle plastic bags at local collection sites?	Q8 What do you do with you plastic bags after putting away your groceries and other goods?			
	Store them for recycling or reuse	Throw them away	Store some and throw some away	Total
Yes	14	0	5	19
No	57	6	58	121
Total	71	6	63	140

Consistency and integrity of data is observed due to the fact that none of the students who throw away their bags indicated that they bring bags to collection sites for recycling, though two students who throw away their plastic bags did not answer Q9. Of the 19 students who do use recycling collection sites to recycle plastic bags, most or 14 out of 19 indicated that after putting away groceries they store the bags for recycling or reuse.

CHAPTER 4

RECOMMENDATIONS

Introduction

Though always attempting objective research, the personal opinions of the researcher prior to the study was that plastic bags are wasteful and unnecessary and that a ban is the best way to deal with the associated problems. However, an opinion is just that and as we know, everyone has one.

The state of the environments we live in and the resources of the Earth that we use matter only in human terms. Environmental degradation is a part of human existence. We have all benefitted from some form of it. Of course, we have all benefitted from and recognize at various levels the value of nature in its pristine state as well. What are the values, objectives, and concerns of all stakeholders involved and what can be done to diminish various groups' weaknesses while maximizing strengths to reach a goal that we can all agree on?

Humans are always looking for an easy, clean, and straightforward answer. However, the solution to any problem or question seems to almost always involve a combination of different views and data for this research is no different. Perhaps banning plastic bags from stores is not the solution in this case. One reason the plastic bag has become one of the most ubiquitous items on Earth is because humans do find it so convenient. First introduced in the US in 1957, plastic bag use flourished in the 1970s and 1980s (Cherrier, 2006). It certainly seems that the

worldwide expansion of plastic bags has reached its pinnacle, and now measures to limit use are spreading across the world. As previously described, since the 1990s, governments including Australia, South Africa, Ireland, Canada, New Zealand and the Philippines have imposed taxes and regulated use on single-use plastic bags (Cherrier, 2006).

To all but shut down the plastic bag industry in the US, as was the case when a ban occurred in China, seems extreme and perhaps hypocritical as well. It may be better to let the industry gradually downsize as demand decreases and then reestablish itself on a smaller scale. Many people around the world and thousands in the US have jobs in the industry. Perhaps the perspective of approach to problems like the plastic bag debate should be "humanistic" rather than "environmentalistic." This is not to say that environmental issues are not important. However, recognizing that environmental problems are just as much problems of humanity as other problems like issues of civility and economics may help in achieving more action towards a solution and less time spent arguing. The Earth, a complex system, was here long before humans arrived and will probably be here long after we are gone. Perhaps decreasing the use of plastic bags gradually by using incentives to increase use of reusable bags and recycling behavior is the best solution and gradually widespread use of the single-use shopping bag will become something of human history on Earth.

A brief description of a recommended plan of action for UA is provided at the end of this chapter while this final chapter begins with a description of literature findings on attitude and motivations related to recycling behavior and a description of the climate of sustainability at UA. Originally, recycling was not planned as a primary focus of this project. However, data findings and the research background have highlighted the importance of the topic. In addition, both of these topics are included at this stage of the paper because the research has led to the deduction

that to decrease plastic bag use and increase sustainability at UA, recycling of plastic bags should increase substantially while use should decrease through an increase in the use of reusable bags which will occur only with external incentive because internal attitudes do not seem to have strong influence over behavior on this issue. The data results in conjunction with strengths and unique qualities of the UA community point towards achievement of these two behavioral changes amongst students as possibilities.

Recycling Literature

As humanity's time on Earth continues and its population increases, inevitably resources decrease while wastes increase. Recycling has moved beyond an action of importance and has become critical (Hornik, Cherian, Madansky, & Narayana, 1995, p. 106). If sustainability is the goal an increase in and improvement of recycling is required. "A sustainable economy must include levels of production and consumption which can be repeated generation after generation without cumulative or worsening environmental damage (Ackerman, 1996, p. 174)." On average, each day every American produces an average of 4 pounds of garbage which costs ten billion dollars each year to collect and dispose of. Disposal means either incineration or landfill storage. The first costing around 75 dollars per ton with externalities of toxic emissions and hazardous ash, though technologies are improving, while the second costs between 50 and 150 dollars per ton. As space depletes in a given landfill, the cost per ton rises. Recycling costs between 40 and 100 dollars per ton to process (Hornik et al., 1995, p. 106). Economically, recycling is not always efficient in the short term. However, savings may occur elsewhere. Consider these examples:

> [For] every ton of paper made from recycled material: the processing generates 60 less pounds of air pollution; 17 trees are not cut for pulp; three cubic yards of landfill space is not used; 4,200 kilowatt-hours of energy are saved, which is enough to power an average home for six months; and 7,000 gallons of water are conserved. Every three months, enough aluminum to rebuild the country's entire commercial fleet of airliners is simply thrown away (Hornik et al., 1995, p. 106).

Ackerman (1996) concedes that while it is impossible to detach cost effectiveness from programs of recycling, it should also be kept in mind that recycling is a solution to a long term environmental problem. With variance in materials and community settings recycling may or may not be profitable in the short term, but it should remembered that not all motivations for action and measures of success are found on a balancing sheet (Ackerman, 1996, p. 2).

Unlike attitude and behavior related to plastic bag use, scholarly literature on the topic of recycling is quite abundant. However, findings do not always point to the same results in identifying critical motivators or facilitators that increase the act of recycling in part due to an array of disciplines that investigate the topic including economics, psychology, sociology, engineering, law, communication, marketing, and environmental studies. However, agreement is found in the fact that positive attitudes toward recycling are prevalent amongst consumers, but similar to findings related to plastic bags, prevalence of the attitude has not resulted in high rates of the associated behavior (Hornik et al., 1995). Indeed, as previously touched upon in Chapter 1 under *Perceptions* and stated by Derksen & Gartrell (1993, p. 434): "Concern for the environment has become almost a cultural constant or norm in western society. Pro-environment attitudes are now socially acceptable and desirable, but may not have much intrinsic meaning." What does the literature suggest as the leading motivators that result in high rates of recycling since a congruent attitude is not enough to elicit the associated behavior?

Hornik et al. (1995, p. 105) evaluated results from 67 empirical studies and found that the best predictors of recycling behavior were: knowledge of and commitment to recycling which the authors categorized as internal facilitators. The next best predictors, categorized as external incentives were: monetary gain and social influence. Also according to Hornik (1995, p. 109), distinct and various feelings of satisfaction may also be derived from both recycling and reusing materials including feelings of frugality and participation (as cited in DeYoung, 1986).

Consistently, people with access to a structured recycling program have much higher levels of recycling than do people lacking such access (Derksen & Gartrell, 1993). Derksen & Gartrell (1993), investigated social context as a link between recycling attitudes and recycling behaviors. The dominant affective link was access to a successful recycling program. Attitudes were found to affect behavior only when a person already had access to recycling facilities. For example, an individual's environmental concern has the ability to improve success of a recycling program, but it was found that the attitude will not lead to recycling behavior that overcomes lack of access to a recycling program. Interestingly, people who did not express attitudes of environmental concern still participated in the recycling program studied due to convenience of the program which involved blue boxes given to individual residences that were picked up curbside just as trash is picked up (Derksen & Gartrell, 1993). In addition, because of the altruistic nature of recycling (Hopper & McCarl Neilsen, 1991), DeYoung (1990) indicated that incentives toward waste reduction and recycling should not be monetary as deeper feelings of altruism or other senses of community have more powerful and longer lasting effects. Common inhibitors to recycling include inconveniences in storing and transporting the materials and a lack of awareness on how or where to recycle (DeYoung, 1988-1989).

The University of Alabama

Some characteristics at the University can be viewed as strengths toward achieving a proposed plan based on research results. These include four traits: a growing population, a desire to become a more environmentally sustainable campus, recent success of the University recycling program, and exceptional pride and enthusiasm for the university football team. Information in this section reflects opinions and experiences of the researcher, not necessarily the university in relation to research findings. Research was gathered using the university newspaper *Crimson White* and the University of Alabama website.

To begin, the student body at UA is rapidly growing. In the past seven years student enrollment has increased by 50% (Hulcher, 2010). The university president, Robert Witt, planned to reach student enrollment of 28,000 by 2013. That goal was reached four years early and in fall 2010 over 30,000 students enrolled (CW Staff, 2010). As student population increases environmental impact will also increase. It is beneficial in the long term to begin reducing environmental impact and awareness on campus now. Though a small number it may be viewed as a strength that 9.4% of the student study participants indicated that they are already using reusable bags more often than single-use plastic bags.

Second, President Witt has emphasized the importance of developing a more sustainable campus. According to the president, "UA is committed to having a positive and lasting impact on the lives of Alabama residents…our commitment to creating and supporting a sustainable campus is a significant component of that commitment (Witt, n.d.). For example, created in 2010, the Office of Sustainability employs a part-time sustainability coordinator and web coordinator while an Environmental Stewardship Committee meets monthly to focus on various

initiatives. Campus green house gas emissions have decreased by 2% since 2007 despite building space expansion of 13% with the implementation of temperature setbacks and temperature control technologies. Buildings on campus meet LEED and Energy Star requirements while the university also has investments in renewable energy funds (The College Sustainability Report Card, n.d.). Since 2007, UA has gradually improved its ratings on the College Sustainability Report Card which is scored according to nine categories. In 2007, UA received an overall grade of D. Every year since the grade has improved from D+, C, B-, and finally a B+ for 2011 (The College Sustainability Report Card, n.d.). Individual category grades for 2011 are shown in Table 3.

Table 3: *UA College Sustainability Report Card 2011*

Category	**Grade**
Administration	A
Climate Change & Energy	A
Food & Recycling	B
Green Building	A
Student Involvement	B
Transportation	B
Endowment Transparency	C
Investment Priorities	A
Shareholder Engagement	--
Overall	**B+**

(Source: The College Sustainability Report Card, n.d.)

Two areas that directly relate to this research topic, *Recycling* and *Student Involvement* received B's and therefore have room for improvement. An A in each of these categories may give UA the edge it needs to receive an A by 2012.

Third, according to a 2009 University of Alabama thesis, an on campus seminar reported these campus wide recycling improvements. In one year recycling revenue increased by around $40,000. Success is attributed to collection of new and various types of materials, improvement in the appearance of collection bins, and use of strategies to promote recycling on dormitory

move-in days and game days (Brown, 2009). The graphic below shows increased recycling revenue and tonnage in recent years. Much of the increase is owed to baling of paper and cardboard because recycling vendors will pay more per ton if these items are baled. For example, loose paper may sell for $20 per ton while baled paper sells for about $200 a ton (Johnson, 2010).

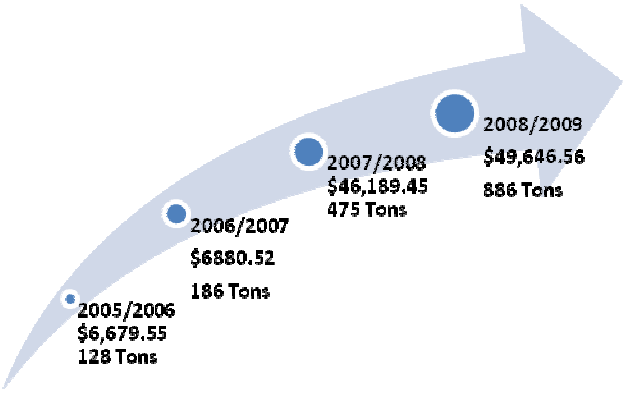

Figure 8. Increase in Recycling Revenue and Material Tonnage 2005-2009
(Source: Johnson, 2010)

In a Power Point presentation by Tony Johnson, Director of Logistics and Support Services at UA, not only has recycling revenue and tonnage increased, but also the program has saved money because less money is spent on landfill disposal due to the resulting decrease in trash volume. In the 2007/2008 school year landfill savings was $13,300.00. During 2008/2009, that number increased to $24,808.00 (Johnson, 2010). In 2010, the recycling program was selected as one of five finalists in the 2010 Southern Association of College and University Business Officers Best Practices competition receiving an honorarium of $750 (UA News, 2010).

Fourth and finally, support and enthusiasm for the UA football team, the Crimson Tide, is exceptional. On game days the UA campus transforms as football fans come from near and far to support their team. The quad is covered with tents and people, and a great deal of trash is

generated. Much of that waste is now recycled. UA employees hand out recycling bags to individual groups of tailgaters so that cardboard, aluminum cans, plastic cups, food wrappers and other plastics, including plastic ice bags, can be recycled rather than thrown away (Evans, 2010).

Therefore, popularity of the football team has already been used to improve campus sustainability. Signs of fanatic football fans can be observed all over town. Alabama football logos can be observed in many places including various clothing items, license plates, vehicle decals, and even reusable shopping bags which are currently sold for $1.99 at The Supestore which is the main campus bookstore. The final section of this report will explain in more detail why popularity of the football team has been included as an important characteristic of the campus environment important for the following recommended plan.

A Plan of Action

Some aspects of data results from the study survey have contributed to the following suggestion. Particularly, the low rate of plastic bag recycling among UA students, attitudes that suggest an inclination toward more sustainable behaviors in general and toward plastic bags specifically, and a seemingly high number of students who have bought reusable shopping bags are all points that lead to the following plan as a suggestion of action.

The recycling center has improved its program through improved placement and appearance of collection bins. Placing plastic bag collection bins in conspicuous locations within dormitories and places where plastic bags are used, like dining centers and book stores would not only increase recycling behaviors, but also increase general awareness of the issue while making people more conscious of their own behavior regarding plastic bags. As indicated in the literature, even people who do not give environmentally related concerns priority in their lives

will recycle if the activity is convenient enough. On-campus housing accounts for approximately 26% of the student population (Brown, 2009). Collection bins for plastic bags provided to and picked up from a person's home is as convenient as it gets. Bins for collecting plastic bags would provide an efficient and affordable method for improving recycling rates of plastic bags because so many students live in one location. Bins for collecting plastic bags in other campus locations that many people use, like food courts and libraries would help to reach many more students and faculty and staff at the University as well while also increasing awareness of the topic. In addition, information sheets posted on the bins could help increase student awareness of the recycling center, its location, and the types of materials that are collected and could also help inform people on some of the problems associated with plastic bags as well as economic considerations such as the number of people employed by the industry. With information on collection receptacles representing various stakeholders, the information will reach out to a greater variety of people as potential recyclers of plastic bags and other materials.

The Supestore, the primary location where students buy and trade their school books each semester, currently sells Crimson Tide reusable bags representing the university football team. They can also be found in other stores around the community like Winn Dixie and Publix. The UA Environmental Stewardship Committee in conjunction with the recycling center and interested student leaders could work toward increased recycling of plastic bags as well as a decrease in the volume of plastic bags used on and around campus. Businesses on campus and surrounding campus could offer discounts, perhaps 10% off the total, when customers use their Crimson Tide reusable shopping bag instead of plastic bags. For example, a Publix grocery store is very close to campus with university property directly across the street from its location. An observation of shoppers exiting two different Publix stores in the area, the one next to campus

and the one across the river in Northport found the percent of shoppers using reusable bags to be slightly higher at the university Publix than the Northport store at 8.6% and 4.5% respectively. A higher number of observations may be needed to take any meaning from these percents, but it could imply that the university community is already more conscious of problems associated with plastic bags. A little incentive might make a major difference. In addition, the recycling center employees could hand out coupons for a free drink at a participating restaurant near campus, for example, to people who drop of plastic bags for recycling.

The suggestion is beneficial on various fronts with high appeal due to the popularity of the football team and the high visibility of its insignias on and off campus. If enough shoppers started taking advantage of such an incentive, high public visibility of the bag could cause such a program to grow. Essentially, it is like carrying around a permanent coupon that also makes a statement or two. The reusable Crimson Tide bags not only represent the football team, but also a sense of community and an effort toward a goal. Such a plan could help to raise environmental publicity for the university and also increase recycling and student involvement scores on the College Sustainability Report Card. The program should be student based and incorporate students, faculty and staff from various university programs to promote collaboration amongst various disciplines and to concur with the interdisciplinary nature of the project as suggested through the literature which involves aspects of economics, environmental studies, community outreach, communications, sociology, and other areas of study. Participating businesses may also attract more customers and/or incentivize more spending, and the program could be a visible and proactive link between the community and the university toward achievement of a goal in which many may benefit.

The suggested plan provides opportunities for choice, involvement, satisfaction, and monetary incentives while at the same time raising public awareness of the issue of plastic bags. A study that attempted to dismiss the debate over whether practices of ethical consumerism arises from pressures of social norms or individual identities combined ideas from both academic perspectives and identified five factors that give the reusable shopping bag symbolic significance as motivators for ethically responsible consumerism in local and micro-social contexts (Cherrier, 2006, p. 515). I suggest that all five factors are reasons why the plan described above has potential for success. The factors include: "a community of meaning and support, emotional affiliation, localized access to political discourse, personalization of the practice, and identity formation (Cherrier, 2006)." A description of each factor identified and described by Cherrier (2006) will follow along with a brief description of how the factor relates to this research project.

The first symbolic factor is *a community of meaning and support.* Participants who bought reusable shopping bags from a particular store and used them at that store in Cherrier's (2006, pp. 518-519) study felt the bags symbolized membership within an environmentally conscious local community. The Crimson Tide reusable bag may symbolize pride and belonging to the UA community while collectively working toward another goal of improving campus sustainability. Similarly, the bags provide *emotional affiliation.* Cherrier (2006, p. 519) found that study participants using reusable bags expressed feelings of happiness when they saw others with the bags too and feelings of guilt if they forgot their bags. This emotional aspect may help incline people toward use of a Crimson Tide bag as proposed. *Localized access to political discourse* was found to be another factor important to participants in the study conducted by Cherrier (2006, p. 520), meaning that changes in bag behavior occurred in part due to exposure or access to information related to the topic. The proposed plan for UA can inform students by

placing information from various view points about the issue of plastic bags near recycling receptacles, while also increasing general awareness of the recycling opportunities available at UA. The concept of *personalization of the practice* implies that each person individualizes and approaches the behavior a little bit differently. For example, Cherrier (2006, p. 520) found that some people refuse to use plastic bags, while others use them occasionally. Some use their reusable bags only for shopping while others carry many different items in the bags. The proposed plan allows for personalization. For example, use of plastic bags is not necessarily viewed as a negative behavior because increased recycling is an important component of the proposal. For example, participatory behaviors may include using only plastic bags but increasing recycling behavior, using some plastic bags and some reusable bags, using only Crimson Tide reusables at participating stores, or choosing to eliminate plastic bags from shopping behaviors entirely. In addition, people can certainly use the Crimson Tide reusable bags in other ways like carrying them to game day parties, using them for shopping all over town not just participating stores, or using them as gift bags, purses, and so on. The final concept from Cherrier's (2006, pp. 520-521) research is *identity formation* meaning that shoppers in the study using reusable bags indicated that the behavior contributed to aspects of the individuals' identity over time implying that identity is a concept that is always changing and evolving. In addition, use of reusable bags which could be labeled as participation in a *micro*-social behavior helped the participants in that study determine how they identified with a *macro*-social issue (Cherrier, 2006, p. 521). The UA football team already seems to be a part of the identities of students and others in the Tuscaloosa area. For example, I came across a child in the community named Crimson and as mentioned team logos are extremely common place on vehicles, clothing, and even advertisements throughout the area. Reusable Crimson Tide shopping bags could tap into

existing identity formations associated with the football team and expand and change identities to include action toward the purpose of decreasing waste on and around campus and/or increasing recycling behaviors while also improving ties between the university and the surrounding community.

Conclusions

Seventy-seven percent of surveyed UA students indicated that plastic bags are harmful to humans and the environment, and an even larger majority, 90.6%, use plastic bags more often than reusable. Students' dominant attitude toward single-use plastic bags is not consistent with dominant behavior or how they use plastic bags. As described by Smith and Mackie (2003, p. 325), findings suggest that the attitude does not affect behavior unless it has a strong presence or stimulus at the forefront of a person's conscious mind. Present stimuli in retail environments are strong enough that generally consumers will use plastic bags despite conflicting attitudes. However, the data collected suggest that reusable bags are not necessarily the solution. Written comments by respondents conveyed the message that while many students realize plastic bags are not *necessary*, they are *convenient*. In addition, thirty-four percent of survey participants feel plastic bags are a necessary part of their shopping experience, and 46.5% would feel a violation of personal choice if plastic bags were banned from shopping centers. The most popular choice for limiting plastic bag waste among UA students was offering a store discount for using reusable bags at 77.9%. Students in support of charging for plastic as the only option or charging in combination with other methods were 9.7% and 24.6% respectively. Nevertheless, 44.1% reported that they had bought reusable shopping bags before. Though owning a reusable bag is not a strong enough stimulus to change plastic bag behavior, this act of buying reusable

bags is a behavior congruent with the attitude expressed in the fact that store discounts for using reusable shopping bags were the most popular choice for reducing plastic bag use. The discount may be the missing stimulus needed to derive consistency between student attitude and student behavior regarding single-use plastic bags. Recycling of plastic bags among UA students is low. An increase in use of reusable shopping bags combined with increased recycling of single-use plastic bags by the UA community will help improve campus sustainability and decrease overall waste.

The results of this explorative research project provide insight into attitudes and behaviors of students at the University of Alabama regarding the single-use plastic shopping bag. A plan was proposed according to data results that may be used for decreasing waste on campus while also improving UA's score on the College Sustainability Report Card from a B+ to an A. Ideally, additional research should involve a hands-on, student driven approach to implementing a plan similar to the one outlined above. Other research avenues may involve documentation of success or failures of such a program and additional ways to improve campus sustainability and other environmentally related connections between the campus and greater Tuscaloosa communities.

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Appendix A

Participant Information Sheet

"Attitude and Action Regarding the Single-use Plastic Shopping Bag on the University of Alabama's Campus"

You are invited to participate in a research study conducted by Kate Miller, from THE UNIVERSITY OF ALABAMA Department of Geography & Environmental Planning. I hope to learn about the opinions and use of single-use plastic shopping bags at the University of Alabama. These bags, which are given to customers for free in grocery stores and other retailers, are a common part of many people's lives. You were selected as a possible participant in this study because you are a student at the university.

Participation is completely voluntary. If you decide to participate, you will be asked to take a brief survey to measure your views of plastic bags and how you use them in your personal life. The survey may take approximately five minutes.

If you are interested in this topic, I would be happy to email you findings of the study at your request. However, choosing to participate in this study will not necessarily benefit you personally.

Volunteers' identities will be kept confidential. The only descriptive information collected is age and sex. Your name is not required.

Whether or not you participate is entirely your choice. Your decision will not affect your relationship with The University of Alabama. If you choose not to participate, no penalties will occur. You are also free to discontinue participation at any time during the survey without penalty.

If you have any questions or concerns, please do not hesitate to contact me at (828) 279-1223 or via email at kebailey2@crimson.ua.edu, University of Alabama Box 870322 Tuscaloosa, AL 35487. My advisor, Dr. Steinberg, may be reached at (205) 348-0349, University of Alabama Box 870322 Tuscaloosa, AL 35487. These address locations are within Farrah Hall on campus. If you have questions or concerns regarding your rights as a research participant you may contact The University of Alabama Research Compliance Office.

You may detach and keep this letter for your records.

UA IRB Approved Document
Approval date: 12/7/10
Expiration date: 12/6/2011

Appendix B

Plastic Bag Survey

This survey is intended to measure opinions and behaviors regarding single-use plastic shopping bags which are given to customers for free in grocery stores and other retailers.

The information collected will be used for a University of Alabama student's masters thesis entitled "Attitude and Action Regarding the Single-use Plastic Shopping Bag on the University of Alabama's Campus."

The information gathered is confidential. No direct references will be made to individual names. A summary of results will be provided to any participant who makes a request.

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1. What is your age?
    a. Below 18
    b. 18 – 22
    c. 23 – 25
    d. 26 +

2. What is your sex?
    a. Male
    b. Female

3. Do you think single-use plastic shopping bags have *notable* negative consequences for humans and the environment?
    a. Yes
    b. No

Comments:_____
_____

4. Do you view single-use plastic shopping bags as a necessary or unnecessary part of your shopping experience?
    a. Necessary
    b. Unnecessary

Comments:_____
_____

5. Have you ever bought a reusable shopping bag with the intent of using less single-use plastic shopping bags?
    a. Yes
    b. No

Comments:_____
_____

6. Plastic bags are manufactured using ethylene gas which is derived from crude oil. In your opinion, is this a problem?
    a. Yes
    b. No

Comments:_____
_____

7. Which do you use more often at the checkout counter when shopping?
    a. Single-use plastic bags
    b. Reusable bags

Comments:_____
_____

8. What do you do with your single-use plastic shopping bags after putting away your groceries and other goods?
    a. Store them for recycling or reuse
    b. Throw them away
    c. Store some and throw some away
    d. I do not use them

Comments:_____
_____

9. If you answered "d." to question 8, skip to question 10. Do you bring plastic shopping bags to local collection sites, such as Publix or Wal-Mart for recycling?
    a. Yes
    b. No

Comments:_____
_____

10. Would you like to use less plastic in your life?
    a. Yes
    b. No

Comments:_____
_____

11. If you answered “no” to question 10, skip to question 12. If you answered yes to question 10, as a consumer do you feel you have enough options or opportunities to reduce the amount of plastic used in your life, but still get the products you want?
    a. Yes, I have enough opportunities to use less plastic, but I just need to change my habits.
    b. No, as a consumer I want to use less plastic, but current circumstances make this difficult.

Comments:_____
_____

12. For question 12, choose all that apply. Would you support any of the following circumstances?
    a. A ban so that single-use plastic shopping bags can no longer be offered and customers would have to bring their own bags to carry purchased goods
    b. A store discount of 5-10 cents per reusable bag that the customer uses when checking out, but plastic bags will still be available to customers for free
    c. Requiring customers to buy each plastic bag used for 5-10 cents if they prefer to use single-use plastic shopping bags over reusable shopping bags
    d. I would not support any of the above circumstances

Comments:_____
_____

13. Would you feel that your right to personal choice as a consumer would be violated if single-use plastic shopping bags were banned from shopping centers?
    a. Yes
    b. No

Comments:_____
_____

14. Prior to participation in this survey, were you aware plastic shopping bags and associated problems are currently a topic of debate in various parts of the United States and the world?
    a. Yes
    b. No

Comments:_____
_____

15. On a scale of 1-5, how important are environmental issues to you? (1 being not important at all and 5 being extremely important.)
    a. 1 b. 2 c. 3 d. 4 e. 5

Comments:_____
_____

Appendix C

Sample Portion of Coded Data Spreadsheet

ID	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
1	2	2	1	2	2	1	1	1
2	2	2	1	2	2	1	1	3
3	2	1	2	2	2	2	1	1
4	2	1	2	2	2	2	1	3
5	2	1	2	1	2	1	1	1
6	2	2	2	1	2	1	1	1
7	2	1	2	1	2	2	1	3
8	2	2	1	2	1	1	1	1
9	2	2	1	2	2	1	1	1
10	2	2	1	1	2	2	1	1
11	2	2	1	2	1	1	1	3
12	2	0	2	1	1	1	1	0
13	2	2	1	1	1	1	1	3
14	2	2	1	1	1	1	1	1
15	2	2	2	1	2	1	1	3
19	2	2	1	1	1	1	1	3
20	2	1	1	1	2	1	1	3
21	2	2	1	2	1	1	1	3
23	2	2	1	2	2	1	1	1
24	2	2	1	1	1	1	1	3
25	2	2	1	1	1	1	2	1
26	2	1	1	1	2	1	1	3
27	2	1	1	2	2	1	1	1
29	2	1	1	2	1	1	2	1
32	2	1	2	2	2	2	1	1
33	2	1	1	2	1	1	1	1
35	2	1	1	2	1	2	1	1
36	2	1	1	2	2	1	1	1
38	2	1	1	2	2	1	1	1
39	2	1	1	2	1	1	1	1
40	2	1	1	2	2	1	1	1
41	2	2	1	1	2	1	1	1
42	2	2	1	2	2	1	1	1
43	2	2	1	2	1	1	2	1
44	2	2	1	1	2	1	1	1
45	2	1	1	2	2	1	1	3
46	2	2	1	2	1	0	1	1
47	2	1	1	2	2	1	1	3
49	2	1	1	1	2	2	1	3