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Understanding Cigarette Butt Littering Behavior on Public Beaches: a Case Study of Jekyll Island, Georgia

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UNDERSTANDING CIGARETTE BUTT LITTERING BEHAVIOR ON PUBLIC BEACHES: A CASE STUDY OF JEKYLL ISLAND, GEORGIA

by

Maranda R. Miller

A THESIS

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UNDERSTANDING CIGARETTE BUTT LITTERING BEHAVIOR ON PUBLIC BEACHES: A CASE STUDY OF JEKYLL ISLAND, GEORGIA

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University of Nebraska, 2017

Adviser: Mark E. Burbach

The world’s natural environment is degrading, and human behavior is a leading cause. Therefore, in order to address environmental problems it is important to understand the factors driving environmentally degrading behaviors and subsequently design behavioral interventions to alter undesirable behaviors.

One environmental issue of particular concern is toxins leeching from trash. Specifically, cigarette butts are of concern due to their prevalence in the environment. Cigarette butt discarding behavior is affected by personal attributes, but data regarding which personal attributes and how these affect discarding behavior is lacking. This thesis seeks to understand cigarette butt disposal on public beaches by exploring “what influences smokers to improperly discard cigarette butts when visiting a public beach?”

A mixed mode design utilized quantitative and qualitative data to study improper cigarette butt disposal. A questionnaire was designed to test theories related to place attachment, environmental attitudes, habits, and environmental awareness as predictors of improper cigarette butt disposal. A qualitative inquiry further explored the phenomenon of cigarette butt littering from the participant’s point of view.

Environmental attitudes, environmental awareness, and habits were significant predictors of improper cigarette butt disposal behavior. Interviews illustrated that “improper disposers” experienced themes involving uncertainty that cigarette butts are
litter, a lack of knowledge, problems with cigarette receptacles currently in place, the requirement of a conscious choice about how to discard a “butt,” and statements that contradicted the behavior observed. Interviews with “proper disposers” illustrated themes that cigarette butts are litter, awareness of social constructs, cumulative effects of cigarette butts on the beach, minimal obstacles to discarding properly, and feelings of personal responsibility.

Recommendations for decreasing improper cigarette butt disposal include: promoting pro-environmental attitudes, altering habitual improper discarding behaviors, promoting environmental awareness of how cigarette butts negatively impact the environment, minimizing barriers to proper discarding, increasing place attachment, and changing policies about cigarette receptacles on beaches.

**Key words:** cigarette butt disposal, public beach, place attachment, environmental attitudes, environmental awareness, habits, mixed-mode methods
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CHAPTER 1 - Introduction

Human Behavior Causes Environmental Degradation

The world’s natural environment is consistently being degraded, and human behavior is the cause of much of that. For example, soil quality is degraded by the use of pesticides, by the disposal of our waste into landfills, and by chemicals that leech into the soil from daily consumption activities (Patterson, 2016). Air is becoming polluted through our use of fossil fuels to power our vehicles and our industrial factories (Patterson, 2016). Our water supplies are depleted due to large agricultural and personal use demands, and water is becoming toxic to people, plants and animals due to chemical runoff from city streets, industrial operations, and oil spills among a myriad of other causes (Patterson, 2016).

One pollutant that is of particular concern, due to its categorization as “one of man’s most widespread pollutants” is trash (Anderson, 2006). More specifically, cigarette butts are a considerable problem, and particularly those that end up in ecologically sensitive areas such as beaches and subsequently in the marine environment.

The Ocean Conservancy is working to combat the issue of trash in our oceans by hosting coastal cleanups where thousands of volunteers collect debris along beaches and waterways each year. During the Ocean Conservancy’s 2014 International Coastal Clean-Up, 561,895 volunteers in 15 countries cleaned up trash along waterways (including rivers, lakes, streams, ponds and oceans). In total, these volunteers collected over 16,000,000 pounds of trash, with the top five items being: 1) cigarette butts (2,248,065
butts), 2) food wrappers (candy, chips, etc.) (1,376,133), 3) plastic beverage bottles (988,965), 4) plastic bottle caps (811,871), and 5) straws and stirrers (519,911) (Ocean Conservancy, 2015). As these statistics clearly illustrate, trash in our waterways is a large problem, and cigarette butts are a huge portion of that.

**Problems with Cigarette Butts**

Cigarette butts cause problems when they are discarded onto the ground for a number of reasons. These include environmental degradation due to plastic-filter fibers persisting in the environment, toxic chemicals leaching into the environment, those chemicals negatively affecting living organisms, and animals ingesting cigarette butts. Additionally, humans can be negatively impacted by cigarette butts improperly discarded into the environment as children can ingest these butts and individuals may be exposed to the chemicals leeching out of the butts.

**Filters are not easily broken down.** Filters found within the cigarette butt that are used to hold the cigarette’s shape, control the flow of smoke, and prevent tobacco from entering the smoker’s mouth do not break down in the environment (Solvay, 2016). Most filters in cigarettes (97%) (Solvay, 2016) are made of cellulose acetate (plasticized fibers) and although environmental conditions can break the filters into smaller pieces, the material has a very slow degradation rate depending on site-specific conditions (Clean Virginia Waterways, 2016; Puls, Wilson, & Holter, 2011; and Robertson, Thomas, Suthar, & Brown, 2012). Due to its inability to biodegrade, cellulose acetate never fully disappears from the environment but can instead accumulate in water and soil, thus contributing to the pollution of the world’s natural resources (Novotny, Lum, Smith,
Wang, & Barnes, 2009). Given the sheer number of discarded cigarette butts retrieved from the environment, the impact is likely considerable.

**Toxic chemicals leech into the environment.** Cigarette butts contain toxic chemicals that leech into the environment. One study by Moerman and Potts (2011) examined metals that leached from smoked cigarette litter. They collected smoked cigarette butts from receptacles on buildings of the University of Tennessee-Chattanooga campus and tested for toxic metals including aluminum, barium, cadmium, chromium, copper, iron, manganese, nickel, lead, strontium, titanium, and zinc. It was discovered that 11 of the 12 metals (cadmium was the exception), were found in quantifiable amounts in an aqueous solution after only 1 day of soaking (Moerman & Potts, 2011). Again, implications of this finding are vastly multiplied when it is considered that over 2 million cigarette butts were removed from the environment in 2014 by one organization alone.

**Toxic chemicals affect living organisms.** As illustrated in the previous paragraph, toxic chemicals from cigarette butts leech into the environment. Not only is that a problem for inorganic ecosystem components, but those leached toxins can pose a problem to animals as well. Micevska, Warne, Pablo, and Patra (2005) demonstrated the dangers of organic compound toxicity in cigarette butt leachates to aquatic life such as *Ceriodaphnia cf. dubia* (freshwater water flea) and *Vibrio fisheri* (tropical and subtropical water bacteria). In their experiment they identified nicotine and ethylphenol as the suspected main cause of toxic compounds found in the two species. They also noted that the different toxicity levels found in the two species demonstrated how “toxicity data
for how cigarette butts effect on one species could not predict or model the toxicity of cigarette butts to the other species” (p. 205). This finding is of particular concern due to the many species that have not been studied in order to understand how cigarette butts negatively impact them (Micevska et al., 2005). Additionally, by understanding that cigarette butt toxins can be absorbed by some of the smallest members of the food chain, we can infer bioaccumulation throughout the food web is probable.

**Ingestion of cigarette butts in animals.** In addition to the chemicals leached from cigarette butts, accidental ingestion of the butts is also a problem for animals. A study of 34 green sea turtles that stranded on the beach in southern Brazil found that the turtles had been feeding on a variety of human-made debris. The gastrointestinal section (i.e., the esophagus, stomach and intestines) of each animal was analyzed and debris was quantified and sorted by type. Cigarette butts were amongst the debris that was found in addition to many types of plastic, foam, cloth, rubber, and other assorted items (Tourinho, Ivar do Sul, & Fillmann, 2010).

**Hazards of cigarette butts to humans.** Ingestion of cigarette butts is also problematic for humans and can occur in children due to their tendency to explore by putting items in their mouths. In their 2014 year end summary, the American Association of Poison Control Center (AAPCC) reported that exposure to tobacco/nicotine/e-cigarette products was one of the top 25 substances that involved pediatric patients (less than 5 years old) with the AAPCC taking 10,452 calls involving this type of poisoning (Mowry, Spyker, Brooks, McMillan, & Schauben, 2015). Nicotine poisoning by ingestion occurs because nicotine (a pesticide found in cigarettes) is absorbed by the oral mucosa and
intestine. Symptoms typically develop in under 4 hours and most commonly present as vomiting (Hulzebos, Walhof, & de Vries, 1998). Additional health hazards to humans include the leachates as mentioned above, which can expose humans to heavy metals and chemical residues not typically found in natural environments (Novotny, Hardin, Hovda, Novotny, McLean, & Khan, 2011).

Cigarette Butts on Jekyll Island

**Jekyll Island’s natural resource protection.** Jekyll Island is a 7-mile long barrier island off the coast of southern Georgia (see figures 1, 2, and 3). The island is owned by the state of Georgia, and its character can be captured by its nickname; “Georgia’s Jewel.” A “self-supporting state agency” known as the Jekyll Island Authority is “responsible for the overall management and stewardship of Jekyll Island” (Jekyll Island, 2016). The island is managed for conservation of natural resources as well as family-friendly tourism activities. According to the Master Plan of the Jekyll Island Authority “Jekyll Island is a unique, state-owned barrier island that balances conserving and preserving natural, historic, and cultural resources with providing accessible, affordable recreation, vacation, and education opportunities for the people of Georgia and beyond” (Jekyll Island Authority, 2014b, p. 4). The guiding principles of the Jekyll Island Authority also state that they will “provide stewardship to conserve, maintain, manage, and restore natural resources and species diversity” (Jekyll Island Authority, 2014b). With this bold, and important commitment to natural resource conservation, it can easily be understood why cigarette butt litter on Jekyll Island must be explored so that behavioral interventions that work to alter this destructive behavior can be established.
Figure 1. Map of the United States showing Georgia outlined in bold and Jekyll Island as a yellow dot.

Figure 2. Map of Georgia outlined in black and Jekyll Island as a yellow dot.

Figure 3. Map of Jekyll Island.
**Cigarette butts found on Jekyll Island.** The Georgia Sea Turtle Center, located on Jekyll Island, established a marine debris collection project for their volunteer team in 2007 after seeing a need for short-term volunteer projects, as well as the need to prevent beach litter from entering the marine environment.

This program utilizes volunteers to clean up the beaches, and volunteers track the debris they find using the Marine Debris Tracker App from the College of Engineering at the University of Georgia. The Georgia Sea Turtle Center volunteer program also works with the Ocean Conservancy to record debris found on Jekyll Island’s beaches. The entire area designated as beach habitat on the island is divided into kilometers (1-15) and volunteers document debris found within each of these designated kilometers. Through these two tracking methods and countless hours donated by Georgia Sea Turtle Center volunteers, staff, AmeriCorps members, and interns, the type and amount of marine debris found on Jekyll Island has been, and continues to be, quantified. It is through these methods that over 14,250 cigarette butts have been retrieved from the beach (University of Georgia, 2016 and Georgia Sea Turtle Center, 2015). These cigarette butts make up 36% of the total number of plastic debris found on Jekyll Island between the years 2012-2015 (University of Georgia, 2016 and Georgia Sea Turtle Center, 2015).

**Jekyll Island’s tourism industry.** It is important to understand that Jekyll Island is a tourist locale. As such, approximately 1 million people visit the island annually (Jekyll Island Authority, 2015). Because of this, the island’s economy relies heavily on tourism, and this tourism contributes to the overall economic status of Glynn County. According to the Glynn County (2014) report the unemployment rate in Glynn County is
consistently within one point of the rest of the state, primarily due to tourism. Therefore, maintaining the tourism industry on Jekyll Island is necessary.

**Cigarette litter effects on tourism.** Importantly, litter on the beach has the potential to cause economic loss due to lower tourism rates. Tourists choose beaches for many reasons, but Vaz, Williams, Silva, & Phillips (2009) indicated that scenery was the main contributing factor for 20% of tourists in Portugal, and 21% of tourists in Wales. Cleanliness of the beach was also noted as a reason for choosing a beach in 21% of Portugal tourists and 10% of Wales tourists. Conversely, 17% of Portugal beach users and 29% of Wales beach users indicated that the lack of cleanliness was the most unpleasant aspect of the beach. Another study by Tudor and Williams (2003) analyzed tourist perceptions of beach debris on resort beaches and semi-resort beaches in Pembrokeshire, Swansea, and Bridgend across Wales in the United Kingdom. They found that the most offensive items to tourists were those that were potentially harmful (such as syringes), but cigarette butts ranked in the top 20 most offensive items in 7 out of their 8 study sites. This finding clearly illustrates tourist dissatisfaction with cigarette butts on the beach.

These two studies may be particularly relevant to Jekyll Island even though Tudor and Williams’ (2003) study focused on a different culture because in Wales, UK the development of the seashore is “strongly restrained due to climate, [so] natural features, such as the surrounding scenery tend to me more highly valued” (Vaz, et al., 2009, p. 1164). This is similar to Jekyll Island’s landscape where 65% of the land must remain undeveloped, buildings must be set back from the shore, the dunes must be protected, and
there is an overall air of valuing the natural scenery over development of the shoreline (Jekyll Island Authority, 2014a). Given that Jekyll Island is so dependent on tourism, and tourism rates can be affected by cigarette butt debris on the beach, it is important to understand cigarette butt discarding behavior in order to work towards preventing improper disposal.

**Impacting Environmental Issues by Studying Human Behavior**

The world’s natural environment is being degraded and human behavior is the cause of much of that degradation. Therefore, efforts to reduce environmental degradation would benefit from a better understanding of human behavior (Penn & Mysterud, 2009, p. 1). Unfortunately, biological and social sciences often are not integrated to solve conservation issues from a human behavior perspective (Penn & Mysterud, 2009). In order to impact environmental issues that stem from human behavior it is imperative to study behaviors and design targeted behavioral interventions aimed at altering those environmentally degrading practices. In this case, cigarette butts existing in the natural environment is the environmentally degrading issue of concern. Therefore, this study addresses that problem by studying improper disposal behaviors of cigarette smokers.

**Purpose Statement**

The purpose of this study is to investigate factors that influence the improper disposal of cigarette butt behavior. The data gathered in this study will provide information that will allow the Jekyll Island Authority to take steps in combating
improper cigarette butt discarding behavior, thus protecting the environment on Jekyll Island and sustaining the island in a state that is welcoming to tourists and maintains the economy of the island.

**Research Question**

What influences cigarette smokers to improperly discard cigarette butts when visiting a public beach?

**Guiding questions to address this issue are:**

- Do smokers who improperly dispose of cigarette butts on a public beach have a habit of improperly discarding cigarette butts elsewhere?
- What role does place attachment play in smokers who improperly dispose of cigarette butts on a public beach?
- Are smokers who have pro-environmental attitudes more or less prone to improperly discard their cigarette butt on a public beach?
- What role does awareness of the environmental impact of cigarette butts play in smoker’s discarding behavior?

**Definition of Terms**

These definitions were used to guide the research project. They will be used throughout this inquiry.

*Beach:* The beach was classified as any area between the edge of the dunes (the vegetated, elevated sandy areas) and the water’s edge. This means that all areas from the dune vegetation edge and inland were excluded from the “beach.” Surveying on the
beach included participants who were out on sandbars that became exposed at low tide, and participants who were walking along the water’s edge with their feet in the water. Also, it is important to note that Jekyll Island beaches are very dynamic and experience large tidal shifts; some days the “beach” was very narrow, and other days the “beach” was very wide depending on the tides.

*Proper cigarette butt discarding:* Properly discarding a cigarette butt consisted of discarding it into an ashtray the individual brought with them, a black cigarette receptacle installed onto the trash can poles found on the beach by the researcher, a trash can, a drink container, or other receptacle the participant provided themselves.

*Improper cigarette butt discarding:* Improperly discarding a cigarette butt meant getting rid of the cigarette butt anywhere other than the previously named “proper” receptacles. This included tossing the butt onto the sand, into the water, missing the trash can, or setting the butt beside oneself (often participants created small piles of cigarette butts near their belongings, but it was impossible to determine if they would remove those butts from the beach when they left for the day, or leave them there. For this reason, these piles were considered improper even if the smoker may have picked them up when they left the beach).
CHAPTER 2 - Literature Review

Introduction

Littering is often an issue with individuals’ behavior rather than a collective societal problem in trash disposal. To underscore this point “the nation’s largest litter study” done by Keep America Beautiful in 2009 found that; (1) 70% of the litter 4 inches or larger found along a roadway could be attributed to motorists and pedestrians, (2) 95% of litter at “transition points” (areas where individuals consuming a food or tobacco products are required to discard the product before entering) was attributed to pedestrians, and (3) 98.5% of the litter in recreation areas such as parks, beaches, and open areas where leisure activities take place was attributed to pedestrians (Keep America Beautiful, 2010). Due to the fact that litter is primarily caused by individuals, it is important to understand factors that lead to an individual’s littering behavior. By understanding the reasons behind an action, we can work to effectively target those reasons and subsequently alter littering behaviors.

Additionally, it is important that research studies are grounded in theory as this provides a framework in which the researcher can reasonably predict the outcomes of the interactions they wish to explore. By understanding what results one can reasonably “expect” to get, they can then provide support for the existing theory that was utilized, disprove that theory, or contribute to refining the theory because it did not function as expected within the context of the study.
This literature review will provide background for this mixed mode study by addressing how littering behavior has been studied in terms of contextual and personal factors. Cigarette littering will be discussed specifically unless that data is not available, then it will refer to the littering of general trash. The study explores the research topics of habits, place attachment, environmental attitudes, and awareness of environmental consequences have been studied, paying special attention to how these topics could be extrapolated to cigarette butt litter. Finally, it will discuss the theories underpinning the constructs that were used to generate the hypotheses for this study.

**Contextual Factors**

For the purposes of this thesis contextual factors are those that relate to “external” experiences or influences on a person’s behavior. External factors are items that influence a person’s discarding behavior and are derived from a source outside of that person. For example, contextual factors that have previously been studied regarding cigarette butt littering are inconsistent law enforcement, social norms, and disposal receptacles.

**Inconsistent law enforcement.** All states have litter laws, however, penalties and enforcement efforts vary widely. Often penalties depend on the amount, type, and location where litter is discarded and the penalty typically increases for repeat offenders in all states (Schultz & Oleen, 2014). The National Conference of State Legislature’s webpage titled “States with Littering Penalties” provides insight into how diverse litter laws can be. According to their website, “weight or volume of litter determines the severity of the crime” in 10 states while “other states focus on the type of litter” and some
states assign penalties based on the location of the littering act “such as public highways, coastal areas, and recreational areas” (National Conference of State Legislature, 2014).

Unfortunately, due to the variability in law enforcement across the nation there is not a standardized method for, or consensus about, how cigarette butt litter should be handled which can lead to non-uniformity in smoker’s beliefs about how they should dispose of their cigarette. This could be an especially big issue if the smoker is in an area they are unfamiliar with, and thus, unfamiliar with local laws.

Social norms. Cialdini and Trost (1998) define social norms as “rules and standards understood by a group that guide and/or constrain human behavior” (p. 152). They are also cues that help people interpret social situations and thus determine how they are supposed to behave (Cialdini & Goldstein, 2004). Research from the social sciences indicates that it is important for individuals to know how to behave in social situations because this can promote social acceptance and can help individuals avoid social sanctions (Cialdini & Goldstein, 2004). It is reasonable then to expect that social norms would influence littering behavior and in fact, there are many studies that support this expectation. During an observational study funded by Keep America Beautiful, individuals were “much more” likely to litter in environments where litter was already present (Schultz & Stein, 2009). A study by Cialdini, Reno, and Kallgren (1990) observed the same behavior when they recorded 32% of individuals littered in an area that was already littered versus only 14% of individuals that littered in litter-free environments. In the two studies mentioned above, the descriptive norm that littering was acceptable in that area was demonstrated by the presence of litter.
However, injunctive social norms (perceptions about which behaviors are typically approved or disapproved of within a social setting) also come into play when an individual is deciding if they should perform a behavior or refrain from one (Cialdini, 2003). Interestingly, Novotny et al. (2009) stated that cigarette butt littering is “mostly ignored” among smokers and “it may even be a part of the smoking ritual” (p. 1700). In the 2013 Litter Attitudes and Behaviors study, 68% of respondents said that they threw butts out due to habit (Texas Department of Transportation, 2013). Therefore, it appears that the injunctive norm among the smoking community is that littering cigarette butts may simply be accepted and approved of behavior.

**Disposal receptacles.** Studies about reducing cigarette butt littering have demonstrated cigarette littering behaviors to be affected by cigarette receptacle availability and convenience. For example, the “Litter in America” study by Keep America Beautiful (2010) included 130 locations across 10 different states made up of fast food, recreation areas, gas stations, city centers, rest stops, medical/hospital areas, bars/restaurants, convenience stores and retail areas. Sites were evenly split between rural, urban, and suburban. Observations of the study sites indicated that out of the 130 locations 91% of them had at least one trash receptacle, but ashtrays of any kind were found at only 47% of the sites. A study conducted in Santa Barbara, California discovered that receptacles specifically designed for cigarette butt disposal influenced discarding behavior (Bagley, Salazar, & Wetmore, 2012). Out of the smokers surveyed, 54% of them noted that they avoided using trash cans to dispose of cigarette butts for fear of causing a fire, and 21% of them noted concerns that throwing cigarette butts into a
regular trash can was simply a “gross” act. Importantly, 64% of the smokers cited the lack of an ashtray or trashcan as the main reason for their improper disposal of a cigarette butt, and “65% of them reported that more ashtrays would motivate them to properly dispose of their cigarette” remains (p. 13).

Schultz et al. (2013) found that the “convenience” of trash receptacles is also important. Their data did not allow an “optimal disposal receptacle distance” to be determined. However, it demonstrated that the lowest amount of littering occurred when receptacles were “close at hand.” For general littering (including all litter types, not just cigarette butts) the lowest littering rate (12%) was obtained when trash receptacles were less than 20 feet from the individual when they had a piece of trash to discard. The rate of littering progressively increased as the distance increased from 21 to 60 feet, then after the individual was more than 60 feet from a trash receptacle the litter rate remained “relatively” constant at 30%. Additionally, Schultz and Stein (2009) studied cigarette butt littering specifically and found that when cigarette butt littering occurred, on average, individuals were 31 feet from a cigarette disposal receptacle.

While it is clear that context plays an important role in cigarette littering behavior (38% of cigarette litter across 130 study sites in 10 states can be attributed to contextual factors such as the availability of disposal receptacles and presence of existing litter) an even larger portion (62%) is attributed to personal factors such as awareness, attitudes, and feelings of personal responsibility (Schultz & Stein, 2009). Given the large effect that personal factors may have on cigarette littering behavior, it is important to study these components.
Personal Attributes

While research has shown that littering is largely due to individuals’ behavior, studies of personal attributes that contribute to littering behavior are difficult to find, and vary in the topics they have studied. Personal attributes that have been explored include demographic information, personal attitudes, intentions, feelings of obligation, and awareness of consequences.

**Demographic information.** Demographic information from various samples of litterers has been collected and analyzed in a number of studies (e.g., Finnie, 1973; Geller, Witmer, & Tuso, 1977). The studies’ findings conflict with one another on gender as a predictor of littering behavior. Some studies support gender as a predictor (Meeker, 1997; Torgler, Garcia-Valinas, & Macintyre, 2008) while others have shown that gender does not predict littering behavior (Finnie, 1973; Geller et al., 1977; Schultz et al., 2013; Williams, Curnow, & Streker, 1997). The other most commonly examined demographic variable in predicting littering behavior is age, and younger individuals have been found to litter more often than older individuals (Durdan, Reeder, & Hecht, 1985; Finnie, 1973; Heberlein, 1981; Krauss, Freedman, & Whitcup, 1978; Schultz & Stein, 2009; Schultz et al., 2013).

**Intentions.** Intentions have also been studied and can reveal information about individual’s cigarette littering behavior. A study by Schultz et al. (2013) observed smoker’s behavior and noted how the cigarette butt was discarded. They used measures from Williams et al. (1997) to code behavior in order to interpret it. The behaviors were categorized as “drop without intent, drop with intent, flick, shoot and miss, inch away,
wedge, sweep, or 90%” (p. 42). The “90%” codes included instances where the individual collected other items for proper disposal but intentionally left one or more objects behind” Schultz et al., 2013, p. 42). All of these categories were classified as variations of “with intent,” except for the first category “drop without intent” which was meant to capture accidental cigarette discarding behavior. It was found that in 81% of the cigarette disposal instances the cigarette was discarded “with intent” (Schultz et al., 2013). This demonstrates that in most cases cigarette butt litter occurs intentionally, not because of an accident.

**Personal obligations.** The observation that cigarette discarding behavior is intentional begs the question “what causes people to improperly discard their cigarette butts?” To date, in-depth studies of this question do not exist. However, personal obligations have been shown to play a role in moderating cigarette littering behavior. In a study conducted by Schultz and Stein, 2009 it was found that smokers who believed littering was wrong, and thus felt a personal obligation not to litter, were observed littering less often, and self-reported that they did it less often. What is unclear though is how these smokers came to classify cigarettes as litter and thus understand that throwing them on the ground is “wrong”. This is where an awareness of behavioral consequences comes into play.

**Awareness of consequences.** According to an online psychology dictionary, consequences are results of a behavior (Nugent, 2013). Therefore, awareness of consequences refers to a person’s understanding of the effects of a behavior they perform.
These consequences can be related to many subjects, but in this study it will refer to an individual’s awareness of the environmental consequences of their behavior. While most smokers (91.8% in a study of 2000 smokers and non-smokers across four U.S. cities) consider cigarette butts to be litter and thus believe that they should dispose of their butts appropriately; they may not know that cigarettes butts have components in them that do not break down in the environment, or that they can actually harm the environment and humans (Rath, Rubenstein, Curry, Shank, & Cartwright, 2012). Therefore, smokers may not understand the consequences of discarding them onto the ground beyond the idea that they are simply litter and therefore belong in a proper receptacle. For example, during a study conducted in Santa Barbara, California only “17% of the smokers surveyed knew that cigarette filters were made of plastic” (Bagley et al., 2012, p. 16). Additionally, an online survey conducted of members from the Research Now panel found that people who “did not consider cigarette butts to be litter were over three a half times as likely to report having ever littered cigarette butts and four times as likely to have littered cigarette butts in the past month.” The belief that cigarette butts were not litter was the only belief that predicted ever littering cigarette butts, or littering of them in the past month (Rath et al., 2012).

This awareness of consequences may also be impacted by a misunderstanding of what happens to cigarette butts when they are discarded. For example, in the Santa Barbara, California study from Bagley et al. (2012) participants had mixed beliefs about what happened to their discarded cigarettes. Many assumed that the butts discarded on streets were collected by others such as street sweepers and business owners. Yet others
thought that cigarette butts were treated with sewage water. This lack of understanding the environmental consequences of discarding a cigarette butt on the ground has great potential to influence an individual’s discarding behavior.

**Factors Being Studied in This Project**

Cigarette butt discarding behavior has been studied primarily in terms of contextual factors and personal attributes. However, researchers have yet to discover a way to mitigate the problem of improper disposal of them as can be confirmed by the removal of over 2 million cigarette butts from our waterways in one year (Ocean Conservancy, 2015). Recall that 62% of cigarette littering behavior was attributed to personal factors (Schultz & Stein, 2009), therefore, it is important to study cigarette littering from a personal attribute standpoint. However, while personal attribute data is present for cigarette discarding behavior, it is lacking in terms of consistency of topics studied and results, and its overall quantity as compared to the wealth of research on contextual factors; this thesis seeks to fill that research gap.

Due to this lack of cigarette littering-specific personal attribute research, this literature review will discuss how personal attributes affect pro-environmental behavior overall. This study assumes that proper cigarette butt disposal can be considered a pro-environmental behavior (where littering behavior is its inverse and thus, a non-pro-environmental behavior). The following section explores four personal attributes demonstrated throughout the literature to affect pro-environmental behavior and will then extrapolate these to cigarette littering behavior. These personal attributes are habits, place attachment, environmental attitudes, and environmental awareness.
Below, each construct is defined and discussed in terms of general environmental issues as well as their theoretical underpinnings. These constructs are then extrapolated to cigarette butt discarding, and theories used to generate the hypotheses for this study are outlined.

**Habits.** The modern habit construct has its roots in the behaviorist traditions of Thorndike’s (1898) law of effect, Hull’s (1943) formalized drive theory, and Skinner’s (1938) operant conditioning. As the construct has evolved, these reinforcement-based models of habit have been supplanted with theories that “capture[d] the complexity of action control and enable[d] integration of these opposing conceptualizations” (Wood & Rünger, 2016, p.11.2). Wood and Rünger (2016) provide a review of the current theoretical foundations of habit.

Habits are the tendency to repeat past behavior efficiently, and eventually automatically, as the behavior is performed frequently and extensively (Lally, Van Jaarsveld, Potts, & Wardle, 2010; Neal, Wood, Labrecque, & Lally, 2012). It is argued that contextual clues and frequency of the behavior drive habit formation (Lally et al., 2010; Neal et al. 2012; Neal, Wood, Lally, & Wu, 2009). Neal et al. (2009) demonstrated the effect of contextual clues when they examined participant’s reactions to sports stadium images. They discovered that participants that frequently visited sports stadiums had a habit of speaking loudly in that setting. As a result, when those participants were given context clues (e.g. shown an image of a sports stadium) they responded by speaking loudly, such as they would typically do in that context. Lally et al. (2010) demonstrated the importance of context and frequency when they examined the habit
formation of 96 volunteers. The volunteers chose a behavior they wanted to perform (e.g., an eating or drinking activity) and were instructed to carry out the behavior daily, in the same context (such as “after breakfast”) for 12 weeks. They found that at the end of the study the participants that had performed the behavior more frequently were associated with a better model fit. Additionally, those participants experienced a steady increase in the automaticity of their chosen behavior, thus “supporting the assumption that repeating a behavior in a consistent setting increases automaticity” (i.e. habits) (p. 1006).

Habit strength also has an effect on the performance of a specific behavior. For example, Ouellette and Wood (1998) showed that future performance of non-habitual behaviors has been predicted by motivational factors such as attitudes, intentions, and self-concept, but these factors had less predictive power when the habit was strong, thus demonstrating that strong habits are not easily influenced. Neal et al. (2012) provided a concise summary of Danner, Aarts, and de Vries’ (2008) study as well as Lally et al.’s. (2010) work by noting that weak habits were “performed with lower frequency and/or in more variable contexts than strong habits” (p. 1).

Unfortunately, the effect of habits has not been studied in relation to cigarette littering behavior, and a literature search about general trash littering habits primarily turns up information about how individuals possess a habit of littering, rather than how habits can affect littering behavior. Despite this lack of information pertaining specifically to cigarette butts, the general habit formation information can be extrapolated to cigarette discarding. Habits develop from repeating a behavior, and smokers discard
many cigarettes per day, thus repeating a discarding behavior (Neal, Wood, & Quinn, 2006). Therefore, their chosen discarding behavior could develop into habitual, automatic behavior. Additionally, the mere presence of a cigarette butt to discard offers the contextual clue needed to form a habit. Therefore, the idea that a habit develops with a repetition of behavior and is activated by certain cues support the development of the hypothesis:

H1: smokers who improperly dispose of cigarette butts on a public beach will have a significantly higher habit of improperly discarding cigarette butts than smokers who properly dispose of cigarette butts on a public beach.

Place attachment. A second factor that may affect an individual’s littering behavior is place attachment. This component is important to understand because of its ability to be a precursor to, and a predictor of, environmentally responsible behavior (Hines, Hungerford, & Tomera, 1987; Oetama-Paul; Relph, 1976; Tuan, 1974; Vaske & Kobrin, 2001).

Place attachment theory has roots in Bowlby’s (1969) theory of attachment which referred to an attachment to people. Building from Bowlby’s theory, Relph (1976) considered attachment to place a fundamental human need. Tuan (1975) added to our contemporary understanding of place attachment by describing that places can be experienced through “strong visceral feelings” (p. 152). Modern place attachment theories continue to consider the feelings and moods that an individual can feel in relation to a “place” (e.g., Giuliani, 2003).
A popular current description of place attachment is that it is “an emotional bond between a person and a particular place” (Williams & Vaske, 2003, p. 838). It often takes into account the “intensity of the bond that people have with places and environments” (Floress, Akamani, Halvorsen, Kozich, & Davenport, 2015, p. 86). Importantly, place attachment often occurs “in an individual whose positively-valenced knowledge of the environment in question largely exceeds the negatively-valenced knowledge” (Giuliani, 2003, p. 151).

Most empirical research of place attachment treats attachment as a “multidimensional” construct. Two components, or dimensions, generally associated with the construct, albeit with some variation, are social bonding and rootedness (Riger & Lavrakas, 1981). Social bonding is identification with neighbors and feeling a sense of belonging to the group (Riger & Lavrakas, 1981). Rootedness is the “…extent to which a person is settled or rooted in her/his neighborhood” (Riger & Lavrakas, 1981, p. 59). Current research in place attachment usually includes dimensions of place identity (Proshansky Fabian, & Kaminoff, 1983) and place dependence (Stokols & Shumaker, 1981). Place identity is an emotional attachment to a place. It includes emotional and symbolic meanings that are “special” to an individual, and often because of this, the place is incorporated into one’s self-identity (Kyle, Absher, & Graefe, 2003; Kyle, Graefe, Manning, & Bacon, 2004; Proshansky et al., 1983; Warzecha & Lime, 2001). On the other hand, place dependence is a functional attachment to a place. This means that an individual is dependent on a place in such a way that they believe it is a “good” location for the specific activity they are interested in. Consequently, they are less interested in
performing that activity at another site that may be less suitable (Kyle et al., 2003; Kyle et al., 2004; Stokols & Shumaker, 1981; Vaske & Kobrin, 2001).

Place attachment has not been studied specifically in terms of littering or cigarette discarding behavior. However, it has been studied extensively in recreational settings and national parks, and primarily focuses on attempts to promote pro-environmental behavior in such settings (Hernandez, Martin, Ruiz, & Hidalgo, 2010; Kyle et al., 2004; Ramkissoon & Mavondo, 2014; Ramkissoon, Weiler, & Graham, 2012; Raymond, Brown, & Weber, 2010; Tonge, Ryan, Moore, & Beckley, 2014). Place attachment has also been studied on an “individual level” by examining landowner’s private land management decisions (Jorgensen & Stedman, 2001; Kunert, 2012; Kyle et al., 2003).

A few specific examples of the importance of place attachment to pro-environmental behaviors can be seen in Jorgensen and Stedman (2001) and Kyle et al. (2003). Jorgensen and Stedman surveyed lakeside property owners and found that the owners who had high place attachment were more willing to perform actions that protected the lake setting’s quality than those with lower place attachment ratings. Additionally, Kyle et al. (2003) surveyed recreationists on public land and discovered that as place identity increased, so too did their support for a fee program that benefited the recreational area, thus they were acting in what researchers categorized as a pro-environmental way. Therefore, an individual who feels attached to a place, and has taken this place on as part of their identity would be expected to act in a way that protects that place. This idea can be extrapolated to smokers to form the second hypothesis:
H2: smokers who improperly dispose of cigarette butts on a public beach have a significantly lower level of place attachment to that area than smokers who properly dispose of cigarette butts on a public beach.

**Environmental attitudes.** A third component that is important to understand when considering an individual’s environmental behaviors are their environmental attitudes. An attitude is defined as "a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor" (Eagly & Chaiken, 1993, p.1). Environmental attitudes build on that definition to also account for “how we relate to nature and our surroundings,” according to an online psychology dictionary (Pam, 2016).

The theory of planned behavior contributes to our understanding of how environmental attitudes can predict ecological behavior. This theory states that behavior is guided, in part, by one's attitude toward a specific behavior. These attitudes influence a person’s intentions. These intentions then join with a person’s perceptions of their behavioral control to influence the actual behavior they perform (Ajzen, 1991).

Therefore, environmental attitudes are important to understand in relation to littering behavior because they allow us to partially predict an individual’s littering behavior based on the attitudes they have towards that environment. For this reason, Newhouse (1990) states that environmental attitudes present promising ways to guide behavior in a more positive ecological direction (Newhouse, 1990).

However, even after extensive studies into the relationship between environmental attitudes and pro-environmental behavior the exact strength of the
relationship is not well understood. Hines et al. (1987) performed a meta-analysis of 128 studies that addressed the relationship between environmental attitudes and behavior. This analysis determined that there was in fact a positive relationship where individuals with stronger pro-environmental attitudes were more likely to engage in pro-environmental behavior than individuals with limited pro-environmental attitudes, but the relationship was weak.

Heberlein (1981) supports this weak relationship with his claim that “research on environmental attitudes has largely been atheoretical and noncumulative” (p. 241) while simultaneously claiming that these attitudes are “fundamentally important.” However, just because the exact method of how environmental attitudes effect behavior is not well understood does not mean that their potential to do so should be discounted. Diekmann and Preisendoerfer (2003) offer an explanation as to why different studies on this topic turn up different results. They believe that individuals perform pro-environmental behaviors in relation to the “cost” of the behavior to that individual. In their study, environmental attitudes were significantly correlated with low cost pro-environmental behaviors, such as recycling, but high cost behaviors such as driving less were not correlated strongly with environmental attitudes. Thus, signifying that individuals choose which pro-environmental behaviors to perform based partly on the “cost” of that behavior.

Environmental attitudes have not been studied specifically in cigarette butt discarding behavior. However, they have been studied in recycling, green purchasing/consumer action, and energy consumption behaviors (Balderjahn, 1988;
Diekmann & Preisendörfer, 2003; Grunert & Juhl, 1995; Lin & Huang, 2012; Sapci & Considine, 2014; Tseng & Hung, 2013; Vining & Ebreo, 1992). Each of these areas have shown that environmental attitudes have a significant effect on behavioral choices. For example, Vining and Ebreo (1992) demonstrated the important role environmental attitudes had in recycling behavior. They measured environmental concern and attitudes of residents in a medium-sized city and their recycling behavior. As voluntary curbside recycling programs were implemented across the city, they noted that recycling behaviors increased across the population. They also found that people who recycled exhibited stronger pro-environmental behaviors than individuals who did not recycle, and they found that recycling attitudes were moderately related to individual’s generalized concern for the environment. Mainieri, Barnett, Valdero, Unipan, and Oskamp (1997) also demonstrated the importance of environmental attitudes when they examined “green buying” (the practice of purchasing products that are environmentally friendly). They questioned individual’s buying habits and found environmental attitudes related to green products, and general environmental attitudes were among the most important predictors of products a consumer would purchase.

Therefore, these studies have demonstrated the ability for environmental attitudes to be a predictor of environmental behaviors. Using these studies and the theory of planned behavior, the third hypothesis is:

H3: smokers who improperly dispose of cigarette butts on a public beach have significantly lower pro-environmental attitudes than smokers who properly dispose of cigarette butts on a public beach.
Environmental awareness. The final variable addressed in this literature review in relation to an individual’s environmental behavior is environmental awareness, otherwise known as awareness of environmental consequences, or “knowing of the impact of human behavior on the environment” (Kollmuss & Agyeman, 2002, p. 253).

An individual must understand that their personal behavior has consequences in order to care about changing that behavior. This idea stems from two inter-related theories. The first, the value-belief-norm theory, states that an individual’s “intentions to perform pro-environmental behaviors include an awareness of the consequences” of their actions according to Hansla Gamble, Juliusson, and Garling (2008) who summarized colleagues’ work (Stern, 2000; Stern, Dietz, Abel, Guagnano, & Kalof, 1999; Stern, Dietz, Kalof, & Guagnano, 1995 in Hansla, et al., 2008). This means that the individual recognizes there are adverse environmental problems as a consequence of their behavior (Hansla, Gamble, Juliusson, & Garling, 2008). This awareness of consequences can in turn cause an individual to develop a personal or moral norm that subsequently guides their behavior to be more pro-environmental, as illustrated in the norm-activation theory of altruistic behavior (Schwartz, 1977).

Awareness of consequences has been indicated as a predictor of general pro-environmental behavior by a large number of studies (Bamberg & Möser, 2007; Cottrell, 2003; Finger, 1994; Hansla et al., 2008; Hines et al., 1987; Hopper & Nielsen, 1991). Environmental consequences of behaviors have been studied in household behaviors such as waste reduction, reuse of items, recycling actions, and green buying (Barr, 2007; Mainieri et al., 1997; Roberts, 1996). However, the bulk of the literature pertaining to
awareness of environmental consequences is focused on awareness campaigns and measuring their effectiveness (Campbell, de Heer, & Kinslow, 2014; Hartley, Thompson, & Pahl, 2015; Hopper & Nielsen, 1991; Maibach, 1993; Marion & Reid, 2007; Noe, Hull, & Wellman, 1982; Reams, Geaghan, & Gendron, 1996). Bringing awareness of the consequences of their actions to recreational users’ attention has been a priority (Marion & Reid, 2007; Noe et al., 1982). Also, littering behaviors and cigarette discarding actions have been targeted by awareness campaigns as a way to alter these environmentally degrading behaviors (Campbell et al., 2014; Hartley et al., 2015; Huffman, Grossnickle, Cope, & Huffman, 1995; Lee, 2012).

There seems to be little literature available about how the awareness of environmental consequences of littering or improper cigarette butt discarding plays into an individual’s discarding behavior. However, based on the theories outlined above we can infer that an individual’s cigarette discarding behavior may be impacted by their environmental awareness, or the awareness of the consequences their behavior could have on the environment. For example, if someone is not aware that improperly discarded cigarette butts and the materials in them can have adverse environmental consequences, then it is conceivable they could believe discarding their cigarette butt onto the ground is acceptable as to their knowledge, there are no adverse consequences. The fourth hypothesis then is:

H4: The awareness of the environmental impacts of discarded cigarette butts will be significantly lower for smokers who improperly dispose of cigarette butts on a
public beach than smokers who properly dispose of cigarette butts on a public beach.

**Conclusion**

Cigarette butt littering is a human behavior that directly causes environmental problems. Cigarette butt litter is particularly important due to the large numbers of discarded butts that are found in the environment, and the compounded effects that the toxic chemicals and plastic filters found inside them have on environmental and human health. Because this is a human behavior, it is important to understand why this behavior occurs, and then design behavioral interventions that work to alter it. Law enforcement, social norm alteration, and increased number of litter receptacles have all been tried extensively as a way to combat this behavior. Personal attributes such as demographic information, intentions, personal obligations, and awareness of consequences have also been studied as a way to understand cigarette butt littering, but the problem persists. This indicates there are other factors at play when an individual decides to properly or improperly discard their cigarette butt. This literature review has explored four factors (habits, place attachment, environmental awareness, and environmental attitudes) that impact pro-environmental behavior, and thus, offer a glimpse of personal attributes that may be affecting cigarette littering behavior. With these items in mind that offer a new approach to littering behavior, perhaps cigarette butt littering can be understood more wholly and the environmentally degrading behavior can be minimized.
Summary of Hypotheses

The hypotheses developed from the literature review above are summarized below; and the model of improper cigarette butt disposal tested in this thesis is shown in Figure 4):

H1: Smokers who improperly dispose of cigarette butts on a public beach will have a significantly higher habit of improperly disposing of cigarette butts than smokers who properly dispose of cigarette butts on a public beach.

H2: Smokers who improperly dispose of cigarette butts on a public beach have a significantly lower level of place attachment to that area than smokers who properly dispose of cigarette butts on a public beach.

H3: Smokers who improperly dispose of cigarette butts on a public beach will have significantly lower pro-environmental attitudes than smokers who properly dispose of cigarette butts on a public beach.

H4: The awareness of the environmental impacts of discarded cigarette butts will be significantly lower for smokers who improperly dispose of cigarette butts on a public beach than smokers who properly dispose of cigarette butts on a public beach.

Grand Tour Study Question

This study will qualitatively explore factors that influence cigarette smoker’s discarding of cigarette butts on a public beach. The grand tour study question is: What factors influence cigarette smoker’s discarding of cigarette butts on a public beach?
Figure 4. Model of Improper Cigarette Butt Discarding Behavior
CHAPTER 3 - Methods

Overview

This study utilized both quantitative and qualitative research approaches. This approach is called a mixed mode study and is used when one seeks to collect and analyze both quantitative and qualitative data in a single study to understand a research problem (Creswell, 2012). The idea is that the combination of both research approaches “provides a more complete understanding of a research problem than either approach alone” (Creswell, 2009, p. 4).

Rationale for Mixed Mode Design

Quantitative research design. Quantitative research is a method that tests “objective theories by examining the relationship among variables” (Creswell, 2009, p. 4). These variables are measured and numbered output data from them is analyzed using statistical procedures (Creswell, 2009). In this method of research, the “investigator identifies a research problem based on trends in the field or on the need to explain why something occurs” (Creswell, 2012, p. 13).

In other words, quantitative research gathers numerical data and allows researchers to illustrate relationships between variables. This type of research design was important in understanding what factors influenced improper cigarette discarding behavior in this study. By using a quantitative approach, the researcher could establish the relationship between improper cigarette discarding behavior and each of the four measured variables; habits, place attachment, environmental attitudes, and environmental awareness. These discovered relationships then allowed the researcher to describe what
factors significantly influenced improper cigarette discarding behavior, and develop behavioral interventions targeted towards those factors.

However, quantitative methods limit the ways in which a participant can react to the questions they are asked (e.g., there are only specific answers they can select from on a survey), so qualitative research was also utilized in this study to explore improper cigarette discarding behavior in greater depth.

Qualitative research design. Some issues researchers wish to understand cannot be represented numerically “without distorting the essence of the social meanings they represent” (Hatch, 2002 p. 9). Therefore, it is appropriate to utilize a qualitative design when the researcher is trying to understand “how people interpret their experiences” (p. 5) around a specific phenomenon (Merriam & Tisdell, 2016). Specifically, these techniques should be used when the issue at hand is complex and a detailed understanding is required, such as when studying a behavioral phenomenon like improper cigarette discarding (Creswell, 2013). Qualitative research can be utilized to empower individuals to share their own story in their own words, and through these processes qualitative research can help explain mechanisms and linkages as to what the cause is behind a behavior (Creswell, 2013).

Qualitative questions were utilized in this study in order to understand the phenomenon of cigarette butt littering from the participant’s point of view. It was hoped that participants would describe the phenomenon as their own lived experience and thus allow the researcher to “make sense of, or interpret, phenomena in terms of the meanings people bring to them” (Denzin & Lincoln, 2005, p. 3). This type of research is important
due to the complexities of behavioral influences that may affect cigarette butt discarding behavior that the researcher may not have been able to anticipate before interviewing participants, and thus, could not measure with a pre-structured survey.

**Qualitative research design type.** This study used a phenomenological case study approach. Phenomenological qualitative research focuses on describing the common experiences and meanings individuals give to a phenomenon (Creswell, 2013). Hatch (2002) states that the purpose of this type of study is to “reveal the essence of human experience” (p. 30). This research sought to understand factors that influence the behavior of improperly disposing of cigarette butts on Jekyll Island by examining participant’s shared experiences with this phenomenon.

This study also utilized a case study methodological approach as that style of research seeks to develop and portray an in-depth understanding of a phenomenon in a specific bounded system (Creswell, 2013). Case studies also explore an issue while utilizing the bounded system as a specific illustration (Creswell, 2013). This study fits both of those descriptions as the phenomenon of discarding a cigarette butt on the beach was studied within the bounded system of Jekyll Island’s beaches. Therefore, the phenomenon was studied in-depth in one location and Jekyll Island serves as a specific illustration of the phenomenon.

**Study Location**

This study was carried out on Jekyll Island, Glynn County, Georgia (lat 31.060124, lon -81.420712). This site was chosen due to the presence of cigarette butts on the beach as documented by the Georgia Sea Turtle Center (2015). The Jekyll Island
Authority, who oversees the island, is committed to “stewardship to conserve, maintain, manage, and restore natural resources and species diversity” for the 1 million people that visit the island annually, so it was important to learn why cigarette butts are discarded onto the beach in order to decrease this behavior and protect Jekyll Island’s natural resources and tourism industry (Jekyll Island Authority, 2014b, Jekyll Island Authority, 2015).

**Researcher Positioning**

In qualitative research it is important to attempt to transcend their past knowledge in order to understand and interpret a phenomenon as participants experience it (Creswell, 2013). Therefore, the researcher acknowledges that she had some background knowledge before beginning this project that may have influenced her interpretations of the phenomenon. These influences fall into four categories; work experiences, research interests, her values, and what she had to gain from this research.

The researcher worked at the Georgia Sea Turtle Center, a facility on Jekyll Island dedicated to sea turtle and marine ecosystem conservation, in the year immediately prior to beginning this thesis. This was where she first learned that cigarette butts were a problem for the environment and that they were found abundantly on Jekyll Island’s beaches. The researcher participated in outreach activities to teach the public about marine debris, and this included educating people about the fact that cigarettes do not break down in the environment. From this experience she learned that people often had no idea that cigarette butts contained chemicals that were harmful to the environment when they were allowed to degrade on the ground, and the majority of people did not
know that cigarette butts contain plastic filters that do not break down in the environment. In addition to educating the public, the researcher also partook in numerous beach clean ups and witnessed firsthand the large number of cigarette butts that were found during each one. Additionally, she developed a personal connection to Jekyll Island which could have also influenced her interpretations of the phenomenon.

The researcher’s personal values could also play a role in her interpretation of participant’s experiences with the phenomenon. For example, she often engages in self-awareness activities such as journaling or analyzing her choices and seeks to understand and evaluate her own behaviors. This could affect her interpretation of the participant’s explanations of how they experienced the phenomenon by believing that everyone was very self-aware and could effectively communicate their experiences. Additionally, the researcher values truthfulness so this could affect her ability to interpret the participants’ experiences. This value proved to be especially tricky in the cases where she observed one behavior, but the participant claimed they “typically” did something else. This could sway the researcher to want to believe or disbelieve all of that participant’s answers. So, she combatted this “desire” by documenting what she observed, but also recording what the participant stated without making judgments in her interpretations of whether they were being truthful or not.

Additionally, the researcher believes in understanding the reason that a behavior occurs and thus, has focused her research around discovering this. Because of that, during the data analysis she needed to be careful not to try to “prove” anything, or provide an
“answer” to why the behavior occurs, but rather she had to simply interpret only what the participants explained.

Finally, the researcher stood to gain an understanding of behaviors and how they related to environmental choices. Working in this capacity is something she would like to do for a career, so the desire to learn factors that may influence improper environmental behavior (such as improperly discarding a cigarette butt) are important to the researcher. Additionally, the researcher will earn her Master’s degree upon completion of this research project, so this could also affect how she interprets the participant’s experiences because she wanted to find a “solution” to her thesis research. Again, she worked to combat these potential biases by interpreting only what the participants explained and not assign meanings where participants didn’t state them.

**Participant Selection**

Participants were purposefully selected utilizing criterion-based sampling; they all smoked on Jekyll Island’s beaches and discarded their cigarette butts. Observation of participant’s discarding behavior was used to categorize them as an “improper” or “proper” discarer rather than asking them how they typically discarded their “butt.” This was done to reduce self-report bias (answering “favorably” as opposed to truthfully). Additionally, it was believed that this method of observing the cigarette discarding behavior from a distance would collect true behavioral data rather than allowing the researcher’s presence to influence the behavior being observed.
The quantitative portion of the study’s sample size was determined by the number of willing participants the researcher could locate over the duration of the study period. This resulted in 244 total participants.

The qualitative portion of the study’s sample size was determined by reaching the saturation point of information. This means that the researcher continued to interview individuals until she felt as though no new information was being obtained. This resulted in 28 participant interviews.

**Study Design**

**Gaining access.** Permission to conduct this research was gained through the University of Nebraska, Lincoln’s Institutional Review Board (IRB) (Appendix A). Secondly, access was gained to Jekyll Island’s beaches by submitting a research proposal to the Jekyll Island Authority. This proposal outlined the project purpose, importance, and methods. Additionally, it told the Jekyll Island Board the benefits there were to this research being conducted on the island. See Appendix B.

Finally, access was gained to participants through informed consent forms containing: 1) the central purpose of the study, 2) procedures for data collection, 3) an understanding that their participation was voluntary and their subsequent right to withdraw, 4) known risks to participants, 5) and benefits to participants. In contrast to what Creswell (2013) recommends for a phenomenological study, participants were not required to sign the consent form as identifying information was not to be collected about them during any part of this study. Instead, the consent form stated that “after having the informed consent form read to you, or reading the informed consent form yourself,
competing the survey qualifies as informed consent.” Therefore, participants indicated their consent to participate in the study by continuing with the interview when asked if they were willing to participate.

**Quantitative design.**

**Questionnaire.** A questionnaire was designed to address each hypothesis related to this study. The following sections are an overview of how each hypothesis was addressed, and why that is an appropriate way to study that specific hypothesis.

**Habit.** This study was designed to investigate about habits as a predictor of behavior rather than simply studying the frequency of cigarette discarding behavior. The Self-Report Habit Index (SRHI) has been used to study “habit as a psychological construct, which has a number of facets, rather than simply defining habit as past behavioral frequency” (Verplanken and Orbell, 2003, p. 21). It has also been noted to be an important tool when one seeks to measure “habit strength as a dependent variable or when one wants to determine the role of habit without measuring behavioral frequency” (Verplanken and Orbell, 2003, p. 3). Finally, the index measures habits based on a history of that behavior, as well as the automaticy (“lack of control, lack of awareness, efficiency”) of said behavior (Verplanken and Orbell, 2003, p. 3). It is for these reasons that the SRHI scale was utilized for this study.

Survey questions were adapted to fit Jekyll Island’s context and were measured with a 5-point Likert scale. Examples of items can be seen in Appendix C.
Place attachment. Place attachment is commonly measured by questionnaires which “allow investigators to describe and quantify the nature and depth of meanings people have for any place or landscape” (USDA Forest Service, 2016). Williams (2000) noted that most people get statistically valid results with short questionnaires that measure place dependence and place identity. Items for this section of the survey were adapted from Williams (2000), and place names were adapted to refer specifically to Jekyll Island. Examples of adapted items can be seen in Appendix D.

Environmental attitudes. The Environmental Attitudes Inventory (EAI) and New Ecological Paradigm (NEP) are commonly used to measure environmental attitudes. This study utilized the EAI because it focuses on an individual’s attitudes in relation to the environment where the NEP focuses on an individual’s ecological worldview. The EAI is composed of 12 scales that measure “broad perceptions or beliefs regarding the natural environment” (Milfont and Duckitt, 2010, p. 82), and the question responses have been found to be unaffected by social desirability. Survey questions for this study were drawn from the scale as reported in Milfont and Duckitt (2010) and utilized portions of their “enjoyment of nature,” “human dominance over nature,” and “ecocentric concern subscales.” Some examples of these questions are shown in Appendix E.

Environmental awareness. As stated in the literature review, an individual must understand that their personal behavior has consequences in order to care about changing that behavior. The questions in the Awareness of Environmental Consequences Measures table shown in Appendix F were largely created from scratch by the researcher and her thesis advisor in order to gauge individuals’ awareness of the effect their cigarette
discarding behaviors can have on the environment. Satisfactory face validity was determined upon review of the items by experts in survey item construction.

**Qualitative design.** A semi-structured qualitative interview protocol was designed and utilized in this study in order to provide a more well-rounded view of the phenomenon of cigarette littering behavior on Jekyll Island. Qualitative research allows subjects to describe their own point of view about the issue in question, thus allowing the researcher to “make sense of, or interpret, phenomena in terms of the meanings people bring to them” (Denzin & Lincoln, 2005, p.3). This type of research is important due to the complexities of behavioral influences that may be at play with cigarette butt littering behavior. Asking open ended questions with follow-up probing questions allowed the researcher to see the issue from the participant’s standpoint rather than only interpreting the issue from the researcher’s pre-designated questionnaire topics. These qualitative questions began with an ice breaker question, then progressed from least personal to most personal topics related to cigarette littering behavior. The interview protocol can be found in Appendix G.

**Data Collection Process**

**Installing cigarette receptacles.** Prior to the commencement of this study the researcher installed black cigarette receptacles at 6 beach access points on Jekyll Island’s oceanfront (Figure 5 and Photo 1). The canisters were mounted onto poles that already contained trash and recycling receptacles (Photo 2). Refer to Appendix H for photo documentation of cigarette receptacles mounted at each beach access.
Figure 5. Map showing beach access points where the researcher placed cigarette butt receptacles. Distance between beach access #30 and #45 is 0.87 miles.

Photo 1. Black cigarette receptacle installed by researcher at 6 beach access points.
Photo 2. Cigarette receptacle mounted on pole at beach access point that already contained trash and recycling receptacles

**Surveying process.** This study was conducted on Fridays, Saturdays, and Sundays from June 24th until August 7th, 2016. Additionally, surveys were conducted on Monday, July 4th. The researcher was present on Jekyll Island’s beaches for 6-9 hours per day based on the abundance of potential participants. The researcher learned the “beach trends” as far as when there was an abundance of beachgoers, thus increasing the chances that some of them would be smokers, and tailored her beach survey times accordingly. On Fridays, the researcher typically began surveying the beach close to 1 pm. On Saturday and Sunday, the researcher typically entered the beach around 10 am in the early portion of the study, but moved to beginning surveys around 11 am or even 12 pm as the summer progressed and the beachgoers didn’t show up until that time. The researcher remained on the beach until the majority of beachgoers had departed for the evening, thus reducing the numbers of potential participants. The researcher typically
found herself leaving the beach between 5:30-7 pm. In the event of rain, which occurred on 8 survey days, the researcher took shelter in one of the beach pavilions or her car and waited out the often brief showers, then return to the beach to continue surveying as beachgoers returned.

**Locating smokers.** To locate smokers, the researcher walked transects in a north and south orientation on the beach between access point #30 and #45 each day (as seen in Figure 2). The researcher typically walked in a “channel” between the dunes and beachgoers in order to remain as inconspicuous as possible. It was easy to observe the smoking and discard behavior inconspicuously from this location because the majority of beachgoers set up their beach gear at least a few yards closer to the water than to the dunes, and they always faced the water. Thus, the researcher was afforded a “channel” that was a few yards wide in which she could travel along the dune edge behind the beachgoers without soliciting much attention (Refer to Photo 3).

Photo 3. Researcher walking in the “channel,” between most beachgoers and the dunes.

The researcher located smokers by utilizing a variety of senses. She paid special attention to any white objects in beachgoer’s hands, watched for movements of
beachgoer’s hands to their mouths, and watched for puffs of smoke in the air. Importantly, she also used her sense of smell and found that if she was standing downwind of a smoker she could smell smoke from 25 yards away and up. Interestingly, the sense of smell became very important as it was often the first sense that detected smoking, and her eyes were then utilized to pinpoint the individual smoking, and subsequently observe the discarding action.

**Observing the cigarette butt discard.** The entire premise of this study depended on observing HOW a smoker discarded their cigarette butt. If smoking behavior was observed, but the discarding action (which often occurred quickly and sometimes covertly) was not observed, that smoker was no longer a potential participant. The researcher did not “guess” on how that individual discarded their “butt,” but instead moved on to the next smoker to begin the observation process anew.

For this reason it was imperative that the researcher be able to view the smoker during their smoking activity, and subsequent discard. To do this, whenever the researcher located someone smoking she would remain in the area where that smoker was. The researcher often sat down in the aforementioned “channel” between the dunes and the smoker. She typically sat multiple yards away from the smoker and off to one side or the other of them thus remaining inconspicuous as she observed the smoking behavior and subsequent discard of the cigarette butt (refer to Photo 4). A small pair of binoculars were utilized to observe the discard action to ensure that they “butt’s” discarded location could be confirmed.
Photo 4. The researcher observing smoking and discarding behavior by sitting in the “channel,” multiple yards away from the smoker.

**Helpers.** Most often, the researcher was the only person present on the beach observing beachgoer smoking behavior. However, occasionally volunteers from the Georgia Sea Turtle Center and personal acquaintances of the researcher assisted in locating potential survey participants by watching for smoking behavior on the beach. In total, there were 8 helpers over the course of the study. These helpers varied in the ways they assisted in locating smokers. For example, one helper preferred to set up her beach chair along with a beach umbrella and “camp out” in one location on the beach observing only those people who were within eyesight, or whose smoking and discarding behavior could be observed through binoculars. However, most other volunteers either walked next to the researcher on her beach transects, or walked in the opposite direction (north or south) of the researcher in order to have more “eyes on the beach” and have two areas of the beach being simultaneously observed for smoking.

The researcher instructed these helpers on how to classify a cigarette discard as “proper” or “improper” and ensured they understood the importance of OBSERVING the discard action. Additionally, helpers were specifically instructed not to interact with the
smoker, but to simply observe them smoking, watch if they discarded the butt properly or improperly, then call the researcher over to be the one to approach the potential participant. Once the researcher approached the smoker to ask them if they would participate in a survey, the helper would resume their smoking behavior observation activities.

**Researcher attire and materials.** The researcher sought to appear professional during this study as she was associated with a research university, but was concerned that dressing in professional attire such as a University of Nebraska polo shirt may alter beachgoer’s behavior if they felt there was an “authority figure” on the beach. For this reason, it was decided that the researcher would try to blend in as much as possible. Additionally, sun protection was important as the researcher was in direct sunlight for 6-9 hours per day, yet lightweight clothing was also crucial to keep the researcher cool while on the beach as heat indices were often above 100 °F.

To address all of these factors, a variety of outfits were tried and the two most often-worn outfits were:

1. UV protection long-sleeved field shirt, shorts, baseball hat, sunglasses, and flip-flop sandals

2. Swimsuit, beach cover-up, baseball hat, sunglasses, and flip-flop sandals

The researcher perceived herself to receive more curious-looks from beachgoers on the days when she wore the field shirt outfit so, as the study season progressed she primarily wore the swimsuit and beach cover-up in order to maintain a professional (i.e.
fully clothed) appearance, have some sun protection, and have a limited influence on beachgoer behavior.

Materials carried on the beach for this research included a backpack, paper surveys, consent forms, descriptions of the project, voice recorder, clipboards, pens, small notebook, mini-binoculars, multiple water bottles, sunscreen, and a beach towel.

**Conducting participant surveys.** Participants were purposefully selected based on the fact that they all smoked on Jekyll Island’s beach and discarded their cigarette butt. The procedure for participant selection was as follows: 1) researcher observed beachgoer activities from a distance, when smoking behavior was observed, 2) researcher monitored from a distance how smoker disposed of that cigarette butt, 3) researcher noted if the disposal was “proper” or “improper,” 4) researcher approached the smoker and described the project to the potential participant, 5) researcher distributed a consent form and written description of the project to potential participants, 6) researcher asked if the potential participant would be willing to fill out a survey, 7) researcher distributed the survey to participants, 8) researcher asked random participants, after they completed their survey, if they would be willing to answer some follow-up open-ended questions, 9) researcher conducted the qualitative interview with participants, 10) researcher collected all distributed materials, 11) researcher thanked the participants for their time, and 12) researcher departed from the group.

The researcher then noted the general appearance of the participants on the top of their survey (i.e. general colors of the participant’s clothing and beach gear present). This aided in the researcher not re-approaching the participant for another survey if smoking
behavior was observed again. The researcher then returned to her beachgoer activity observation transects to watch for additional smoking behavior on the beach.

The script used to introduce the project to participants can be found in Appendix I. Appendix J shows the consent form potential participants were given.

**Recording and storing data.**

*Recording information.* Participant’s answers to the survey questions were recorded on the paper survey itself, by the participant. The open-ended interviews were recorded on a Philips® digital voice recorder for analysis at a later date.

*Storing data.* Keeping data secure in order to do no harm to participants is important. For this reason, this study’s paper surveys are kept in a locked desk drawer and the voice recordings are kept on a password protected computer, and on an external hard drive which is stored in a locked desk drawer. Only the principal investigator and her advisor, Dr. Mark Burbach, have access to the raw data. Information will be stored until data collection and interpretation is completed and will then be destroyed after May 1st, 2018.

**Data Analysis**

**Quantitative data.**

*Reliability.* The first step of the quantitative data analysis was to test the reliability of each independent variable (habit, place attachment, environmental attitudes, and environmental awareness). “‘Reliability’ tells us how well a test consistently measures what it is supposed to measure” (Statistics How To, 2014). So, during this process, some
items that were shown to lower the reliability of the independent variable were removed to increase the reliability of that section of the survey. These unreliable items could have been the result of a multitude of things including participants not fully reading or understanding the question. Items contributing to low reliability were all reverse scored.

The reliability score is represented by a Cronbach’s alpha (α) score from 0 to 1. A score of “0” indicates there is no correlation between scale items, whereas a score of “1” indicates high covariance between scale items (Goforth, 2015).

**Pearson’s correlation.** The next step in data analysis was to determine the correlation coefficient, or how well two sets of data are related. This was done utilizing a Pearson’s correlation (r). This test illustrates if there is a linear relationship between two sets of data (Statistics How To, 2012). Essentially, this means ‘can a line graph be drawn to represent the data?’ The line is called the line of best fit, and results are reported between -1 and 1. These results are called a correlation coefficient and a negative value illustrates an inverse relationship where when one variable increases, the other decreases and vice versa. A positive value indicates a positive correlation where both variables increase or decrease together. The closer the correlation coefficient is to “0”, the “greater the variation between the data points and the line of best fit” (i.e. this means there is low correlation) (Statistics How To, 2012).

**Determining significance.** It is important to know if the correlation between variables is significant, so this was determined by examining the p-values of the correlations. This value tells us if the correlation coefficient is significantly different from “0”. Significance levels used in this study’s correlation matrix were .05 and .01. A p-
value less than or equal to .05 indicates that there is only a 5% chance of concluding that a correlation exists when really there is no correlation (i.e. type I error), so, it can be said, with 95% confidence, that the correlation is significant. Additionally, a p-value of less than or equal to .01 means there is only a 1% chance of concluding that a correlation exists when really there is no correlation. So, when a correlation coefficient is less than or equal to .01 it can also be said that it is significantly correlated, but with 99% confidence. In contrast, when a p-value was shown to be greater than the .05 significance level, it must be concluded that there is no significant correlation (Minitab Inc., 2016).

Interpreting a correlation matrix. All of the values described above are illustrated in a correlation matrix which shows the correlation coefficients between two sets of variables. Each variable is paired with the other variables in the table, thus illustrating which pairs have a significant correlation (Statistics How To, 2016). The diagonal in the matrix is the Cronbach’s alpha (α) score and the left “triangle” of the matrix is the correlation coefficient generated by the Pearson’s correlation test, as previously discussed. The correlation table also includes the means and standard deviation of each variable.

Regression. The next step in the quantitative data analysis was to perform a regression analysis. This type of analysis is used to estimate the relationships among variables. Regression analysis is performed when trying to predict an outcome, and it tells if the variables used in the analysis can be used to predict or explain an outcome. This test was ideal for this study because as outlined in the four hypotheses, research indicates that habits, place attachment, environmental attitudes, and environmental
Logistic regression. Using a logistic regression, statistically significant models of habits, place attachment, environmental attitude, and environmental awareness were examined as potential predictors of improper cigarette disposal behavior. Hypotheses were analyzed using a logistic regression because the outcome variable of improper cigarette disposal is dichotomous (i.e. improper or proper discarding) and the predictor variables of habits, place attachment, environmental attitudes, and environmental awareness include a mix of continuous and categorical variables. The logistic regression was performed in a stepwise fashion.

Interpreting the odds ratio. The odds ratio describes the odds (i.e. the chance) that an individual will display a particular behavior according to their score on the survey instrument for that particular construct. When the odds ratio is greater than 1, the odds of an individual performing the dependent behavior increase. Conversely, when the odds ratio is less than one, the odds of them performing that behavior decrease. In this study the dependent behavior is improper cigarette discarding. So, to predict the possibility (odds) of an individual improperly discarding their cigarette based on how they answered the questions on habits, place attachment, environmental attitudes, or environmental awareness on the survey instrument one must examine the odds ratio given in the statistical output.

Qualitative data analysis. The qualitative data analysis followed the procedure outlined by Creswell (2013). Recorded interviews were transcribed by the researcher into
Microsoft Word documents. Next, the researcher read the transcripts several times to get a sense of the interview as a whole (Agar 1980 in Creswell, 2013). A list of significant statements was developed about how participants experienced the phenomenon of discarding a cigarette butt while on the beach. These statements were then grouped into units based on their meaning, thus creating codes. These categories were then teased out into general themes which contain several codes (or significant statements) pertaining to one common idea.

These common ideas became themes, and these themes were then described using textural descriptions to illustrate what the participants experienced. Verbatim statements were used to support the researcher’s findings and illustrate the meanings participants gave the themes. MAXQDA computer software was used to code and analyze the data (VERBI Software GmbH, Version 12, 2015).

It would be preferable to validate these qualitative findings by utilizing member checking where one presents their findings to the originally-surveyed population and solicits feedback on the accuracy of their findings. However, participants were not asked for follow up contact information to protect their privacy, so this was not possible. Therefore, validation of the findings was done by clarifying the researcher bias, as seen in the “researcher positioning” section of this thesis. This ensures that the reader understands how the researcher’s personal experiences may have influenced her findings. Further validation was conducted by two reviews of the coding process by experts in qualitative research methods. Peer reviewers were also utilized to play “devil’s advocate” about the findings, thus shedding light on potential areas of misinterpretation.
CHAPTER 4 – Results and Findings

The results of the quantitative analyses and the findings of the qualitative analyses are discussed in this chapter. Due to the mixed mode methods of this study, the quantitative results and qualitative findings are presented in two sections.

Demographic Information

The quantitative portion of this study was comprised of 244 participants, 107 (44%) of these participants discarded their cigarette properly, while 137 (56%) discarded their cigarette improperly. The age range of participants was 19-66 years old with a mean age of 39 years. There were 109 males, 133 females, and 2 people did not report their gender. Out of the 244 participants, 227 gave valid zip codes. This data showed that the distance participants lived from Jekyll Island ranged between 0-1947 miles, with an average distance of 231 miles away. Of the individuals that gave zip codes, 28 participants (12%) were from the local area (Brunswick and Jekyll Island), with none coming from the neighboring island of St. Simons.

The qualitative portion of this study was comprised of a subset of the quantitative participants and included 28 individuals, 14 (50%) of these participants discarded their cigarette properly, while 14 (50%) discarded their cigarette improperly. The age range of participants was 23-63 years old with a mean age of 46.39 years. There were 16 males and 12 females. The range of distances participants lived from Jekyll Island was 24.5-1947 miles, with an average home distance of 311.84 miles away. Only one participant (4%) was from the local area (Brunswick and/or Jekyll Island).
Quantitative Results

Correlations.

**Reliability.** All four predictor variable scales had satisfactory internal reliability (Table 1). Nunnally and Bernstein (1994) concluded that acceptable minimum reliability (Cronbach’s alpha) for measurement scales should be .70. The Cronbach’s alpha for the four predictor variable scales were: place attachment (α = .95), environmental attitudes (α = .72), environmental awareness (α = .72), and habit (α = .94).

Table 1. Descriptive Statistics and Correlation Matrix for Cigarette Butt Disposal and Predictor Variables (N=244).

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>S.D.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Cigarette Butt Disposal</td>
<td>0.56</td>
<td>0.50</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Place Attachment</td>
<td>3.19</td>
<td>1.03</td>
<td>0.00</td>
<td>(.95)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Environmental Attitude</td>
<td>4.12</td>
<td>0.67</td>
<td>-0.21**</td>
<td>0.33**</td>
<td>(.72)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Environmental Awareness</td>
<td>6.13</td>
<td>1.78</td>
<td>-0.22**</td>
<td>-0.01</td>
<td>0.20**</td>
<td>(.72)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Habit</td>
<td>1.81</td>
<td>1.02</td>
<td>0.27**</td>
<td>-0.07</td>
<td>-0.20**</td>
<td>-0.14*</td>
<td>(.94)</td>
<td></td>
</tr>
<tr>
<td>6. Age</td>
<td>38.94</td>
<td>11.52</td>
<td>-0.05</td>
<td>0.19**</td>
<td>0.03</td>
<td>0.00</td>
<td>-0.16*</td>
<td></td>
</tr>
<tr>
<td>7. Gender</td>
<td>0.55</td>
<td>0.50</td>
<td>-0.12</td>
<td>0.13*</td>
<td>0.15*</td>
<td>0.03</td>
<td>-0.09</td>
<td>0.04</td>
</tr>
</tbody>
</table>

Note. Reliability coefficient estimates (α) are in Parenthesis along diagonals. *p < 0.05; **p < 0.01. (Two-tailed tests).

**Significance.** There was a nonsignificant correlation of 0.00 (p = n.s.) between place attachment and cigarette butt disposal (Table 1). However, environmental attitude, environmental awareness, and habit were significantly correlated with cigarette butt disposal, r = -0.21, r = -0.22, r = 0.27 respectively and all at p < 0.01 (Table 1).

**Descriptive statistics and frequencies.** Means and standard deviations were calculated for place attachment (M = 3.19, SD = 1.03), environmental attitudes (M =
4.12, SD = 0.67), environmental awareness (M = 6.13, SD = 1.78) and habit (M = 1.81, SD = 1.02) (Table 1).

**Logistic regression.** In the logistic regression, demographic factors (age and gender) as well as scores from habits, place attachment, environmental attitudes, and environmental awareness questions were used as predictors of improper cigarette discarding behavior. Results can be found in Table 2.

<table>
<thead>
<tr>
<th>Construct</th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Exp(B)</th>
<th>Nagelkerke R² Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-0.004</td>
<td>0.013</td>
<td>0.095</td>
<td>1</td>
<td>0.757</td>
<td>0.996</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>-0.365</td>
<td>0.286</td>
<td>1.631</td>
<td>1</td>
<td>0.202</td>
<td>0.694</td>
<td></td>
</tr>
<tr>
<td>PlAtt</td>
<td>0.160</td>
<td>0.150</td>
<td>1.137</td>
<td>1</td>
<td>0.286</td>
<td>1.174</td>
<td>0.022</td>
</tr>
<tr>
<td>EnAtt</td>
<td>-0.534</td>
<td>0.242</td>
<td>4.854</td>
<td>1</td>
<td>0.028</td>
<td>0.586</td>
<td>0.062</td>
</tr>
<tr>
<td>EnvAwa</td>
<td>-0.191</td>
<td>0.082</td>
<td>5.442</td>
<td>1</td>
<td>0.020</td>
<td>0.826</td>
<td>0.037</td>
</tr>
<tr>
<td>Habit</td>
<td>0.501</td>
<td>0.160</td>
<td>9.784</td>
<td>1</td>
<td>0.002</td>
<td>1.650</td>
<td>0.055</td>
</tr>
<tr>
<td>Constant</td>
<td>2.603</td>
<td>1.249</td>
<td>4.343</td>
<td>1</td>
<td>0.037</td>
<td>13.507</td>
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</tbody>
</table>

Each predictor variable was added to the logistic regression in a stepwise fashion and variables were considered to be significant at p<.05. The overall model was significant, \(\chi^2 (6, N = 239) = 33.64, p = 0.00\) which indicates that the model is a good fit, or it predicts some of the variability in our data. Specifically, the Nagelkerke \(R^2\) value (0.176) shows that all of the variables in combination with the demographic information predict 17.6% of the variability in the data. In other words, they describe 17.6% of the “factors” of improper cigarette discarding behavior.
Block (step) one, which included only demographics (age and gender), was not significant $\chi^2(2, N = 239) = 3.89, p = 0.143$. The Nagelkerke $R^2$ value (.022) shows that only 2.2% of the variability in the data could be due to these demographic factors.

Block (step) two included demographics plus place attachment. This step was not significant $\chi^2(3, N = 239) = 3.98, p = 0.264$. The Nagelkerke $R^2$ value for the block (.022) shows that 2.2% of the variability in the data could be due to the demographic factors and place attachment. Place attachment did not add any explanation of the variability in the data. This step indicated that the place attachment variable was not significant ($B = .038, \text{Wald } \chi^2 = 0.086, p = 0.770, \text{ and odds ratio } = 1.039$). Thus, hypothesis 2 was not accepted.

Block (step) three included demographics, place attachment, and added environmental attitudes. This step was significant $\chi^2(4, N = 239) = 15.433, p = 0.004$. The Nagelkerke $R^2$ value for the block (0.084) shows that 8.4% of the variability in the data could be due to the combination of demographic factors, place attachment, and environmental attitudes. The Nagelkerke $R^2$ change (0.062) indicates that environmental attitudes explain 6.2% of the variability in the overall model. This step also showed that the environmental attitudes variable was significant ($B = -0.738, \text{Wald } \chi^2 = 10.555, p = 0.001, \text{ and odds ratio } = 0.478$). Based on the odds ratio, as environmental attitudes increase, an individual’s likelihood of improperly discarding their cigarette butt decreases. Thus, hypothesis 3 was accepted.

Block (step) four included demographics, place attachment, environmental attitudes, and added environmental awareness. This step was significant $\chi^2(5, N = 239) =$
22.644, \( p = 0.000 \). The Nagelkerke \( R^2 \) value for the block (0.121) shows that 12.1% of the variability in the data could be due to the combination of demographic factors, place attachment, environmental attitudes, and environmental awareness. The Nagelkerke \( R^2 \) change (0.037) indicates that environmental awareness explain 3.7% of the variability in the overall model. This step also showed that environmental awareness variable was significant (\( B = -0.212 \), Wald \( \chi^2 = 6.965 \), \( p = 0.008 \), and odds ratio = 0.809). Based on the odds ratio, as environmental awareness increases, an individual’s likelihood of improperly discarding their cigarette butt decreases. Thus, hypothesis 4 was accepted.

Block (step) five included demographics, place attachment, environmental attitudes, environmental awareness, and added the final variable of habit. This step was the overall model, so as previously mentioned it was significant, \( \chi^2 (6, N = 239) = 33.64 \), \( p = 0.00 \). Additionally, it indicates that the predictor variables and demographic information combined predict 17.6% of the variability in the data. The Nagelkerke \( R^2 \) change (0.055) indicates that habit explained 5.5% of the variability in the overall model. This step showed that the habit variable was also significant (\( B = 0.501 \), Wald \( \chi^2 = 9.784 \), \( p = 0.002 \), and odds ratio = 1.650). Based on the odds ratio, as habit increases, an individual’s likelihood of improperly discarding their cigarette butt also increases. Thus, hypothesis 1 was accepted.

The overall model is a good fit, as it predicts some of the variability in our data. And, the variables in combination with the demographic information describe 17.6% of the “factors” predicting improper cigarette discarding behavior.
Qualitative Findings – Proper Discarders

The themes in this section are derived from the participants who discarded their cigarette butt properly. Table 3 outlines the themes and subthemes, and is followed by an in-depth description of each theme.

Table 3. Proper Discard Themes.

<table>
<thead>
<tr>
<th>Theme</th>
<th>Subtheme</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Litter</td>
<td>1.1: Appearance</td>
</tr>
<tr>
<td></td>
<td>1.2: Time</td>
</tr>
<tr>
<td></td>
<td>1.3: Chemicals in filters</td>
</tr>
<tr>
<td>2. Social Awareness</td>
<td>2.1: Stigmatized group identity</td>
</tr>
<tr>
<td></td>
<td>2.2: Behavior may affect others</td>
</tr>
<tr>
<td>3. Cumulative Effects Mean Negative</td>
<td>3.1: Ugly toxins</td>
</tr>
<tr>
<td>Consequences</td>
<td>3.2: Smoking ban</td>
</tr>
<tr>
<td>4. Minimal Obstacles</td>
<td>4.1: Low amount of time and effort</td>
</tr>
<tr>
<td></td>
<td>4.2: Doesn’t require planning</td>
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<td>5. Personally Responsible</td>
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**Theme 1: Litter.** Many proper-discarding participants considered cigarette butts to be litter, and by litter they meant something that should not be on the ground, or left in the natural ecosystem. For example, a number of participants explicitly stated that a cigarette butt is “trash.” Participants also indicated that general litter was bad, and that “any trash [laying around] is not good.”

**1.1: Appearance.** Several participants expanded to say that a reason these “butts” should not be on the ground is that they are “unsightly.” The concern here was that the cigarette butts are an “eyesore, a dirty, filthy eyesore.” The reason the discarded butts
look unsightly is because the participants classified cigarette butts as litter and trash, and they did not want trash on the beach. Cigarette butts lying on the ground was also a problem because participants stated that they swell up and break open and are then a larger pile of trash that takes away from the aesthetics of the beach.

1.2: Time. Participants explained that cigarette butts take a long time to break down, noting that cigarettes “take forever” to disintegrate. Because of the amount of time that these take to break down, some participants expressed concern that the butts could have further impacts than just their ugly appearance. For example, a participant stated that “it could take 50 years for it to break down and at that point in time it’s probably been incorporated into somebody’s nest.”

1.3: Chemicals in filters. An additional problem participants noted with cigarette butts being on the ground was that the filters were full of chemicals. It was described that when a person smokes they draw a number of chemicals, including “nicotine and carcinogens,” into the filter. Then, when the butt is discarded onto the ground that filter holds chemicals that can “affect everything” in the environment. Therefore, the filters were seen as a problem with discarded butts being on the ground. For example, one participant stated that “unfiltered cigarettes aren’t really that big of a deal.”

Theme 2: Social awareness. The proper-discardng participants indicated that they were socially aware, or aware of social constructs within the culture around them. This was demonstrated by their feelings of belonging to a stigmatized group, and them being aware that their smoking actions impacted others.
2.1: Stigmatized group identity. It was clear these participants identify as a group that performs a behavior that is judged by others and is stigmatized, or “worthy of disgrace or great disapproval” (Oxford University Press, 2017). For example, participants commented on how they felt like they belonged to a “minority group” of people who smoke in society, and it was noted that fewer people are smoking, therefore furthering the feelings of being in a minority group. A number of participants also spoke about how “people don’t like people smoking anymore,” so it was clear that they perceived their smoking behavior to be unaccepted within the social constructs of their culture.

One person told how it was “hurtful to walk around and see so many [cigarette butts].” This “hurt” comes from feeling that his group is performing socially unacceptable behavior of smoking and the improperly discarded cigarette butts simply gives non-smokers a reason to believe that smoking is bad because the smoking behavior is now affecting others, thus probably contributing to further stigmatization.

2.2: Behavior may affect others. Because participants were socially aware, they recognized that their smoking and cigarette discarding behavior may negatively affect others’ beach experiences. For example, a participant described how Jekyll Island was “a family beach and not everybody wants to be exposed to cigarette smoke.” Additionally, smoking was seen as a personal choice that should not affect others. One woman stated that “I know [smoking] is bad for me, whatever. I still choose to do it, that’s my choice, but I’m also very conscientious that it is my choice, not anybody else’s choice.” A number of participants echoed this sentiment and also took steps to minimize their smoking behavior’s impact on others. They did this by asking people near them if they
minded them smoking before lighting their cigarette, not flicking their ashes where anyone would get burned, and making sure to “pick up after” themselves.

**Theme 3: Cumulative effects mean negative consequences.** Participants were concerned that “if everybody’s doing it [discarding their cigarette butts onto the ground]” there would be negative consequences. These consequences included an accumulation of toxins in the ecosystem, the natural setting where people were discarding their “butts” becoming ugly, and a potential ban on smoking.

**3.1: Ugly toxins.** Participants were concerned that an accumulation of cigarette butts would be “a bad thing.” Specifically, they indicated this would cause “poisons” to end up in the surrounding ecosystems. Additionally, if everyone threw their cigarette onto the ground that area would “look gross.” For example, one participant said “if everyone left their trash in that natural setting…that beautiful place you went to visit would be nothing but a trash pile, and no one would go and look at it anymore.”

**3.2: Smoking ban.** Participants recognized that the cumulative effects of many smokers discarding their “butts” improperly would result in a large number of cigarette butts on the beach, which could in turn cause there to be a ban on smoking to prevent this issue. Importantly, having a ban of smoking on the beach was a concern for them because they appreciated that they could smoke on Jekyll’s beaches. Participants noted that “it’s [smoking] still allowed here, it’s part of why I come here.” One participant tried to prevent a smoking ban saying that she helped pick up after other people because “if there are cigarette butts left all over” then her right to smoke on the beach could be taken away.
**Theme 4: Minimal obstacles.** Participants perceived the obstacles to discarding their cigarette properly to be minimal. This was due to the fact that they believed proper discarding took a low amount of effort, a small amount of time, and required no planning.

4.1: Low amount of time and effort. Participants described that discarding their cigarette butt properly required little to no effort. They stated that finding a place to put the cigarette butt did not require a lot of thought, calling it something that they “didn’t even think twice about.” It was even described that bringing a cigarette to the beach required more effort than taking it back.

Because of this low amount of effort needed, participants also discussed how discarding their cigarette butt properly required only a little bit of time. They stated that this action was “not a big deal,” and the only thing that may prevent them from discarding properly may be that they were in a hurry.

4.2: Doesn’t require planning. It was very clear that participants did not feel that they had to plan ahead to discard their cigarette butts properly. In other words, they did not feel that they needed to plan to bring an item with them specifically for this task. Instead, there was an attitude that the items they already had could be utilized. One participant said “you can always make something or find something that you’re going to throw away anyway.”

As an example of this, a number of participants talked about using their pocket, purse, used cigarette carton, partially empty water bottle, or soda can to discard a butt. The item utilized depended on what they had with them, but there was agreement that they would use “whatever you can find.” Participants also talked about using regular
trash cans, as long as they extinguished the cigarette first to prevent fire. This was done by leaving a little bit of liquid in the bottom of a water bottle or soda can then discarding the butt in there before tossing the whole thing into the trash, or simply rubbing the burning end of the cigarette out so there would be no glowing embers left.

**Theme 5: Personally responsible.** Participants believed that it was their own responsibility to take their cigarette butts with them, then dispose of them properly. Additionally, they extended this belief to everyone, including non-smokers, saying that it was each person’s responsibility to pick up their own trash whether that meant cigarette butts or general trash. This idea was stated nicely by one participant; “if you are making trash then you take it with you and you dispose of it properly.” Importantly, some participants talked about just “knowing better than to throw it down,” and said it was common sense to them that being personally responsible for their own trash and cigarette butts was how everyone should act.

Because of this sense of personal responsibility, often, participants did not feel like they needed any special accommodations (such as cigarette receptacles). Instead, they stuck to the idea that each person should be responsible for getting their own trash to a proper place.

A number of proper discarders also recognized that if they didn’t properly discard their own cigarette butts, no one else was going to pick them up for them. As an example, one person stated “it’s irresponsible to throw your trash in any type of natural setting and expect that-- who’s going to clean it up?”
Qualitative Findings – Improper Discarders

The themes in this section are derived from the participants who improperly discarded their cigarette butt. Table 4 outlines all of the themes and subthemes, and is followed by an in-depth description of each theme.

Table 4. Improper Discard Themes.

<table>
<thead>
<tr>
<th>Theme</th>
<th>1. Litter or Not?</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Lack of Knowledge</td>
<td>2.1: Lack knowledge about components of a cigarette butt</td>
</tr>
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<td></td>
<td>2.2: Lack knowledge of environmental impacts</td>
</tr>
<tr>
<td>3. Problems with Cigarette Receptacles</td>
<td>3.1: Receptacles not convenient</td>
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<td></td>
<td>3.2: Not recognizing receptacles</td>
</tr>
<tr>
<td></td>
<td>3.3: Didn’t see the receptacles</td>
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<tr>
<td>4. Conscious Choice Required</td>
<td></td>
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<tr>
<td>5. Statements Contradict Behavior Observed</td>
<td>5.1: Reported do not leave cigarette butts on ground</td>
</tr>
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<td></td>
<td>5.2: Awareness of fire</td>
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<td></td>
<td>5.3: Laws and fines</td>
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<td></td>
<td>5.4: Feelings of personal responsibility</td>
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<td></td>
<td>5.5: Other people</td>
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<td></td>
<td>5.6: Thinking about nature</td>
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<td></td>
<td>5.7: Knowledge that cigarette butt CAN impact the environment</td>
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<td></td>
<td>5.8: Social norm is clean beaches</td>
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<td></td>
<td>5.9: Location (Jekyll Island) does not impact discarding behavior</td>
</tr>
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**Theme 1: Litter or not?** From these interviews, it appeared that there is some discrepancy between improper-discardng participants about if cigarette butts are litter or not. A number of participants expressed their thoughts that discarding a cigarette butt onto the ground was considered litter by directly stating throwing butts on the ground “[is] pretty much littering.” In contrast to this, some of the participants noted that they were unconcerned about cigarette butts being discarded onto the ground because “I figure
it’s harmless.” Additionally, one man justified his discarding behavior by stating that cigarette butts are not bad in comparison to other issues, “You’ve got to look at the amount of cigarette butts and the impact on the environment from the cigarette butts. I think it's minimal compared to the other stuff we've got going on.” This disagreement is important because participants indicated that litter was something that should not be on the ground. Therefore, if a smoker does not consider a cigarette butt to be litter, it stands to reason that they would be all right discarding it onto the ground.

**Theme 2: Lack of knowledge.** This theme clearly exposed two areas where participants lacked knowledge. Participants didn’t understand what components were in a cigarette butt and they did not know about the environmental impacts that a cigarette butt can have when discarded onto the ground.

*2.1: Lack knowledge of about components of a cigarette butt.* When participants were asked about the materials that cigarette butts contained, it was clear that they did not have an understanding of this topic. Participants stated that there were chemicals, metals, and plastics, in them, but the answers were very vague, quite often including non-descriptive statements such as “whatever materials.” Additionally, a number of participants directly stated, “I’m not sure,” but then continued on with non-descriptive statements such as the ones previously listed. This lack of knowledge was stated outright by one participant; “I’m not exactly sure what’s in a cigarette butt.” Another participant echoed this sentiment and noted that “I’m pretty sure they might leak something out of the filters, nicotine or whatever.”
2.2: Lack knowledge of environmental impacts. It can be expected that if one does not know what materials are in the product they are discarding onto the ground, they would not be able to express in detail, how that item may affect the environment. This sub-theme brought to light the inability of some of the participants to express HOW the environment would be impacted by their cigarette butt being discarded onto the ground. Again, answers were very vague such as “I just know that there’s a lot of cons,” and participants sometimes searched for confirmation from the researcher that their answer was correct. For example, one woman stated “I don’t know. I’m sure it does something bad to this [the beach environment]. Right?”

Theme 3: Problems with cigarette receptacles. Recall that at the beginning of this project, black canister cigarette receptacles were installed on the trash can poles that were present at beach entrances. So, cigarette receptacles were available to all participants as they entered or exited the beach. However, during this interview process it was discovered that there were problems with those cigarette receptacles. These exact problems are outlined in the sub-themes below.

3.1: Cigarette receptacles not convenient. Participants noted that they wanted the cigarette receptacles to be more convenient for them by placing receptacles both on the beach, and at the beach access points. Participants recognized that placing the bins on the beach would not be wise due to the tidal change, but it was suggested that receptacles be “spread out along the edge of the dunes,” every couple hundred feet or so. After the black cigarette canister receptacles were pointed out to one participant she expressed the importance of inconvenient receptacles by stating “since it’s so close, I would do it
[discard the cigarette butt into the receptacle] every time.” However, participants were also concerned that adding too many receptacles to the beach could cause it to appear cluttered; “there are trash cans and stuff like that where you can discard your trash. But if you had them just sporadic throughout the open area they would just cause too much stuff.” There was also concern that the receptacles themselves would detract from the beach experience; “you come out to the beach to relax. You’re looking for the beauty of the beach, you are not looking for ‘oh there's a trash can over here, there’s a beautiful sunset or a sunrise coming up’ but right there you’ve got a trash can in your view.” Participants stated that a useful place to put cigarette receptacles would be “anywhere that's going to have a lot of people coming through it,” such as “on the end of the guardrail, or where you’ve got the trash cans up they could have one on each side.”

3.2: Not recognizing receptacles. The irony to what participants were describing about cigarette receptacle placement is that the black cigarette receptacles used in this study were located where many of the participants were stating they should be; they were mounted on the trash can poles where a lot of people were coming through, and were easily accessible when individuals entered or exited the beach. In fact, after being shown the receptacle on the trash can pole nearest her, one participant noted that “that’s really good placement…it’s everything I said back there [previously in her interview].” This discrepancy between what participants were saying about receptacle placement, and subsequently being observed improperly discarding their cigarette butt may be explained by the theme that the bins were not being recognized.
The participants expressed being accustomed to looking for particular smoking accommodations, and they stated that the small black canisters were “not something that we’re recognizing. We recognize the tall standing thing.” Participants also expressed frustration that there were not designated smoking areas that they typically look for; “it would be nice if they had a little smoking area set up with ashtrays where they could be disposed of. Designated areas.”

3.3: Didn’t see the receptacles. An additional explanation for the discrepancy between suggested bin placement and being observed improperly discarding a cigarette butt may lie in simply not seeing the black canisters. Probing questions involved drawing the participant’s attention to the black receptacles that had been mounted on the trash can poles. More than half of participants noted that they had not seen those receptacles, “Oh I hadn't seen it, but I see it now!” Sometimes, even after drawing their attention to the receptacle, participants still had trouble seeing them, “Yeah, barely see it. It seems to me like it's blending into the pole.” Additionally, upon being asked if they had looked for receptacles participants often stated that they had in fact looked for a proper receptacle but had seen only the trash cans, not the cigarette receptacles; “I did [look for a cigarette receptacle] and I didn't see anything. I was thinking that was just trash there.”

Participants also appeared to look for signage to help them identify various smoker accommodations. They suggested that signage would help smokers know that the black bins were meant to be for them to discard their cigarette butts. Brightly colored signs including words such as “smoking” or “cigarette disposal” above the canisters were suggested. Additionally, one man stated that signage could provide a reminder to smokers
about alternative disposal methods with words that “tell people to just use their Coke cans
and beer cans to put their cigarette butt out in.” However, this idea of using an alternative
discarding methods carries with it the assumption that the item used to discard the “butt”
into would then itself be properly discarded.

Theme 4: Conscious choice required. The fourth theme to emerge involved
participants deciding what to do with their cigarette butt, and the fact that a conscious
choice has to be made if they were to dispose of it in a way contrary to what they
currently did with it. However, that is not to say that the “automatic” reaction was to
discard it on the ground. This theme simply emerged when participants were asked what
kind of effort it would take for them to use an alternative method of discarding, which
they did not do, as they discarded the butt onto the ground.

Participants noted that they have to make a decision about where to discard their
“butts,” and this requires “a conscious effort.” Participants didn’t believe that this was
necessarily a difficult thought process, or one that required a lot of effort, but they did
recognize that it required a conscious choice about how they wanted to discard the butt.
For example, some participants spoke about how discarding properly would require them
to “find a place to put it [the cigarette butt],” and to find that place they would have to
think about where to put the butt.

Theme 5: Statements contradict behavior observed. This theme represents
statements given by individuals that contradict the improper discarding behavior that they
were observed doing. It encompasses statements that appear to have a social awareness
quality to them. In other words, participants expressed statements that were most likely to appear to be “socially acceptable.”

Social desirability bias may be at play in participants’ answers. This bias is the tendency for individuals to “deny socially undesirable traits and to claim socially desirable ones” (Nederhof, p. 264, 1985). This means that participants may answer questions in what they believe to be a favorable, or socially acceptable way. This can occur in two ways; by “self-deception,” where a person “actually believes a statement to be true of him or herself, even though it is inaccurate,” or “other deception,” where a person “might purposefully misrepresent the truth as a form of impression management” in order to avoid evaluation by others (Millham and Kellogg, 1980 in Nederhof, p. 264, 1985).

5.1: Reported do not leave cigarette butts on ground. The most common “contradictory” statement made (stated by 12 out of 13 participants) was the participant describing that they do not leave their cigarette butts on the ground. Instead, individuals often cited other locations where they claimed to put their cigarette butt such as into their pocket, into a used soda can, or into the trash can. However, the common thread amongst these statements was an adamant claim that they did not discard their cigarette butts onto the ground, but unbeknownst to them, they’d just been observed improperly discarding the butt. Interestingly, one person that admitted they buried the cigarette butt they’d just been observed smoking also stated that they may put those butts somewhere other than on the ground; “I either put them in my pocket or I bury them.”
Additionally, some participants explained that they put their cigarette butts down on the ground temporarily, then remove them when they leave the beach. For example, “I usually start it [a pile of cigarette butts] right there in the sand, before I leave I grab the handful and stick it in a Ziploc bag that’s right in there and we throw it in the trash right along with our beer cans.” While this may have been the case with some individuals, it was certainly not the case with all of them as some individuals clearly gave answers that did not match their actual actions. For example, the researcher observed two participants smoking while walking down the beach along the water’s edge. Upon finishing smoking their cigarettes, both participants discarded the butts into the ocean. When interviewing these participants shortly after their discarding, it appeared they were giving socially acceptable answers rather than the truth as they both stated that they never discard improperly, and that they discard their “butts” into a used beverage can.

The researcher sought to tease out the truth with these two individuals by specifically asking “sometimes I see people smoke and walk down the beach. What if you were to do that? Do you take a can with you, or what's your [disposal] process there?” To this, one of the two participants responded “no, I don't smoke. If you're going to go for a walk, you don't smoke.” While the other participant stated “Or if I do [smoke while walking down the beach], I mean I choose to smoke, so I will literally hold that butt until I get back to dispose it properly.” Yet, both participants had, only minutes before, been observed walking while smoking and discarding their cigarette butts improperly into the ocean.
Because some individuals gave what appeared to be socially acceptable answers, it was possible that participants who made a pile of butts near themselves stated that they were going to pick them up in order to make their behavior appear more socially acceptable. Because the researcher could not predict a participant’s future intentions with the pile of butts they were creating, everyone who stated they created a pile and picked them up later was still classified as an improper discarer given the observed discarding action of placing the cigarette butt onto the ground and the presence of their cigarette butts on the ground at the time of their interview.

5.2: Awareness of fire. Starting a fire from a discarded cigarette butt was another “contradictory” concern expressed by participants. If an individual is discarding their cigarette butt onto the ground, they would not be expected to report being concerned about fire since their actions are contributing to the chance of that fire. However, statements made by participants often indicated that they did in fact consider the risk of starting a fire. For example, one woman said that when discarding her cigarette butt she thinks about the fact that “I need to put that out and make sure it's totally out so that we don't catch anything on fire by being careless.”

Interestingly, because of this risk of fire there was disagreement amongst participants about discarding their cigarette butt into a trash can. One man stated that “you can take the fire off of it and put it in the trash can,” clearly all right with discarding his cigarette butt in the trash can as long as he addressed the risk of fire first. However, others discussed how they would not discard their “butts” into a trash can because “I don't want to ignite something that might be in the trash can.” Additionally, disagreement
was present when talking about smoker-discarding poles as one participant said this is a viable solution to prevent fire; “you stick your cigarette but in them and they make sure it doesn't catch on fire,” while another one claimed that they had seen the receptacle itself on fire before.

5.3: Laws and fines. Laws, and subsequent fines associated with them was something that a number of participants showed concern about. Specifically, participants expressed concern that at some point non-smoking laws could be instituted on the beach. Again, this theme is contradictory to their observed improper cigarette disposal because the participants recognized that their own actions of discarding their cigarette butt onto the ground could lead to the institution of anti-smoking laws on the beach, yet they still discarded improperly.

Participants acknowledged that governments may get involved to regulate smoking locations, but this fact was seen both as a positive and a negative scenario. In a positive statement about government involvement one man recalled the 70’s era and how “everybody screamed about the federal government being in all of our business, but if they hadn't got in our business, we wouldn't have changed.” But, another participant stated that if people continue to discard cigarettes onto the ground “the government's going to say ‘ơp, no smoking on the beach,’” showing clear concern that his smoking freedoms on the beach could be restricted. A few participants echoed this man’s concerns and they talked about how appreciative they were that smoking on the beach was currently not restricted. Participants happily stated that “you don’t even see no smoking signs.”
Despite their concerns over the beach potentially becoming non-smoking, participants indicated that they would follow non-smoking laws; “I would abide by it because I would understand.”

5.4: Feelings of personal responsibility. The majority of participants talked about feeling personally responsible for their cigarette waste. This theme contradicts participant’s observed improper discarding actions because despite these expressed feelings of personal responsibility, participants were still observed discarding onto the ground. Sometimes, this personal responsibility was cited as being an inherent responsibility of a being a smoker, for example “it's your right to smoke and your freedom to smoke. Keep it clean. It's just common sense to me.” One person expanded on this to say that it was a smoker’s responsibility to pick up after themselves or an overarching entity may step in, “I think it should be the person's responsibility versus the government or somebody trying to step in.”

5.5: Other people. Additionally, participants also expressed feeling personally responsible for preventing their cigarette waste from impacting other people. There were two trains of thought expressed here, the first being that cigarettes were unsightly, and the second that other beachgoers could be harmed by stepping on the butts.

Participants indicated that discarded cigarette butts lying on the beach can cause “eyesores” for other beachgoers. For example, one woman stated that “I don't expect anybody else to go look ‘oh God a cigarette butt’ because I left one” Another woman expanded on this to say that she felt responsible to not ruin the beach experience for anyone “I don't want to ruin any kind of experience for anyone else. I don't want someone
to come up and be like ‘oh, there was trash on the ground’ you know and it be because of me.” However, these statements contradict their observed improper disposal because if an individual disposed of their cigarette butt improperly, they would be contributing to those “eyesores” on the beach that they claimed were important not to have.

Participants also appeared to consider others and the fact that they could step on a cigarette butt. Participants considered this to be problematic because people have bare feet on a beach and stepping on a butt could both be “nasty,” or cause injury, such as burns. For these reasons, a number of individuals indicated that they thought about “a place that's out of the way where no one's going to step on them” when considering where to discard their “butt.” It is interesting that they appeared to be considering the impact of their “butt” discarding on other people; however, contradictorily, they didn’t seem to recognize that properly discarding their “butts” in a receptacle would also prevent injury to others.

5.6: Thinking about nature. Participants often mentioned that they were thinking about various aspects of nature, often implying that they do not improperly discard their cigarette butts because they value nature. However, these statements contradict their observed actions of discarding improperly because their cigarette butts are entering the natural environment they indicated they cared about. For example, one participant stated “I fish. I spend a lot of time in the ocean and I understand what it’s like to see a sea turtle out at sea, even raised with plastic stuck to them.” Another participant said that she thinks about nature when choosing how to discard her cigarette butt specifically when she is on Jekyll because she is more aware of the impact that butt could have. She stated “I see the
birds right there and it's in my face and I think ‘I don't want them to get them.’ When I'm going down the road I don't think about it. But with me seeing that and I know that the tide comes up and would get them and I don't want the fish to eat them. I just don't want to hurt them.”

5.7: Knowledge that a cigarette butt CAN impact the environment. In a number of instances participants described ways that the environment could be impacted by improper cigarette butt disposal, specifically that animals could be impacted and that cigarette butts are not biodegradable. Again, if a smoker has an understanding of how their discarded cigarette butt could negatively impact the environment, it’s surprising that they would discard improperly. Therefore, these statements demonstrated participants concern for the environment, but they still discarded butts onto the ground. Their statements contradicted their actions - insinuating the old admonition “do as I say not as I do”.

The majority of participants made statements about animals being impacted. However, many of the statements were vague without much explanation. For example, “I think that animals can get to them and it's not good for them I'm sure, and the environment as a whole.” And, many of the explanations that were provided hinged on the fact that the animals would ingest the cigarette butt and that could harm them such as “[the animals may think it’s] some kind of food and swallow it and choke or mess their intestinal tract up.”

A few participants went into a bit more detail to describe how their cigarette butt would get into the ocean and harm the animals there; “when you throw them on the
ground at the beach generally they’re going to be swept out to the ocean and the animals are probably going to swallow them at some point.”

However, one participant pointed out what may be a reason for this high number of statements about animals. She said “As your survey implied, obviously if there's cigarette butts going into the ocean and an animal swallows them that's not good for them, and on top of that it's part of the food chain.” So, this high number of responses about cigarette butts affecting animals may be attributed to the participants being asked about their thoughts on environmental impacts with “ingestion of cigarette butts can cause intestinal blockage and death in wildlife” being one of the answers they could select on the survey given to them directly before their interview.

A few participants also recognized that cigarette butts are not fully biodegradable. One participant stated “a cigarette butt can last for a very long time through rain and storm and snow and it can be there next year. I mean they do not disintegrate. I understand that.” Often, these realizations stemmed from personal experience of observing cigarette butts persisting rather than breaking down over time. For example, one individual stated that “I've seen them in my driveway and I can tell you that they last a long time.” While another participant described his experience of mowing over butts on his own property saying that created a “fluffy” cigarette butt and “it [the mowing] grinds it, but it does not disintegrate.”

5.8: Social norm is clean beaches. Social norms guide behavior. They are made up of injunctive and descriptive norms. Injunctive norms are an individual’s belief about what behaviors are approved or disapproved of by others (Cialdini, Reno, and Kallgren,
Descriptive norms refer to what behavior is normal or typical in a certain setting (Cialdini, Reno, and Kallgren, 1990).

A few participants specifically noted the cleanliness of Jekyll’s beaches stating that “it’s clean.” Some participants elaborated on this to refer directly to cigarette butts stating that “it's very clean. I don't see cigarette butts laying around anywhere.” These statements are important because they indicate that participants observed that others keep the beach clean which they are picking up on due to the lack of trash they see on the beach. Their statements about there being no trash reflect the idea that they’ve perceived keeping the beach clean is what’s normal or typical in that setting (i.e. the descriptive norm is a clean beach). Therefore, they feel an external pressure to also keep the beach clean.

One participant illustrated the fact that he understood the normal behavior on the beach was to not discard onto the ground; “if you look around people are pretty much policing their brass [picking up their own trash].” In other words, he noticed that other people weren’t discarding trash onto the ground, therefore he perceived the social norm was to have a clean beach.

A number of participants gave statements that indicated there was also an injunctive norm at play; individuals understood discarding cigarette butts onto the beach was disapproved of by others. Their statements indicated they sensed there was an expectation to not discard cigarette butts on the beach. For example, one participant referred to himself and other smokers as “the low society, scum of the Earth smokers”
when talking about improper discarding habits. He considered himself to be “less” of a person because he perceived others to disapprove of his improper cigarette butt disposal.

Additionally, another participant spoke about the $6 entrance fee to access the island and how it “keeps the riffraff and the lower scale, what I call ‘just don't give a care’ [off the island].” He stated that “they don't just pay $6 to ride here and trash the place.” This statement indicates there is an expectation that if a person is committing to pay the entrance fee, then they value the island more than a different “free beach” they could choose. Therefore, this participant indicates that there is an expectation that visitors will not “trash the place,” or that littering is disapproved of on the island.

These statements about beach cleanliness and improper discarding being disapproved of illustrate that smokers understood the social norm of Jekyll Island was to have a clean beach, yet their improper discarding actions of throwing their cigarette butt on the beach contradict their understanding of the social norm.

5.9: Location (Jekyll Island) does not impact discarding behavior. When participants were asked how their experience as a smoker was different at Jekyll Island than another public area the majority of participants indicated that it did not affect their behavior, stating that their behavior doesn’t change based on their location. For example, “it's not [any different]. I treat it the same wherever I go.”

Interestingly, a large number of the individuals that stated location, or Jekyll Island, didn’t impact their experience of being a smoker also described that they always discard their butts properly, but this contradicts their behavior where they were previously witnessed discarding improperly. For example one participant said “it's
[discarding properly into a used beverage container] natural and what we do whether we're at home, out shopping, whether we’re at a public forum like this” yet, moments before, they had been observed discarding their cigarette butt onto the ground.

However, one individual stated that Jekyll Island did not impact his experience of being a smoker because “it's the same as always. Just nonchalantly slinging them out the window or wherever else I went. I have total disregard for all of that, no matter where I am.”
CHAPTER 5 – Discussion

Summary

This study used a mixed mode inquiry to examine the question ‘what influences smokers to improperly discard cigarette butts when visiting a public beach?’ Quantitative and qualitative research approaches were employed to “provide a more complete understanding of the research problem than either approach could provide alone” (Creswell, 2009, p. 4,).

Two hundred and forty-four individuals completed paper questionnaires, and of those, 28 were asked follow-up open-ended questions to further explore the phenomenon of cigarette butt discarding behavior on a public beach from the participant’s point of view. Over half (56%) of the total participants discarded improperly. The questionnaire data were analyzed using a logistic regression, and the interview questions were coded and themes were developed pertaining to the experience of improper and proper cigarette discarding.

Quantitative results indicate that environmental attitudes, environmental awareness, and habits were significant factors in improper cigarette butt disposal behavior. Interviews illustrated that individuals who improperly disposed of their cigarette butt experienced themes involving discrepancy about if cigarette butts are considered to be litter or not, a lack of knowledge, problems with the cigarette receptacles currently in place, the requirement of a conscious choice about how to discard a “butt,” and statements that contradicted the behavior observed. Additionally, interviews with
individuals who properly disposed of their cigarette butts illustrated themes involving the idea that cigarette butts were litter, individuals displayed social awareness, there was an understanding of the cumulative effects of cigarette butts on the beach, there were minimal obstacles to discarding properly, and participants had feelings of personal responsibility. Full results of both quantitative and qualitative inquiries are reported in Chapter 4.

Discussion of the Results and Findings

This section interprets the results and findings. Both quantitative results and qualitative findings will be discussed by stating each result/finding, relating it back to the literature review, and describing why each finding is important.

Discussion of the quantitative results.

Place attachment. Place attachment was not a significant predictor of cigarette butt disposal behavior. Thus, Hypothesis 2 was not supported. This result is supported by the qualitative finding that “location does not impact discarding behavior” where participants stated that Jekyll Island didn’t affect their cigarette discarding, and that their discarding behavior doesn’t change based on their location. Participants’ statements therefore illustrated that place attachment doesn’t affect their discarding behavior.

Additionally, this result may reveal a couple of things about the participants. Place attachment is made up of place identity (an emotional attachment to a place; often the place is incorporated into one’s self-identity) and place dependence (functional attachment to a place; the individual is dependent on a place in such a way that they
believe it is a “good” location for the specific activity they are interested in) (Kyle, Absher, & Graefe, 2003; Kyle et al., 2004; Proshansky et al., 1983; Stokols & Shumaker, 1981; Vaske & Kobrin, 2001; and Warzecha & Lime, 2001) Based on this study, the participants appear to not have an attachment to the island.

This idea can also be supported by the data that showed only 12% of the participants were from within 30 miles of Jekyll Island. Therefore, a very large portion of the participants were coming from far enough away to probably not have the opportunity to visit the island often and this could influence their ability to develop an attachment to it. For example, an attachment often occurs “in an individual whose positively-valenced knowledge of the environment in question largely exceeds the negatively-valenced knowledge” (Giuliani, 2003, p. 151). However, if the individuals have not visited the island enough to have developed positively- or negatively-valenced knowledge, it stands to reason that they would have no attachment to the place, and thus, their discarding behavior is not affected by an attachment to Jekyll Island.

The second thing these results could indicate is that participant’s discarding action is instead more strongly impacted by other factors. These are discussed later on in this chapter.

**Environmental attitudes.** Results indicated that a smoker who scored lower on the environmental attitudes scale, and thus holds less pro-environmental attitudes, was more likely to discard their cigarette butt improperly. Thus, Hypothesis 3 was supported. This result aligns with previous research by Hines et al. (1987) which found a positive relationship between environmental attitudes and pro-environmental behavior;
individuals with stronger pro-environmental attitudes were more likely to engage in pro-environmental behavior than individuals with limited pro-environmental attitudes. This result is important because if an individual does not hold pro-environmental attitudes, then they will be more likely to discard their “butt” improperly.

*Environmental awareness.* Results showed that a smoker who was less aware of the environmental consequences of improper cigarette butt discarding were more likely to discard improperly. Thus, Hypothesis 4 was supported. This result is supported by previous research that found that an individual who recognizes there are adverse environmental problems as a consequence of their behavior may be influenced by that knowledge to protect the environment or develop a personal or moral norm that subsequently guides their behavior to be more pro-environmental, as illustrated in the norm-activation theory of altruistic behavior (Hansla, Gamble, Juliusson, & Garling, 2008, & Schwartz, 1977). This result is important because if an individual does not understand the impact their cigarette butt can have on the environment once it’s discarded improperly, they will not understand the negative environmental consequences of their actions, and therefore will not seek to change that behavior.

This result may be related to the fact that there was discrepancy about if cigarette butts are considered to be “litter” or not. For example, the group of proper discarders considered cigarette butts to be litter, or something that should not be on the ground or left in the natural environment. However, the group of improper discarders disagreed amongst themselves about if cigarette butts were considered to be litter or not. This disagreement also ties into the “lack of knowledge” themes. For example, a theme
emerged that demonstrated participants lacked knowledge about the components found in a cigarette butt. If an individual does not know what’s in a cigarette butt, they can’t be expected to automatically think discarding them improperly will cause a problem to the environment. Thus, they don’t have an awareness of the consequences their improper discarding action could cause and therefore may believe discarding them onto the ground is an acceptable behavior.

The same goes for the sub-theme “lack of knowledge of environmental impacts” where participants could not express HOW the environment would be impacted by a cigarette butt discarded onto the ground. If they don’t understand the environmental impacts that a cigarette butt can have, they don’t have an awareness of the consequences their improper discarding action could cause.

**Habit.** This study found that improper discarders were more in the habit of discarding improperly than proper discarders. Thus, Hypothesis 1 was supported. This means that as improper cigarette discarding became more habitual, the person was more likely to improperly discard the cigarette butt.

This result aligns with research that found habits develop from behavior that is repeated frequently and in the same context; in this case frequency is because of how often most smokers smoke a cigarette, and context is having the physical cigarette to dispose of (Lally et al., 2010; Neal et al. 2012; Neal, Wood, Lally, & Wu, 2009). Once habits are established they then cause past behavior to be repeated efficiently, and eventually automatically (Lally, Van Jaarsveld, Potts, & Wardle, 2010; Neal, Wood, Labrecque, & Lally, 2012). This automaticity then promotes minimal awareness of the
actions that one is performing “in the sense that people do not need to attend closely to what they are doing when they habitually repeat prior behavior” (Verplanken & Wood, 2006, p. 93).

This is important because if a person has a habit of discarding their cigarette butt onto the ground, they may do this automatically, with minimal consideration of the action. Combined with low awareness of the environmental consequences of their actions, improper disposers may not be motivated to use proper cigarette butt receptacles even if they are aware of them. This can be problematic because, as the improper discarders noted, a conscious choice is required to dispose of the cigarette butt in a way that’s contrary to what they were doing.

**Discussion of the qualitative findings - proper discarder themes.**

*Litter.* This group considers cigarette butts to be something that should not be on the ground due to the fact that they cause eyesores, take a long time to disintegrate and therefore may have environmental impacts, and the chemicals in the filters can affect the environment. This is important because these beliefs influenced this group’s desire and commitment to keep their cigarette butts off the beach. Thus, implementing measures that impress upon improper discarders that cigarette butts left on the beach are litter might meet some success.

*Social awareness.* Individuals were aware of social constructs around them as demonstrated by their feelings of belonging to a stigmatized group, and awareness of how their discarding behavior may affect others. This finding is important because this social awareness prompted this group to discard properly to protect their group identity while
they performed a behavior (smoking) that they feel is already unaccepted by most others around them. This social awareness also prompted them to minimize their smoking behavior’s impact on others such as asking people near them if they minded them smoking and then making sure to pick up after they finished smoking. Thus, campaigns to raise social awareness may have some influence on improper discarders.

**Cumulative effects mean negative consequences.** Proper discarders were concerned that if everyone discarded their cigarette butt onto the ground there would be consequences such as toxins entering the ecosystem, the discarded butts would look gross, and smoking bans may be instituted. These recognitions caused the group to realize that they did not want those consequences, so they made sure they weren’t the ones bringing about those potential consequences by properly discarding their cigarette butts. This finding is important because the threat of smoking bans might impact improper discarding behavior.

**Minimal obstacles.** Participants perceived obstacles to discarding their cigarette butt properly to be minimal such as requiring only a low amount of time and effort, and requiring no planning ahead in order to be able to discard properly. This was important because these beliefs promoted an attitude of always being able to find a way to discard properly. Thus, improving access to cigarette butt receptacles and other measures to minimize obstacles could influence improper discarders.

**Personally responsible.** Proper-discarders believed it was their own responsibility to take their cigarette butts with them and dispose of them properly. This caused them to think about their own discarding actions and recognize that others were
not going to pick up the butts; if they discarded onto the ground, the butt would stay there. This subsequently promoted an attitude to pick up their own trash. Thus, promoting responsible smoking behavior campaigns might influence improper discarding.

**Discussion of the qualitative findings - improper discarer themes.**

**Litter or not?** Improper-discardin participants disagreed about if cigarette butts were litter or not. Some thought it was litter, others thought it was harmless or that there were other larger issues to be dealt with. This is important because if a person doesn’t believe a cigarette butt is litter, they would not be expected to care that it was discarded onto the ground. This finding ties into the next theme; lack of knowledge.

**Lack of knowledge.** Participants did not understand what components a cigarette butt contained, and did not know the environmental impacts that cigarette butt could have when discarded onto the ground. This finding is important because if a person doesn’t know what’s in a cigarette butt, they would not be able to understand how a butt discarded onto the ground could affect the environment. Thus, they would not be expected to care about discarding them onto the ground. Therefore, raising awareness of cigarette butts as litter and the impact of cigarette butt litter on the environment might influence improper discarders to properly discard.

**Problems with cigarette receptacles.** Improper-discardin participants exposed issues with the black cigarette receptacles installed on the beach saying that they were not convenient, that they did not recognize the receptacles, and that they simply didn’t see the receptacles. These findings are important because they all contributed to participants not using the cigarette receptacles on the beach.
Previous studies have indicated that smokers do not prefer to discard their cigarette butts into regular trash cans (Bagley, Salazar, & Wetmore, 2012). Therefore, it is important to have designated cigarette butt collection receptacles available to smokers. However, if smokers do not realize these receptacles exist, they cannot be expected to utilize them, and therefore resort to other discarding methods such as improperly discarding onto the ground. Additionally, previous studies have indicated that the distance to a trash receptacle impacts littering behavior where the lowest amount of littering (of all trash, not just cigarette butts) occurred when trash receptacles were less than 20 feet from the individual when they had a piece of trash to discard (Schultz et al., 2013). Therefore, if receptacles are not convenient and well identified, a smoker may choose to discard improperly due to the inconvenience of trying to locate a proper receptacle. This is especially true if that individual does not have any additional information telling them that improperly discarding is unacceptable, such as a social norm, or they lack knowledge that their cigarette butt on the ground is harmful.

**Conscious choice required.** Participants stated that discarding in a way contrary to their current action would require a conscious effort. This is not to say that discarding on the ground was the “automatic” reaction, but simply that discarding properly would require a thought process. This finding is important because it indicates smokers need to make a choice about how to discard their cigarette, and other findings indicate that that choice can be influenced by a variety of factors. For example, a smoker’s discarding choice may be influenced by the convenience of receptacles, or effort required to discard properly. Additionally, this conscious choice may be linked to habitual behavior as well.
as environmental awareness. For example, a person needs to consider how they are going to discard their cigarette, but if they have a habit of improperly discarding, that habit may “kick in” and cause them to automatically discard improperly rather than consciously thinking about their discarding action. Furthermore, if they are not aware of the environmental consequences that discarding a cigarette butt on the ground can have, the smoker would not have a conscious thought telling them to protect the environment because they would not know that discarding onto the ground could cause environmental problems. Combined with raising awareness campaigns and improving access to receptacles, efforts to raise consciousness may not be too onerous for improper discarders to change their behavior.

**Statements contradict behavior observed.** Participants expressed answers to questions that contradicted the observed improper discarding behavior. Social desirability seemed to play a big role here, where participants expressed statements what were most likely to be socially desirable. This is important, and unfortunate because expressing socially desirable answers to questions does not provide a true glimpse into what is causing improper cigarette discarding. If social desirability was at play here it may be possible to capitalize on this influence and impress upon improper discarders to do the socially acceptable behavior and properly discard their butts.

**Implications for Practice**

While research is useful in its own right, one of the primary goals of research should be to guide practice. If research findings are not properly disseminated and applied to the “real world,” then those findings fail to guide management practices. To
put the findings and results of this study that focused on understanding the behavior of improperly discarding cigarette butts on a beach into practice, behavioral interventions must be designed.

Importantly, “the effectiveness of behavioral interventions generally increases when they are aimed at important antecedents of the relevant behavior and at removing barriers for change” (Steg & Vlek, 2009, p. 311). Therefore, intervention strategies recommended from this study focus on factors the findings indicated as being the most influential on cigarette discarding behavior. For this reason, the implications for practice include promoting pro-environmental attitudes, altering habitual improper discarding, promoting awareness of how cigarette butts impact the environment, increasing place attachment, minimizing barriers to proper discarding, and changing policy. For the most effective behavior change intervention, it is recommended that as many of these intervention strategies be implemented as possible.

**Promoting pro-environmental attitudes.** Out of the four constructs this study explored quantitatively (place attachment, environmental attitudes, environmental awareness, and habits) environmental attitudes accounted for the largest portion of the variability in the data. Unfortunately, there is not much research available on how to promote environmental attitude change.

However, one technique from the social psychology literature that may hold some promise for altering environmental attitudes, and subsequently promoting pro-environmental behavior, is cognitive dissonance. This dissonance is “discomfort that occurs when we behave in ways that we see as inconsistent, such as when we fail to live
up to our own expectations,” is experienced as a sort of “pain,” and has been shown to change attitudes (Stangor, C., Jhangiani, R., & Tarry, H., 2015, p. 7). To create this dissonance, and individual must be shown that their attitudes and behavior are inconsistent. When dissonance is created the individual is then prompted to reduce that dissonance (pain) by 1) changing their behavior or attitudes, 2) reducing the dissonant cognitions, for example by acquiring new information that allows them to rationalize their behaviors, or 3) creating new cognitions to counteract the dissonant ones (Stangor, C., Jhangiani, R., & Tarry, H., 2015).

It is apparent from the improper-discarding themes that improper discarders have a desire to be perceived as acting in a socially acceptable way. Perhaps a behavioral intervention could involve pointing out an improper discarer’s socially unacceptable discarding behavior to them directly after that behavior had been observed. The intervention would involve describing to individuals that they had previously been observed discarding improperly (behavior), then information could be given to them about how this is socially undesirable (i.e. specific information about how it affects other beachgoers and the environment). This pointing-out of how their behavior is not aligned with their desire to be socially accepted would create dissonance, thus causing the individual to seek to reduce that dissonance. Of course, while it is “hoped” that this dissonance would be reduced by them discarding properly next time, they could also reduce that dissonance by rationalizing their behavior, as it appeared some improper discarders did with their claims that cigarette butts are not the biggest environmental issue that needs to be dealt with. Further examination of the social psychology literature
about cognitive dissonance should be performed to determine the best way to create dissonance to effectively alter attitudes. Moreover, promoting a social norm of proper butt discarding may also be affective.

**Altering habitual improper discarding behavior.** As individuals repeat a behavior, in the same context, environment-response associations are gradually developed, thus forming habits (Wood, Neal, & Quinn, 2006). The familiar, practiced behavior then becomes automatic when the individual is exposed to the same context, and therefore that habitual behavior is more immediately available than alternatives that require thought (Verplanken & Wood, 2006). This automatic reaction can cause individuals to “hold expectations about the environment” thus creating a type of “tunnel vision” whereby the habitual behavior is repeated unless the context changes significantly (Verplanken & Wood, 2006, p. 92). This “tunnel vision” could explain why a large number of people did not see the cigarette receptacles; they were accustomed to there not being receptacles on beaches.

Therefore, the downstream-plus-context-change approach to changing habitual behaviors is specifically useful to alter habitual improper cigarette discarding actions (Verplanken & Wood, 2006). This strategy includes altering the environmental context in which the undesirable behavior is normally performed in order to disrupt a habit. This in turn “renders people with strong habits vulnerable to new information” and can lead to the formation of new habits (Verplanken & Wood, 2006, p. 96). Context changes can include changes in the physical environment an individual is exposed to, so altering the
environment a smoker is exposed to on the beach is important (Verplanken & Wood, 2006).

One idea for a contextual change on the beach includes increasing the availability of proper discarding options. Importantly though, these must change the context of having a cigarette to discard on the beach enough that individuals who improperly discard out of habit will have their habitual mindset disrupted, thus becoming vulnerable to new information (e.g. the presence of receptacles), and the subsequent formation of new habits (Verplanken & Wood, 2006). Therefore, it is recommended that this contextual change be applied across a wide geographic range, and paired with an educational campaign about the new presence of the receptacles. See the “changing policy” section of this chapter for details.

**Promoting environmental awareness.** It is important to promote an awareness of HOW cigarette butts discarded onto the beach can negatively impact the environment because without that knowledge, an individual cannot be expected not to discard their “butt” on the ground due to concerns about the environment.

Information in these interventions should address areas that participants lack knowledge in, as exposed in this study; components that cigarette butts contain, and how those components then impact the environment when the butts are discarded onto the ground. Additionally, this information can be used to help smokers reach a consensus that discarding onto the ground is considered litter by illustrating that it has negative consequences, thereby promoting attitudes toward proper discarding.
An informational campaign could utilize brochures to convey the components of cigarette butts and negative impacts of those butts when they are discarded onto the ground. These brochures could be distributed to visitors as they pass through the entrance gate to the island. That message would then have the potential to reach each visitor to the island as each person must pass through that gate. Additionally, these messages could be displayed on signage at beach access points to tell visitors of the impacts of improper cigarette discarding directly before they enter the beach.

However, informational campaigns that simply bring awareness about an environmental problem “hardly ever” result in behavior changes unless that behavior is perceived to be “convenient and not very costly in terms of money, time, effort, and/or social disapproval” (Steg & Vlek, 2009, p. 313). Importantly, improper-discarding participants did not perceive proper discarding to be convenient or require only minimal effort. Therefore, it is essential that an informational intervention be paired with interventions that target the other factors in improper cigarette butt disposal. For example, an environmental awareness campaign could be paired with an intervention to make proper discarding more convenient, and less costly in terms of effort. This is discussed further in the following section.

The technique of community-based social marketing may be beneficial in altering improper cigarette discarding behavior on Jekyll Island as it offers an alternative to information-only campaigns. This strategy is rooted in social psychology and “draws from the idea that sustainable behavior change is most effective when it involves direct contact with people and is carried out at the community level” (McKenzie-Mohr, 2011).
This approach has been proven to foster sustainable behavior change, and utilizes five steps to promote that change (selecting behaviors, identifying barriers & benefits, developing strategies, conducting a pilot, and broad-scale implementation). It would be beneficial to utilize the five steps to create a community-based social marketing (CBSM) campaign to alter improper cigarette disposal behavior on Jekyll Island (See the CBSM website for additional information on CBSM and implementing the five steps: [http://www.cbsm.com/public/world.lasso](http://www.cbsm.com/public/world.lasso)).

**Increasing place attachment.** Place attachment was not shown to be a predictor of cigarette disposal behavior in this study. However, that may be due to the fact that the participants did not have an attachment to Jekyll Island. Importantly though, many other studies have demonstrated the ability of place attachment to be a precursor to, and predictor of, environmentally responsible behavior (Hines, Hungerford, & Tomera, 1987; Oetama-Paul; Relph, 1976; Tuan, 1974; Vaske & Kobrin, 2001). Therefore, increasing place attachment to Jekyll Island in smokers may decrease improper cigarette disposal on the island. Specific interventions could include marketing strategies that target the development of place identity amongst the smoker population. These interventions should create an emotional attachment to Jekyll Island, and cause the smokers to incorporate the place into their self-identity. Additionally, marketing strategies could target the development of place dependence to Jekyll Island in smokers, demonstrating how and why this place is a good location for the specific activity they are interested in and why it is an important ecosystem, thus helping them to develop a functional attachment to the place and subsequently promoting in them a desire to protect it.
Minimizing barriers to proper discarding. Human behavior does not depend on motivations alone (Steg & Vlek, 2009). Instead, contextual factors, such as infrastructure, also influence behaviors an individual will perform (Steg & Vlek, 2009). For this reason, it is important that smokers have sufficient infrastructure in which to discard their cigarette butts properly.

Participants in this study indicated they look for specific infrastructure including cigarette waste-specific receptacles and “designated smoking areas.” The type of cigarette disposal receptacle matters as smokers indicated they did not recognize the small black cigarette canisters utilized in this study, but instead “recognize the tall standing thing.” The designated areas participants described would include “little smoking areas set up with ashtrays where [cigarette butts] could be disposed of.” This type of accommodation could be envisioned as a specific location on the beach smokers are asked to go to in which they smoke and discard their butts in the receptacles provided in that location. For example, a shade canopy could be installed at the end of each beach access point and under that canopy there would be a cigarette receptacle.

Participants noted it is important to clearly indicate that receptacles are for cigarette waste. To communicate this, participants recommended brightly colored signs placed above receptacles with the words “smoking” or “cigarette disposal” on them. Additionally, the smoking areas with canopies over them should be designated as such with similar signage.

Proximity to a cigarette receptacle is also important and participants stated having them spread out along the dunes would allow them to be more convenient to use while
they were on the beach. They also stated a useful place to put cigarette receptacles would be “anywhere that's going to have a lot of people coming through it,” such as “on the end of the guardrail, or where you’ve got the trash cans up they could have one on each side.”

**Changing policy.** If smoking is banned on a beach, cigarettes would no longer be used there, so it stands to reason that improper cigarette disposal on that beach would no longer be an issue. In fact, smokers supported this idea and stated that they would abide by these laws if they were in place. However, this answer could have been driven by participants’ socially desirability – why would someone openly admit that they would break a law? Support for this being a socially desirable answer also comes from the smokers who demonstrated a concern that instituting a smoking ban would hinder their beach experiences. Additionally, a number of smokers cited the fact that they were allowed to smoke on the beach was a factor in their choice to visit Jekyll Island’s beaches.

Importantly, Jekyll Island is a popular tourist destination whose economy relies heavily on the tourism industry. Therefore, instituting a smoking ban on Jekyll Island could hinder beach experiences for some smokers and could cause individuals to select another beach to visit, would not be a wise management strategy. However, this may be more than offset by making the beach more attractive to non-smokers.

However, large-scale policy changes can solicit behavior change by restricting undesirable behaviors (such as smoking on the beach), but policies can also be utilized to “increase the ease of performing certain behaviors” (Verplanken & Wood, 2006, p. 98). So, instead of instituting a smoking ban on beaches, perhaps policy that requires cigarette
discarding receptacles at all public beach access points across the nation would be a better use of policy. In addition to making the behavior of discarding properly easier by providing receptacles, the presence of cigarette receptacles at all public beaches would contribute to the formation of a new habit through the aforementioned environment-response associations and subsequent contextual shift.

The presence of cigarette receptacles at all beaches could cause the needed shift in contexts to release individuals from their previously held expectations of not having cigarette discarding receptacles on beaches. The increased presence of receptacles at all beaches could cause smokers to begin expecting receptacles on the beach, thereby creating a habit of looking for receptacles rather than habitually discarding onto the ground.

Again, this intervention would be most effective when combined with others. For example, it would be beneficial to have an educational campaign that discussed the environmental impacts of cigarette butts on the ground, but then also educated people about the new policy of having receptacles at all beaches and made them aware to watch for the new receptacles.

**Study Limitations**

This study was limited in a few ways. First, constraints of only a few weeks to survey and only one researcher on the beach required the researcher to make a discarding action classification based on what they observed immediately after their observation of smoking behavior, thus allowing them to give that individual a questionnaire, ask them follow-up questions, and move on to the next participant in a timely manner. Therefore,
individuals who set the butt beside themselves (some participants created small piles of cigarette butts near their belongings) were classified as improper discarding because it was impossible to determine if they would remove those butts from the beach when they left for the day, or leave them there. With different survey techniques, or increased personnel, it would be beneficial to remove the ambiguity around these “piles of butts” by observing the beachgoers until they left the beach and recording how the cigarette butts were ultimately disposed of; were they left on the beach, or did that smoker take the butts with them?

Time constraints also limited the study to occurring only on weekends, when beachgoer numbers were at their highest, thus increasing the change for the researcher to locate participants. However, had this study occurred during the week, it may have given different results. For example, perhaps place attachment would have been a significant factor in disposal action as maybe there would have been more locals who had an increased sense of place attachment.

A second limitation was a perceived lack of participants. The researcher was concerned that participants may be difficult to locate, so the study protocol was designed to utilize the same smokers for both questionnaires and follow up interview questions, thus reducing the number of participants that would have to be located. However, in the analysis phase of this study it became clear that this technique solicited socially desirable answers from some participants to interview questions because of viewing topics being addressed on the questionnaire. Therefore, it would be beneficial to utilize two different survey populations for the different study methods.
A third limitation is the fact that this study was conducted on only one beach, thus, extrapolation of its results to other areas is limited. However, it still exposed a number of important factors that other beach managers can use as a starting point to understand cigarette littering in their area.

This study only looked at four predictor variables (place attachment, environmental attitudes, environmental awareness, and habits), but as indicated by the qualitative findings, many other factors are at play in improper cigarette disposal.

**Future Research**

This study was guided by the fact that the presence of cigarette butts in the natural environment negatively affects that environment. For this reason, when designing the study the researcher primarily relied on literature related to environmental behavior, thus the study was framed in a context that participants make choices in relation to the natural environment. However, it must be acknowledged that cigarette butt discarding could have nothing to do with consideration of the natural environment. This idea is supported from the qualitative findings which exposed numerous themes that were unrelated to environmental consideration. For example, social awareness and feelings (or lack thereof) of personal responsibility.

Therefore, it is also appropriate for future researchers to “think outside of the box” by looking beyond environmental literature when trying to understand and subsequently impact cigarette discarding behavior. While the overall problem being addressed will still be that of trying to alter the environmentally destructive behavior of improper cigarette butt disposal, additional influential factors may lie in behavioral
research contexts. Future research should incorporate additional social and behavioral psychology literature. This literature may better explain social awareness and how that can influence individual’s behavior. Importantly, some of this type of research has already been done in relation to littering behavior and social norms are one social influence that seems to play a large role in individual’s littering behavior. However, what additional factors are related to social awareness?

Additionally, future research could look to psychology concepts about how one’s feelings of personal responsibility for cigarette discarding is formed, and how feelings of personal responsibility may be promoted in the smoker population to influence more proper disposals of cigarette butts. Future research should utilize psychology literature to also expose additional personal attributes that could impact cigarette disposal behavior.

Place attachment should be explored further as a factor in improper cigarette disposal. Place attachment may play a stronger role at different locations based on the demographics of the beachgoers. Jekyll Island is a vacation destination, and as such, only 12% of the participants in this study were “locals.” Therefore, it is understandable that place attachment did not influence the majority of the study participant behavior; they had not formed an attachment to the place. However, if place attachment proves to be a factor at another location, then intervention strategies that promote a stronger attachment to place, and subsequent protection of that place, would be appropriate in that location. Furthermore, methods to increase place attachment to a place infrequently visited could be investigated.
Future research techniques should also take care to reduce social desirability. While this was attempted in this study by way of observing participant’s discarding behavior rather than asking them to self-report it, this was not enough to solicit answers free from social-desirability-bias in some cases. For example, much of the information given by the improper discarding participants may have been influenced by social desirability. Suggestions for how to reduce social desirability bias are as follows:

1. Reduce ambiguity in what ultimately happens to discarded cigarette butts. Categorize individuals into proper and improper categories only after they have left the beach and it is clear what has occurred with the cigarettes they were smoking on the beach. This is specifically important for the smokers who created a pile of butts on the beach, but then claimed in their interviews that they would pick them up at a later time. If observing these individuals leaving the beach and confirming that they did or did not take their “butts” with them is not feasible, they should be excluded from the survey population to ensure absolute samples of improper and proper discarders.

2. Do not give the questionnaire to individuals who are being interviewed. While this will by no means reduce all social desirability bias, it will require smokers to have to generate their own responses to research questions rather than reciting information they had previously seen on the questionnaire, and thus could assume the project’s purpose of questioning cigarette littering, and therefore feed the researcher answers they felt would be more socially acceptable.
Finally, future research should continue to utilize a mixed mode research approach. Qualitative data allowed the researcher to test objective theories about habits, place attachment, environmental attitudes, and environmental awareness. Qualitative data allowed the researcher to learn about improper cigarette butt discarding from the participants’ point of view and thus offered a more in-depth exploration of the phenomenon. An example of this can be seen in the place attachment results and findings where the quantitative data demonstrated that place attachment for improper discarders was low, and interviews with the participants supported this result. Utilizing the two methods illustrates how researchers can learn more about a phenomenon using multiple forms of data collection and analysis. A pure quantitative study would have missed some of the richness gained from the qualitative findings.

**Future research to guide practice.** Due to funding and time constraints this research is ending at the completion of this thesis. However, to fully understand if recommended solutions work in real-world contexts, the recommendations outlined in this thesis should be implemented and their effectiveness in impacting cigarette littering behavior should be measured. Through this process, additional factors influencing cigarette disposal could also be discovered as issues with these recommendations are exposed.

As part of this “intervention testing” process, various contextual shifts to break habitual improper discarding behavior could be evaluated to expose which shifts have the most impact in altering person’s cigarette discarding habits. This would allow beach
managers to implement the most effective strategy to break the habit of improper cigarette discarding.

Additionally, participants noted that useful places to put cigarette receptacles on the beach would be “anywhere that's going to have a lot of people coming through it,” such as “on the end of the guardrail, or where you’ve got the trash cans up they could have one on each side.” However, despite receptacles being in these locations, participants still did not use them. Therefore, further exploration into reasons why these were not used should be performed. Were reasons purely contextual (such as the idea that participants did not recognize the receptacles), or is there something that is more behavioral occurring?

**Conclusion**

This study examined the environmental issue of cigarette butt litter by utilizing a mixed mode approach to provide insights to the question ‘what influences smokers to improperly discard cigarette butts when visiting a public beach?’

It was found that environmental attitudes, environmental awareness, and habits were significant factors in improper cigarette butt disposal behavior. Interviews illustrated that individuals who improperly disposed of their cigarette butt experienced themes involving discrepancy about if cigarette butts are considered to be litter, a lack of knowledge, problems with cigarette receptacles currently in place, the requirement of a conscious choice about how to discard a “butt,” and statements that contradicted the behavior observed. Interviews with individuals who properly disposed their cigarette butts illustrated themes involving the idea that cigarette butts were litter, individuals
displayed social awareness, there was an understanding of the cumulative effects of cigarette butts on the beach, there were minimal obstacles to discarding properly, and feelings of personal responsibility.

By understanding the human behaviors that contribute to the environmental issues, such as that of improper cigarette disposal, behavioral interventions can be designed and implemented to target the behavior, thus reducing the environmental issue. Therefore, recommendations for decreasing improper cigarette butt discarding on a public beach include: promoting pro-environmental attitudes amongst smokers, altering habitual improper discarding behaviors, promoting environmental awareness of how cigarette butts negatively impact the environment, minimizing barriers to proper discarding, increasing place attachment, and changing policies about cigarette receptacles on beaches.

Understanding environmental issues from the perspective of the environmentally degrading behaviors causing them allows behavioral interventions to be designed to alter undesirable behaviors and the world’s natural environment can be protected.
References


Lee, J. (2012). Get your butt off the ground! Consequences of cigarette waste and litter-reducing methods.


Oetama-Paul, A. Place attachment as a construct for understanding individual pro-environmental behaviors in the workplace.


APPENDICES
APPENDIX A – INSTITUTIONAL REVIEW BOARD APPROVAL

Official Approval Letter for IRB project #16135 - New Project Form
June 12, 2016

Maranda Miller
School of Natural Resources

Mark Burisch
School of Natural Resources
HAB 512, UNL, 60503-0935

IRB Number: 20160616135E
Project ID: 16135
Project Title: Cigarette Butt Littering Behavior

Dear Maranda:

This letter is to officially notify you of the certification of exemption of your project for the Protection of Human Subjects. Your proposal is in compliance with this Institution’s Federal Wide Assurance 00002238 and the DHHS Regulations for the Protection of Human Subjects (45 CFR 46) and has been classified as exempt.

You are authorized to implement this study as of the Date of Exemption Determination: 06/13/2016.

Review conducted using exempt category 2 at 45 CFR 46.101.
Funding: N/A

We wish to remind you that the principal investigator is responsible for reporting to this Board any of the following events within 48 hours of the event:
- Any serious event (including on-site and off-site adverse events, injuries, side effects, deaths, or other problems) which, in the opinion of the local investigator was unanticipated, involved risk to subjects or others, and was possibly related to the research procedure;
- Any serious accidental or unintentional change to the IRB-approved protocol that involves risk or has the potential to recur;
- Any publication in the literature, safety monitoring report, interim result or other finding that indicates an unexpected change to the risk/benefit ratio of the research;
- Any breach in confidentiality or compromise in data privacy related to the subject or others;
- Any complaint of a subject that indicates an unanticipated risk or that cannot be resolved by the research staff.

This project should be conducted in full accordance with all applicable sections of the IRB guidelines and you should notify the IRB immediately of any proposed changes that may affect the exempt status of your research project. You should report any unanticipated problems involving risks to the participants or others to the Board.

If you have any questions, please contact the IRB office at 402-472-0965.

Sincerely,

Becky R. Freeman
CIP for the IRB

University of Nebraska-Lincoln Office of Research and Economic Development
mggrant.unl.edu
May 25, 2016

University of Nebraska – Lincoln
Institutional Review Board
2200 Vine Street
275 Whittier Research Center
Lincoln, NE 8583

Dear Institutional Review Board Members,

The Jekyll Island Authority (JIA) senior staff and research advisory committee, are aware of the proposed study "Understanding Cigarette Butt Littering Behavior on Public Beaches: A Case Study of Jekyll Island" by prospective Master of Science student Maranda Miller, and her advisor Dr. Mark Barbach.

We understand that Maranda will study cigarette littering behavior on Jekyll Island’s beaches during the summer of 2016 through the use of behavioral observations, questionnaires, and face-to-face interviews.

This letter is to inform the IRB that the JIA is aware of, and supports, the proposed research project.

Sincerely,

Ben Carwell
Director of Conservation
The Jekyll Island Authority
912-635-9384
### APPENDIX C – HABIT MEASURES

<table>
<thead>
<tr>
<th>Question</th>
<th>Strongly Agree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discarding a cigarette butt on the ground is something . . .</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I do without having to consciously remember.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I would find hard not to do</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
## APPENDIX D – PLACE ATTACHMENT MEASURES

<table>
<thead>
<tr>
<th>Measuring</th>
<th>Question</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identity</td>
<td>I feel like this Jekyll Island’s beach is a part of me</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Dependence</td>
<td>This beach is the best place for what I like to do</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Dependence</td>
<td>I get more satisfaction out of visiting this beach than from visiting any other place in the world</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Identity</td>
<td>Visiting this beach says a lot about who I am</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
## APPENDIX E – ENVIRONMENTAL ATTITUDE MEASURES

<table>
<thead>
<tr>
<th>Question</th>
<th>Strongly Agree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Scale 01. Enjoyment of Nature</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>07. I enjoy spending time in natural settings just for the sake of being out in nature.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10. I think spending time in nature is boring. (R)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td><strong>Scale 09. Human Dominance over Nature</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>02. Human beings were created or evolved to dominate the rest of nature.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>03. Plants and animals have as much right as humans to exist. (R)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td><strong>Scale 11. Ecocentric Concern</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>02. It makes me sad to see natural environments destroyed.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>05. I do not believe protecting the environment is an important issue. (R)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
APPENDIX F – ENVIRONMENTAL AWARENESS MEASURES

1. Which of these items, if any, are contained in cigarette butts? Circle all that apply.

<table>
<thead>
<tr>
<th>Cotton</th>
<th>Paper</th>
<th>Plastic</th>
<th>Metals</th>
<th>Asbestos</th>
<th>Cellulose acetate</th>
</tr>
</thead>
</table>

2. In your opinion, are any of these statements about cigarette butts true? Circle all that you think are true.

| Asbestos from cigarette butt waste can pollute the air. |
| Plastics can emerge from cigarette butts and pollute the ocean. |
| Metals in cigarette butts can leak out and pollute soil/sand. |
| Ingestion of cigarette butts can cause intestinal blockage and death in wildlife. |
| Cigarette butt components break down quickly and are not a problem for the environment. |

Note: Participants received a composite score of awareness for each of these questions. For example, if they circled all correct answers on either question they received a “very aware of their behavioral consequences” rating, and if they circled incorrect answers for either question, they received a “not very aware of their behavioral consequences” rating.
APPENDIX G – QUALITATIVE QUESTIONS

Qualitative Questions Script (only a subset of all survey participants will be asked follow-up questions)

Thank you for taking the survey. Would you be willing to answer a few open ended follow up questions about your experience of smoking on Jekyll Island? These will allow you to express your thoughts in your own words.

1. Please briefly describe your experience so far on Jekyll Island.
   a. Clarifying statement: For instance what activities have you done during your time on Jekyll? What brought you to Jekyll Island?

2. Please describe how your experience as a smoker here at Jekyll Island is different than a visit to any other public area.

3. Please describe the decision process you use when disposing of (trash).
   a. How about disposing of cigarette butts.

   b. If access to ashtrays were more convenient, on Jekyll Island? What other things would influence your use of them?

4. If public disposal receptacles for cigarette butts are not convenient, what other methods of discarding could possibly be used? What does that require of you? What are some obstacles of that?

5. Please describe your thoughts on environmental impacts a cigarette butt can have when discarded onto the ground.

6. Please describe anything you would like to see Jekyll Island implement to accommodate smokers.

   Follow up question if not previously asked: If access to ashtrays were more convenient on Jekyll Island what other things would influence your use of them?
APPENDIX H – CIGARETTE RECEPTACLE PLACEMENT AT BEACH ACCESS POINTS

Photo A. Access #30 - Tortuga Jack’s

Photo B. Access #32 – Great Dunes Pavilion
Photo C. Access #34 – Great Dunes South Pavilion

Photo D. Access #38 – Village Green
Photo E. Access #39 – Westin

Photo F. Access #45 – Days Inn
APPENDIX I – SCRIPT RESEARCHER USED TO INTRODUCE PROJECT

Introduction Script

Hi, my name is Maranda. I am a graduate student at the University of Nebraska, Lincoln. We are conducting research on beachgoers and their smoking experience on Jekyll Island.

Your opinion is very important for this study. It will take 5-10 minutes to complete the survey. After you’re done we have tokens of our appreciation that you could choose from. Would you be willing to help us out with our study by taking a short survey?

Please read over this informed consent form. It describes how this data will be used, what you will receive in return for taking the survey, and certifies that you voluntarily consent to taking this survey.
APPENDIX J – CONSENT FORM GIVEN TO PARTICIPANTS

INFORMED CONSENT FORM

Studying Smoking Behavior on Public Beaches

Purpose:
This research project aims to obtain information on smoking behavior on public beaches. You must be 19 years of age or older to participate. You are invited to participate in this study because you are a smoker on a public beach.

Procedures:
You will be asked to complete a short survey. The survey will take 5-10 minutes and will be conducted while you are on the beach. Immediately following the survey, you may also be asked to participate in some follow up personal interview questions. These will allow you to express your thoughts and opinions regarding smoking behavior. They may take between 15-30 minutes to complete.

Benefits:
There are no direct benefits to you as a research participant.

Risks and/or Discomforts:
There are no known risks or discomforts associated with this research.

Confidentiality:
Any information obtained during this study which could identify you will be kept strictly confidential. The data will be stored in a locked cabinet in the investigator’s office and will only be seen by the investigator and her advisor during the study and for 2 years after the study is complete. The information obtained in this study may be published in scientific journals or presented at scientific meetings but the data will be reported as aggregated data.

Compensation:
You will receive no compensation for participating in this project. However, after completing the survey you may obtain a small token of our appreciation of your participation.

Opportunity to Ask Questions:
You may ask any questions concerning this research and have those questions answered before agreeing to participate in or during the study. Or you may contact the investigator(s) at the phone numbers below. Please contact the University of Nebraska-Lincoln Institutional Review Board at (402) 472-4963 to voice concerns about the research or if you have any questions about your rights as a research participant.

Freedom to Withdraw:
Participation in this study is voluntary. You can refuse to participate or withdraw at any time without harming your relationship with the researchers or the University of Nebraska-Lincoln, or in any other way receive a penalty or loss of benefits to which you are otherwise entitled.

Consent, Right to Receive a Copy:
You are voluntarily making a decision whether or not to participate in this research study. After having the informed consent form read to you, or reading the informed consent form yourself, completing the survey qualifies as informed consent.

Name and Phone number of investigator(s)
Marnada Miller, Principal Investigator Office: (402) 381-2506
Mark Bublitz, Ph.D., Secondary Investigator Office: (402) 472-8210
512 Harlan Hall / P.O. BOX 830886 / Lincoln, NE 68583-0886 / (402) 472-8210 / http://www.unl.edu