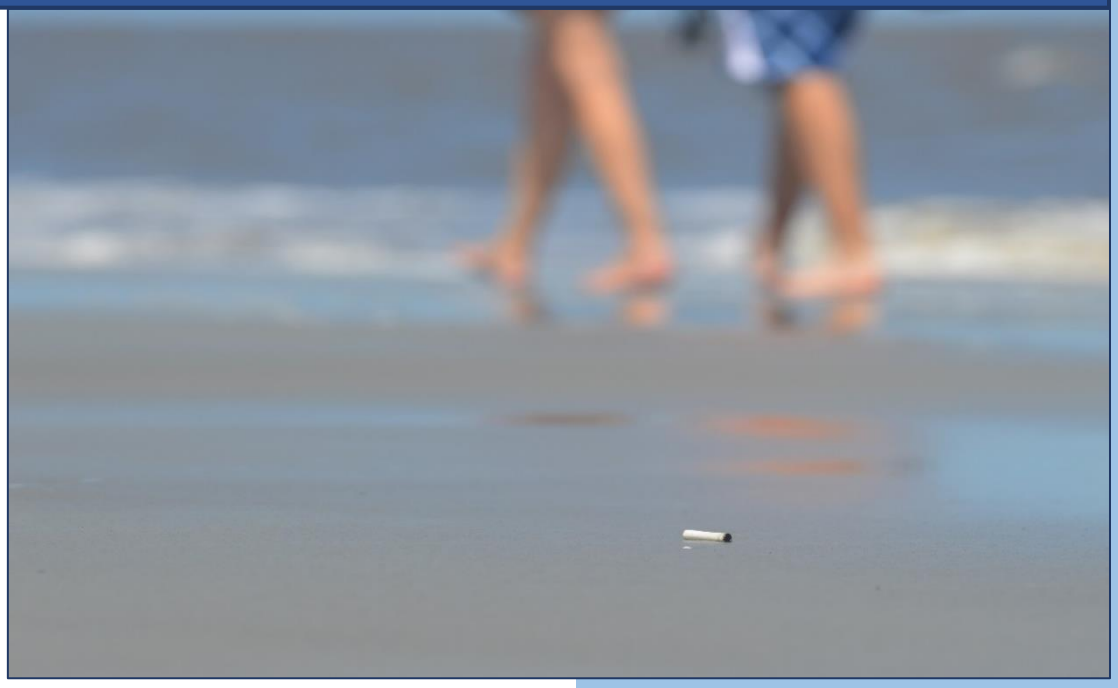
Understanding Cigarette Butt Littering Behavior on a Public Beach: A Case Study of Jekyll Island Georgia



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Section 1 - Introduction

Conservation of natural resources and promotion of family-friendly tourism activities are vital to Jekyll Island. As it is stated in the Jekyll Island Authority (JIA) Master Plan "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 JIA has reported approximately 1 million people visit the island annually (Jekyll Island Authority, 2015). As such, tourism is instrumental to Jekyll Island's economy, and that tourism contributes to the overall economy of Glynn County. According to a report put out by Glynn County (2014) the unemployment rate in the county is consistently within one point of the rest of the state, primarily due to tourism.

Unfortunately, natural resources and tourism on the island can be impacted by improper cigarette discarding. The Georgia Sea Turtle Center's (GSTC) Marine Debris Initiative has collected over 31,100 cigarette butts from Jekyll Island's beaches, which accounts for 32% of the total plastic debris found on Jekyll Island between the years 2012-2017 (Georgia Sea Turtle Center, 2017; University of Georgia, 2017).

The presence of these cigarette butts can be problematic for the ecosystem of the island. For example, cigarette filters do not biodegrade when discarded onto the ground, but instead accumulate in the water and soil, thus contributing to the pollution of natural resources (Clean Virginia Waterways, 2016; Novotny, Lum, Smith, Wang, & Barnes, 2009; Puls, Wilson, & Holter, 2011; Robertson, Thomas, Suthar, & Brown, 2012). Additionally, cigarettes can leech toxic chemicals into the environment (Moerman & Potts, 2011), and the chemicals can harm living organisms that are present in that area (Micevska, Warne, Pablo, & Patra, 2005). Finally,

ingestion of cigarette butts can have detrimental effects on animals (Tourinho, Ivar do Sul, & Fillmann, 2010).

The presence of cigarette butts can also impact people and subsequently impact tourism. For example, ingestion of cigarette butts by children can cause nicotine poisoning (Mowry, Spyker, Brooks, McMillan, & Schauben, 2015). Leachates, as mentioned above, can expose humans to heavy metals and chemical residues not typically found in natural environments (Novotny, Hardin, Hovda, Novotny, McLean, & Khan, 2011). Stepping on an unextinguished cigarette butt can burn bare feet, and tourist attitudes about, and subsequent use of, a beach can be impacted by the mere presence of cigarette butts on the beach.

Tourists choose beaches for a variety of reasons, among them are their scenic qualities and cleanliness (Vaz, Williams, Silva, & Phillips, 2009). For example, Williams and Barugh (2014) found that litter-free sand was ranked as the highest preference beach area when beachgoers were asked which beach qualities they preferred, and Semeoshenkova (2011) demonstrated that clean sand was one of the most important reasons beachgoers selected a specific beach. Importantly, cigarette butts have been ranked in the top 20 most offensive beach debris items as noted by tourists (Tudor & Williams, 2003). Therefore, the presence of cigarette butts has the potential to harm Jekyll Island's tourism industry.

Based on the research outlined above it is clear that the presence of cigarette butts on the beach can conflict with the JIA goals of protecting the natural resources and promoting tourism on Jekyll Island. This study examined cigarette butt discarding behavior and provides insights that allow a better understanding of cigarette butt littering behavior and ways to combat cigarette littering. Thus, the findings discussed in this report provide ways to protect the natural

environment, and help to maintain tourism, particularly the nature-based tourism industry of Jekyll Island.

Purpose Statement

Cigarettes do not occur naturally in the environment; thus, cigarette butts on a beach are a consequence of human behavior. For this reason, it is important to combat this environmental issue by examining the human behavior leading to it. Therefore, the purpose of this study was to investigate factors that influence the improper disposal of cigarette butt behavior. The data gathered in this study uncovered information that will allow the JIA to take steps to combat improper cigarette butt discarding behavior, thus protecting the natural environment on Jekyll Island, sustaining the island in a state that is welcoming to tourists, and subsequently helping maintain the economy of the island.

Research Question

This study addressed the following question: What influences cigarette smokers to improperly discard cigarette butts when visiting a public beach?

Section 2 – Literature Review

Factors Studied in This Research Project

This study assumed 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 in the scientific literature to affect pro-environmental behavior and then extrapolates these to cigarette littering behavior. These personal attributes are habits, place attachment, environmental attitudes, and environmental awareness.

Habits. 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 also drive habit formation (Lally et al., 2010; Neal et al. 2012). Additionally, habit strength has an effect on the performance of a specific behavior whereby strong habits are not easily influenced (Ouellette & Wood, 1998).

Habit formation can be extrapolated to cigarette discarding. Habits develop from repeating a behavior, and smokers may 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 cigarette butt discarding behavior is place attachment. This component is important to understand because of its potential 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 is "an emotional bond between a person and a particular place" (Williams & Vaske, 2003, p. 838). Importantly, place attachment often occurs "in an individual whose positively-valenced knowledge of the environment in question largely exceeds their negatively-valenced knowledge" (Giuliani, 2003, p. 151).

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). Place dependence, on the other hand, 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).

Research indicates 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 (Jorgensen &

Stedman, 2001; Kyle et al., 2003). 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 could affect an individual's cigarette butt discarding behavior 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" (Pam, 2016). Importantly, individuals with strong pro-environmental attitudes are more likely to engage in pro-environmental behavior than individuals with limited pro-environmental attitudes (Hines et al., 1987).

Additionally, individuals perform pro-environmental behaviors in relation to the "cost" of the behavior to that individual. Diekmann and Preisendoerfer (2003) demonstrated this by showing 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. Environmental attitudes have also 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). Environmental attitudes have had a significant effect on behavioral choices in each of these areas. Therefore, these studies

have demonstrated environmental attitudes to be a predictor of environmental behaviors. Based on the findings of these studies 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 that could impact an individual's cigarette discarding behavior is their 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).

This means that the individual recognizes there are adverse environmental problems as a consequence of their behavior (Hansla, Gamble, Juliusson, & Garling, 2008). Importantly, awareness of consequences was found to be a predictor of general pro-environmental behavior in a large number of studies (Bamberg & Möser, 2007; Cottrell, 2003; Finger, 1994; Hansla et al., 2008; Hines et al., 1987; Hopper & Nielsen, 1991).

Based on the theories and studies outlined above we can infer that an individual's cigarette discarding behavior may be impacted by 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.

Section 3 – Methods

Mixed Mode Study Design

This study utilized both quantitative and qualitative research approaches. This method 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).

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.

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). Qualitative research empowers 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).

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" discarder rather than asking them how they typically discarded their "butt" (see full definitions in Appendix A). This was done to reduce self-report bias (answering "favorably" as opposed to truthfully).

Study Design

Quantitative design.

Questionnaire. A questionnaire was designed to address each hypothesis related to this study. The following section is an overview of how each hypothesis was tested.

Habits. The Self-Report Habit Index (SRHI) was utilized to investigate habits as a predictor of improper cigarette discarding behavior (Verplanken & Orbell, 2003). Survey

questions were adapted to fit Jekyll Island's context and were measured with a 5-point Likert scale. Examples of these items can be seen in Appendix B.

Place attachment. The Williams (2000) place attachment scale was adapted for the context of this study. Examples of adapted items can be seen in Appendix C.

Environmental attitudes. The Environmental Attitudes Inventory (EAI) was used in this study because it focuses on an individual's attitudes in relation to the environment. Survey items for this scale were drawn from 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 D.

Environmental awareness. The questions in the Awareness of Environmental Consequences Measures table shown in Appendix E were largely created by the researchers 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. Open ended questions were asked with follow-up probing questions which allowed the researcher to see the issue from the participant's viewpoint. 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 F.

Survey process. The study period ran from June 24th until August 7th, 2016. Survey days were primarily on weekends, and one of the researchers was present on the beach for 6-9 hours on survey days. More details are available in Appendix H.

The researcher located smokers on the beach by walking transects in a north and south orientation along the beach between access points point #30 and #45 each day (as seen in Figure 1). She watched for white objects in beachgoers hands, the movement of their hands to their mouths, and for puffs of smoke in the air. She also used her sense of smell which was surprisingly influential in being able to locate someone smoking on the beach. Details can be found in Appendix I.

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. Helpers were not allowed to interact with potential survey participants, they were only allowed to observe smoking behavior. For information about how they did this see Appendix J.

In order for a smoker to be eligible to be a survey participant they had to be observed discarding their cigarette butt so that the researcher could classify them as an "improper" or "proper" discarder. To do this, whenever the researcher located someone smoking she would remain in the vicinity of the smoker until they discarded their butt. See Appendix K for more information.

It was important for the researcher to appear professional during this study as she was associated with a research university, yet she did not want to influence beachgoer's activity by wearing a uniform and appearing to be an "authority figure" on the beach. For this reason, it was

decided that the researcher would try to blend in as much as possible. She also had to protect herself from the harsh sun and intense heat of the beach environment, so she wore a UV protection long-sleeved field shirt, or a swimsuit and a cover-up, shorts, baseball hat, sunglasses, and flip-flop sandals. An additional discussion about the choice of attire is available in Appendix L.

Once the researcher located someone smoking and observed how they discarded the butt she approached the smoker and explained who she was, described the project and distributed a survey consent form, asked if they would be willing to participate in a survey, then handed out the survey. Upon completion of the paper survey the researcher asked if the participant would be willing to answer some open ended follow up questions, then proceeded with the qualitative interview questions if the participant agreed. Additional steps can be found in Appendix M.

Installing cigarette receptacles. Research has indicated that receptacles specifically designed for cigarette butt disposal influence discarding behavior (Bagley, Salazar, & Wetmore, 2012). Out of the smokers surveyed in Bagley, Salazar and Wetmore's study (2012), 54% noted that they avoided using trash cans to dispose of cigarette butts for fear of causing a fire, and 21% expressed 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).

To ensure smokers in this study had access to receptacles specifically designed for cigarette butt disposal the researcher installed black cigarette receptacles at six beach access points on Jekyll Island's oceanfront prior to the commencement of this study (Figure 1 and Photo 1). The canisters were mounted onto poles that already contained trash and recycling receptacles

(Photo 2). Refer to Appendix G for photo documentation of cigarette receptacles mounted at each beach access.

Figure 1. 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 six beach access points.

Photo 2. Cigarette receptacle mounted on pole at beach access point that already contained trash and recycling receptacles

Section 4 – Results and Findings

Demographic Information

Demographic information describing participants is below.

Quantitative Phase

- 244 participants
  - Cigarette Disposal Observed
    - 107 (44%) discarded cigarette properly
    - 137 (56%) discarded cigarette improperly
  - Age
    - Range - 19-66 years old
    - Mean - 39 years old
  - Gender
    - 109 males
    - 133 females
      - 2 participants did not report their gender
  - Home Location Distance from Jekyll Island
    - 227 participants gave valid zip codes
      - Range - 0-1947 miles from Jekyll Island
      - Mean - 231 miles from Jekyll Island
      - 28 participants (12%) were from the local area (Brunswick and Jekyll Island)
        - No participants came from St. Simons Island

Qualitative Phase

- 28 individuals - comprised of a subset of the quantitative participants
  - Cigarette Disposal Observed
    - 14 (50%) discarded cigarette properly
    - 14 (50%) discarded cigarette improperly
  - Age
    - Range - 23-63 years old
    - Mean - 46 years old
  - Gender
    - 16 males
    - 12 females
  - Home Location Distance from Jekyll Island
    - 28 participants gave valid zip codes
      - Range - 24.5-1947 miles
      - Mean - 311.84 miles
        - 1 participant (4%) was from the local area (Brunswick and/or Jekyll Island)

Results of the Quantitative Phase

Correlations.

***Reliability* –** Test determines how well each independent variable (place attachment, environmental attitudes, environmental awareness, and habit) consistently measured what it was supposed to measure" (Statistics How To, 2014). Items that were shown to lower the reliability of the independent variables were removed to increase the reliability of the survey.

- All four predictor variables had satisfactory internal reliability ($\alpha > .7$, Appendix P).

***Pearson's correlation* -** Test illustrates if there is a linear relationship between two sets of data (Statistics How To, 2012).

Significance – Test tells if the correlation between two variables is statistically significant. In other words, it describes if the Pearson's correlation test accurately (with 95% confidence) finds a correlation between improper cigarette disposal and each of the independent variables being tested. Correlation coefficients between improper cigarette disposal and independent variables are shown below (See Appendix P for complete correlation matrix, $*p < 0.01$).

- Place attachment – nonsignificant correlation (0.00)
- Environmental attitudes – significant correlation (-0.21*)
- Environmental awareness – significant correlation (-0.22*)
- Habit – significant correlation (-0.27*)

Descriptive statistics and frequencies. Means and standard deviations were calculated for each independent variable. Results are below (See Appendix P for full statistical output).

- Place attachment (M = 3.19, SD = 1.03)
- Environmental attitudes (M = 4.12, SD = 0.67)
- Environmental awareness (M = 6.13, SD = 1.78)
- Habit (M = 1.81, SD = 1.02)

Logistic regression. Test tells if independent variables used in the analysis can be used to predict or explain an outcome. So, demographic factors (age and gender) as well as scores from habit, place attachment, environmental attitudes, and environmental awareness items were used as predictors of improper cigarette discarding behavior. A summary of the logistic regression result is below (Full statistical results can be found in Appendix Q).

Overall model – significant χ^2 (6, N = 239) = 33.64, p = 0.00

- Indicates model is a good fit, predicts some of the variability in the data
    - Nagelkerke R^2 value (0.176) - shows all of the variables in combination with the demographic information predict 17.6% of the variability in the data.
        - In other words, all of the variables (habits, place attachment, environmental attitudes, and environmental awareness) and demographic information (age and gender) describe 17.6% of the "factors" of improper cigarette discarding behavior.

Amount of Variability. This section breaks the 17.6% of the "factors" of improper cigarette discarding behavior down to illustrate which independent variable was responsible for which proportion of the 17.6%.

Demographic factors (age and gender) - Nagelkerke R^2 value (.022)

- 2.2% of variability in the data due to these demographic factors
    - 2.2% of the total 17.6% is due to demographic factors

Place attachment - Did not add any explanation of the variability in the data. The variable was not significant.

- Hypothesis 2 was not accepted.

Environmental attitudes - Nagelkerke R^2 change (0.062)

- 6.2% of the variability in the overall model is due to environmental attitudes
    - 6.2% of the total 17.6% is due to environmental attitudes
- Odds ratio indicated as environmental attitudes increase, an individual's likelihood of improperly discarding their cigarette butt decreases
    - Hypothesis 3 was accepted

Environmental awareness - Nagelkerke R^2 change (0.037)

- 3.7 % of the variability in the overall model is due to environmental awareness
    - 3.7% of the total 17.6% is due to environmental awareness
- Odds ratio indicated as environmental awareness increases, an individual's likelihood of improperly discarding their cigarette butt decreases
    - Hypothesis 4 was accepted.

Habits - Nagelkerke R^2 change (0.055)

- 5.5 % of the variability in the overall model is due to habit
    - 5.5% of the total 17.6% is due to habit
- Odds ratio indicated as habit increases, an individual's likelihood of improperly discarding their cigarette butt also increases
    - Hypothesis 1 was accepted

Qualitative Findings – Proper Discarders

Qualitative data analysis. Followed procedure outlined by Creswell (2013).

1. Recorded interviews were transcribed
2. List of significant statements developed about how participants experienced phenomenon of discarding a cigarette butt while on the beach
3. Statements were then grouped into units based on their meaning, thus creating codes
4. Categories teased out into general themes containing several codes (or significant statements) pertaining to one common idea (theme)
5. Themes were then described using textural descriptions to illustrate what the participants experienced

The themes in this section are derived from the participants who discarded their cigarette butt properly. Table 1 outlines the themes and subthemes, and contains a description of each theme.

Table 1. Proper Discard Themes.

Theme	Description
1. Litter	• Cigarette butts considered to be litter, something that should not be on the ground, or left in the natural ecosystem
1.1: Appearance	• Reason "butts" should not be on ground is they're "unsightly"
1.2: Time	• Participants explained cigarette butts take long time to break down ○ Due to amount of time, concerned "butts" could have further impacts than just ugly appearance – example; incorporated into a nest
1.3: Chemicals in filters	• Filter holds chemicals that can "affect everything" in the environment when "butt" discarded onto ground
2. Social Awareness	• Participants indicated they're socially aware, or aware of social constructs within the culture around them
2.1: Stigmatized group identity	• Participants self-identified as group that performs a behavior that's judged by others and is stigmatized - they perceived their smoking behavior to be unaccepted within the social constructs of their culture
2.2: Behavior may affect others	• Recognized their smoking and cigarette discarding behavior may negatively affect others' beach experiences - smoking was seen as a personal choice that should not affect others
3. Cumulative Effects Mean Negative Consequences	• Participants concerned that if everyone discarded "butt" onto ground there would be negative consequences
3.1: Ugly toxins	• Consequences might include "poisons" ending up in the surrounding ecosystems and the area would "look gross"
3.2: Smoking ban	• Consequences might also include ban of smoking on beach - concern as participants appreciated that they could smoke on Jekyll's beaches as opposed to other beaches where it's banned
4. Minimal Obstacles	• Participants perceived obstacles to discarding cigarette properly to be minimal
4.1: Low amount of time and effort	• Described that discarding their cigarette butt properly required little to no effort and little time - finding a proper place to put the cigarette butt did not require a lot of thought
4.2: Doesn't require planning	• Did not feel they had to plan ahead to discard their cigarette butts properly - attitude that the items they had with them could be utilized
5. Personally Responsible	• Participants believed it was their own responsibility to take their cigarette butts with them, then dispose of them properly

Qualitative Findings – Improper Discarders

The themes in this section are derived from the participants who improperly discarded their cigarette butt. Table 2 outlines all of the themes and subthemes, and contains a description of each theme.

Table 2. Improper Discard Themes.

Theme	Description
1. Litter or Not?	• Participants disagreed about if cigarette butts are litter ○ some believed cigarette butts not litter because they're "harmless," or their impact is "minimal compared to other [pollutants]"
2. Lack of Knowledge	• Participants lacked knowledge about cigarette butt components and effects on the environment
2.1: Lack of knowledge about components of a cigarette butt	• Could not describe materials in a cigarette butt - gave very vague answers such as; chemicals, metals, plastics – many stated "I'm not sure"
2.2: Lack of knowledge of environmental impacts	• Unable to express HOW environment would be impacted by cigarette butt discarded onto ground – many gave vague answers; "I just know that there's a lot of cons"
3. Problems with Black Cigarette Receptacles Installed for Study	• Participants expressed problems with the black canister cigarette receptacles installed at beach access points
3.1: Receptacles not convenient	• Receptacles should be more convenient – placed on beach and beach access points - suggested receptacles "spread out along the edge of the dunes," every couple hundred feet so
3.2: Not recognizing receptacles	• Accustomed to looking for particular smoking accommodations - small black canisters "not something that we're recognizing. We recognize the tall standing thing." They also look for designated smoking areas
3.3: Didn't see the receptacles	• Hadn't seen the installed receptacles – blending into the pole, saw trash cans but not cigarette receptacle, looked for signage to help identify receptacles but no signage present
4. Conscious Choice Required	• Participants stated a conscious choice had to be made if they were to dispose of cigarette butt in a way contrary to how they currently did – doesn't mean "automatic" reaction was to discard it on the ground
5. Statements Contradict Behavior Observed	• Some statements given by individuals contradicted the improper discarding behavior they were observed doing. Social desirability appeared to be at play; participants gave statements most likely to make them appear socially acceptable

5.1: Reported to not leave cigarette butts on ground	• Claimed do not leave their cigarette butts on ground - often cited other locations where they put the butt
5.2: Awareness of fire	• Considered the risk of starting a fire by discarding cigarette butt on the ground ○ also disagreement amongst participants about discarding butt into a trash can – some said yes if "take the fire off" the butt first, others said no because always a risk of starting the trash on fire
5.3 Laws and fines	• Acknowledged discarding butts onto ground could result in a smoking ban or fines, expressed concern over those consequences occurring
5.4 Feelings of personal responsibility	• Discussed feeling personally responsible for their cigarette waste - "it's your right to smoke and your freedom to smoke. Keep it clean. It's just common sense to me."
5.5: Other people	• Expressed feeling personally responsible for preventing their cigarette waste from impacting other people - discarded cigarette butts lying on the beach can cause "eyesores" for other beachgoers, or people could step on them and be injured
5.6: Thinking about nature	• Mentioned thinking about various aspects of nature, often implying they do not improperly discard because they value nature
5.7: Knowledge that cigarette butt CAN impact the environment	• 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
5.8: Social norm is clean beaches	• Noticed other people weren't discarding trash onto the ground, perceived socially acceptable behavior (social norm) was to not discard your trash onto the beach
5.9: Location (Jekyll Island) does not impact discarding behavior	• Stated being a smoker was no different at Jekyll Island than another location, stated their behavior didn't change based on location – also stated they always discard their cigarette butts properly, but were observed doing otherwise

SECTION 5 – Discussion

Discussion of the Results and Findings

This section interprets the results and findings. Both quantitative results and qualitative findings are discussed by stating each result/finding 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.

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; Warzecha & Lime, 2001) Based on results of this study, the participants appear to not have an emotional or functional attachment to Jekyll Island.

This lack of an attachment may be due to the distance participants lived from the island. Only 12% of the participants were from within 30 miles of Jekyll Island. Therefore, a very large portion of the participants came 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. Giuliani (2003) explained that an attachment often occurs "in an individual whose positively-valenced knowledge of the environment in question largely exceeds the negatively-valenced knowledge", (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.

Environmental attitudes. Results indicated that a smoker who scored low on the environmental attitudes scale, and thus holds weak 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) who 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 (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. Recall, 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, improper discarders expressed no consensus about whether 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 cannot be expected to automatically think discarding them onto the ground 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.

Habits. 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 most smokers smoke a

cigarette "often," and context is having the physical cigarette to dispose of (Lally et al., 2010; Neal et al. 2012). Once habits are established they then cause past behavior to be repeated efficiently, and eventually automatically (Lally et al., 2010; Neal et al., 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. The proper discarders considered 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 unappealing, 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. Proper discarders perceived few obstacles to discarding their cigarette butts properly 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-discarding participants 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 discarder themes.

Litter or not? Improper-discarding 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 pollution 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-discarding 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, or 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 prefer receptacles specifically designed for cigarette waste as opposed to 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, Bator, Large, Bruni, & Tabanico, 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. Thus, designated cigarette waste receptacles that are convenient and well identified may influence improper discarders to properly discard.

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 of their discarding behavior 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 role here, where participants expressed statements that were likely to be socially desirable.

Social desirability plays a role in many cases where individuals perform a behavior that could be perceived to be unacceptable by others. For example, it is common knowledge that it is publically unacceptable to litter, spit in public, skip putting money in the parking meter, speed, text while driving, etc. The people who do these socially unacceptable behaviors know they might be perceived in a less than flattering light if caught, so they do things to avoid being perceived that way (lie, minimize, make excuses, etc.). Trying to convince others that a person wasn't doing the action they know is unacceptable is like a kid caught with his hand in the cookie jar while simultaneously denying he was taking a cookie.

While socially desirable answers to questions do not provide a true glimpse into what is causing improper cigarette discarding, recognizing that people want to appear socially accepted, or at least not seen as doing something not socially acceptable, offers an opportunity to alter the improper discarding behavior. For example, knowing that individuals are aware of social norms offers the opportunity to impress upon improper discarders what the socially acceptable behavior is (discarding properly) and influence them to properly discard their cigarette butts.

Recommended Behavioral Interventions

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 recommended behavioral interventions 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 habit), environmental attitudes accounted for the largest portion of the variance explained in the data (i.e. predicted the largest portion of improper cigarette discarding). Research available on how to promote environmental attitude change is limited, but one technique from the social psychology literature that may hold some promise 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," and it is experienced as a sort of "pain," and has been shown to change attitudes (Jhangiani, Tarry, & Stangor, 2014, p. 186). To create this dissonance, an 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 (Jhangiani, Tarry, & Stangor, 2014).

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 discarder's socially unacceptable discarding behavior to them directly after that behavior had been observed. The intervention could 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 that improper discarding behavior affects other beachgoers and the environment). 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.

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. The following section, "changing policy," describes this in more detail.

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. Many smokers 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? Additionally, a number of smokers expressed concern

that instituting a smoking ban would hinder their beach experiences. Some smokers even 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 that 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.

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 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.

While this policy change approach would be most effective if implemented on a large geographic scale (nationally if possible so the expectation was to always have access to cigarette

waste receptacles no matter what beach a person visited), it could also be adapted on a smaller scale where Jekyll Island required cigarette disposal receptacles at all beach access points. In this way visitors would begin to expect the presence of a receptacle at beach access points all over the island.

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.

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 an environmental awareness intervention 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 the new 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 of 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 "minimizing barriers to proper discarding" 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 fosters 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).

Minimizing barriers to proper discarding. Human behavior does not depend on motivations alone. 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 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. Smoking could also be limited to designated areas off the beach that are less environmentally sensitive. For example, the aforementioned shade canopies could be installed at the entrances to the beach.

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."

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 and vulnerable ecosystem, thus helping them to develop a functional attachment to the place and subsequently promoting within them a desire to protect it.

Section 6 - Conclusion

Given the impacts improperly discarded cigarette butts can have on the environment and on tourism it is clear that the presence of cigarette butts on the beach can conflict with the JIA goals of protecting the natural resources, and promoting tourism on Jekyll Island. This study examined cigarette butt discarding behavior and provided insights that allow a better understanding of cigarette butt littering behavior and ways to combat cigarette littering. Thus, the findings of the study offer insight into ways to protect the natural environment, and help to maintain tourism, particularly the nature-based tourism industry of Jekyll Island.

This study 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.

Based on these findings, recommendations for decreasing improper cigarette butt discarding on a public beach, and Jekyll Island in particular, include: promoting pro-environmental attitudes amongst smokers, altering habitual improper discarding behaviors, changing policies about cigarette receptacles on beaches, promoting environmental awareness of

how cigarette butts negatively impact the environment, minimizing barriers to proper discarding, and increasing place attachment to Jekyll Island.

By implementing as many of these behavior change recommendations as possible it is conceivable that the JIA could reduce the number of improperly discarded cigarette butts. Thus, the JIA could protect the natural environment on Jekyll Island and sustain the island in a state that is welcoming to tourists and subsequently helps maintain the economy of the island.

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APPENDICES

APPENDIX A – DEFINITION OF TERMS

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 crated 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).

APPENDIX B – HABIT MEASURES

Question	Strongly Agree 1	Disagree 2	Neutral 3	Agree 4	Strongly Disagree 5
Discarding a cigarette butt on the ground is something . . .					
I do without having to consciously remember.	1	2	3	4	5
I would find hard not to do	1	2	3	4	5

APPENDIX C – PLACE ATTACHMENT MEASURES

Measuring	Question	Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5
Identity	I feel like this Jekyll Island's beach is a part of me	1	2	3	4	5
Dependence	This beach is the best place for what I like to do	1	2	3	4	5
Dependence	I get more satisfaction out of visiting this beach than from visiting any other place in the world	1	2	3	4	5
Identity	Visiting this beach says a lot about who I am	1	2	3	4	5

APPENDIX D – ENVIRONMENTAL ATTITUDE MEASURES

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

APPENDIX E – ENVIRONMENTAL AWARENESS MEASURES

1. Which of these items, if any, are contained in cigarette butts? Circle all that apply.
Cotton
Paper
Plastic
Metals
Asbestos
Cellulose acetate
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 F – 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 G – 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 H – SURVEYING DAYS AND TIME PERIODS

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.

APPENDIX I - METHODS FOR 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 discarding 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 G. 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.

APPENDIX J – UTILIZING HELPERS TO LOCATE SMOKERS

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.

APPENDIX K – 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 H. The researcher observing smoking and discarding behavior by sitting in the "channel," multiple yards away from the smoker.

APPENDIX L – RESEARCHER ATTIRE AND BEACH 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.

APPENDIX M – 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.

APPENDIX N – SCRIPT RESEARCHER USED TO INTRODUCE PROJECT

Introduction Script

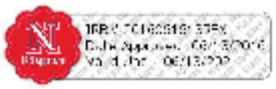
Hi, my name is Maranda. I am a graduate student at the University of Nebraska, Lincoln. We are conducting research on beachgoers and their smoking experience on Jekyll Island.

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 O – CONSENT FORM GIVEN TO PARTICIPANTS

University of Nebraska Lincoln



INSTITUTE OF AGRICULTURE AND NATURAL RESOURCES
SCHOOL OF NATURAL RESOURCES

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 a 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:
No data that could identify you will be collected. Paper surveys from this study will be stored in a locked cabinet in the investigator's office, voice recorded records will be kept on the investigator's password protected computer, and on an external hard drive that will be stored in a locked desk drawer. Data 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. Additionally, the Jekyll Island Authority will receive a copy of the final report resulting from this data, but no identifiable information will be included in this report.

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) 472-6965 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)

Maranda Miller, Principal Investigator	Office: (507) 381-2506
Mark Burbach, Ph.D., Secondary Investigator	Office: (402) 472-8210

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APPENDIX P – DESCRIPTIVE STATISTICS AND CORRELATION MATRIX

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

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

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

APPENDIX Q – SUMMARY TABLE OF LOGISTIC REGRESSION

Summary of the Logistic Regression Summary of the Logistic Regression

Construct	B	S.E.	Wald	df	Sig.	Exp(B)	Nagelkerke R^2 Change
Age	-0.004	0.013	0.095	1	0.757	0.996	
Gender	-0.365	0.286	1.631	1	0.202	0.694	
PlAtt	0.160	0.150	1.137	1	0.286	1.174	0.022
EnAtt	-0.534	0.242	4.854	1	0.028	0.586	0.062
EnvAwa	-0.191	0.082	5.442	1	0.020	0.826	0.037
Habit	0.501	0.160	9.784	1	0.002	1.650	0.055
Constant	2.603	1.249	4.343	1	0.037	13.507	