## CaRe: Communicating About Recycling, Phase I

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## PROJECT TITLE: CaRe: Communicating About Recycling, Phase I

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**PROJECT DURATION:** 9/30/2016 – 3/31/2018

## **ABSTRACT:**

The Florida Legislature established a statewide recycling goal of 75% to be achieved by 2020. Strategic communication efforts can promote and encourage recycling. In addition, targeted education interventions can help address the issue of recycling contamination, which has been identified by the Florida Department of Environmental Protection as a challenge to meeting the 75% by 2020 recycling goal. The goal of recycling promotion efforts is, therefore, twofold: to encourage greater rates of recycling among residents who are not currently recycling, and to educate those who are recycling on how to prevent contamination. Recycling communication and education efforts could be enhanced by the development of evidence-based messaging strategies that will supply relevant information to audiences with different levels of knowledge and facilitate community engagement and peer-to-peer feedback. To inform promotion and education efforts around recycling, this project developed and evaluated a comprehensive set of communication recommendations entitled, Communicating about Recycling (CaRe).

The main goal of this project was to develop a tool for recycling education that could (a) be tailored and used by recycling coordinators in Florida counties, (b) promote general awareness and positive attitude toward recycling among all Floridians, and (c) educate residents about recycling contamination. This was accomplished through three main aims:

Aim 1. Create a Technical Awareness Group and develop clearinghouse of recycling education messages in the State of Florida to evaluate their core text and visual components.

Aim 2. Identify characteristics of high- and low-recyclers through formative research.

Aim 3. Develop a set of best practice recommendations for recycling communication.

#### Key words:

Recycling, Recycling Communication, Message Testing, Content Analysis, Focus Groups, Recycling Contamination, Survey, Recycling Behaviors, Recycling Attitudes, Best Practice Development

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## **Metrics:**

1. List research publications resulting from THIS Hinkley Center project.

James, V., Islam, S., Lee, D., Raisa, A., Poitier, A., Hagmajer, D., March, L., & Krieger, J. (Manuscript under review). What are counties doing to curb contamination? A content analysis of communication efforts to promote recycling. Resources, Conservation, and Recycling

James, V., Lee, D., Raisa, A., & Krieger, J. (in process). Reduce, reuse, recycle, reevaluate: Assessing recycling messages in the state of Florida. Resources, Conservation, and Recycling.

Lee, D., James, V., Raisa, A., & Krieger, J. (in process). How environmentally conscious are young adults? Developing communication strategies to promote recycling among young adults. Journal of Aging.

2. List research presentations resulting from **THIS** Hinkley Center project.

James, V., Islam, S., Lee, D., Raisa, A., Poitier, A., Hagmajer, D., March, L., & Krieger, J. (August, 2018). What are counties doing to curb contamination? A content analysis of communication efforts to promote recycling. Manuscript submitted for presentation at the meeting of the Association for

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3. List who has referenced or cited your publications from this project.

N/A

4. How have the research results from **THIS** Hinkley Center project been leveraged to secure additional research funding? What grant applications have you submitted or are planning on submitting?

CaRe: Communicating About Recycling, Phase II Hinkley Center for Solid and Hazardous Waste Management Grant application under review

5. What new collaborations were initiated based on THIS Hinkley Center project?

The work done for this project has created a potential interest in future collaboration between the UF STEM Translational Communication Center and Keep America Beautiful.

6. How have the results from **THIS** Hinkley Center funded project been used (not will be used) by the FDEP or other stakeholders?

This project has led to the creation of an online recycling communication toolkit that is available to recycling communicators and interested members of the public. This allows for the results of this project to be of immediate use to a wide variety of stakeholders.

## TABLE OF CONTENTS

TABLES	
FIGURES	viii
ACKNOWLEDGEMENTS	ix
EXECUTIVE SUMMARY	xi
INTRODUCTION	1
PROJECT AIMS	2
METHODS	3
RESULTS	6
CONCLUSIONS	25
REFERENCES	27

# TABLES

Table 1: Demographics from the Florida Resident Recycling Survey.	11
Table 2: One-way ANOVA for Pre-/Post-Test Recycling Self-Efficacy by Age Group	18
Table 3: Response Means to Perceived Message Characteristics for Simple/Complex Messages	20
Table 4: Response Means to Perceived Message Characteristics for Non-Governmental/Governmental N	e
Table 5: Response Means to Perceived Message Characteristics from Urban/Rural Respondents	
Table 6: $\chi^2$ Comparisons for Message Channel Preferences by Respondent and Message Type	24

## **FIGURES**

Figure 1: Response Means to "How often do you recycle in your household?" by Age Group13
Figure 2: Response Means to "How environmentally conscious do you consider yourself to be?" by Age Group14
Figure 3: Response Means to "Do you think it's easy to recycle outside of your home?" by Age Group15
Figure 4: Response Means to "How environmentally conscious do you consider yourself to be?" by Income Group16
Figure 5: Response Means to Perceived Message Characteristics for Simple/Complex Messages
Figure 6: Response Means to Perceived Message Characteristics for Non-Governmental/Governmental Messages
Figure 7: Response Means to Perceived Message Characteristics from Urban/Rural Respondents

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## **EXECUTIVE SUMMARY**

In 2008, the Florida Legislature established a statewide recycling goal of 75% to be achieved by 2020. As of 2014, 18 Florida counties met its intermediate recycling goal of 50%, and some counties, like Lee (70%) and Pasco (65%), are well on their way to reach the ultimate recycling rate. However, the slower progress in many other counties signals the need for a strategic communication effort that would promote and encourage recycling. The Florida Department of Environmental Protection has identified communication from state, county, and city recycling organizations as one of the main challenges in meeting the 75% by 2020 recycling goal.

This project was undertaken to help develop empirically-tested strategic communication strategies centered around recycling for residents in the state of Florida. The main goal of this project was to develop a tool for recycling communication that could (a) be tailored and used by recycling coordinators in Florida counties, (b) promote general awareness and positive attitude toward recycling among all Floridians, and (c) educate residents about recycling contamination. This was accomplished through three main aims:

# Aim 1. Create a Technical Awareness Group and develop clearinghouse of recycling education messages in the State of Florida to evaluate their core text and visual components.

#### Aim 2. Identify characteristics of high- and low-recyclers through formative research.

#### Aim 3. Develop a set of best practice recommendations for recycling communication.

These aims were achieved using a variety of methods to assess both the current state of recycling messages being delivered to residents across Florida and also the recycling attitudes and intentions of Floridians. Work in this project included: 1) a content analysis of the recycling messages present on Florida country recycling webpages (N = 58); 2) focus groups (N = 11, participant n = 57) held across the state in six counties designed to provide information about the facilitators and barriers to recycling faced by residents in different parts of Florida; 3) a recycling survey of Florida residents (N = 1083) administered to adults 18 and over across the entire state, assessing recycling habits, environmental attitudes, perceptions of recycling, and a pre-post messaging evaluation relating recycling self-efficacy and exposure to different recycling messages; and finally 4) the creation of an online toolkit to be used by recycling communicators across Florida, informed by the results of our project. This toolkit can be accessed at: https://www.jou.ufl.edu/stem/communicating-about-recycling/.

Overall, the results of this project indicate that although all of the Florida counties are striving to reach the same recycling goals, there is no apparent unifying strategy in place for recycling communication. Our focus group and survey participants all indicated that much of their recycling behavior was driven by convenience, but this was not always addressed in recycling messages. Similarly, knowledge about what can be recycled and how played a major role in Florida residents' recycling attitudes and intentions. Recycling messages from both state- and county-level organizations varied widely in the amount of information about recycling they contained, however, often leading to confusion and uncertainty.

Thankfully, our data suggest that recycling messages of all types are working; any type of message was able to lead to an increase in recycling self-efficacy among survey participants, and efforts to get

messages in front of as many people as possible are worth continuing. Still, strategic messaging strategies that consider message context as well as consumer needs and desires have the potential to make our recycling messages even more effective. For example, even though participants wanted messages that increased their recycling knowledge, different types of audiences wanted that information delivered to them in different ways. Rural participants were more likely to want their recycling information to be present on the recycling bins themselves or presented on social media than urban participants.

Focusing on only one type of distribution channel, then, is unlikely to be enough if mass audiences want to be reached. Understanding both how and where to communicate with your audience is a basic communication tenant that is clearly important in the context of recycling. To ensure that our messages are truly having an impact on the way that Floridians recycle, we as communicators must do more to make sure that we're getting our messages across to *all* of our audiences and that they contain the they need, in the places that they want, in the manner that is most understandable to them.

## **INTRODUCTION**

In 2008, the Florida Legislature established a statewide recycling goal of 75% to be achieved by 2020. As of 2014, 18 Florida counties met its intermediate recycling goal of 50%, and some counties, like Lee (70%) and Pasco (65%), are well on their way to reach the ultimate recycling rate. However, the slower progress in many other counties signals the need for a strategic communication effort that would promote and encourage recycling. The Florida Department of Environmental Protection has identified communication as one of the main challenges in meeting the 75% by 2020 recycling goal.

Despite numerous studies spanning decades, scientists have been unable to reach a consensus about the most effective way to deal with the 220 million tons of trash Americans produce each year. However, researchers have also pointed out that the amount of fossil fuels expended during transportation of recyclables and at the facilities used to process the material may negate benefits of recycling (Rinkesh, 2013). Another concern about the efficiency of recycling is the fact it may take more energy to recycle specific types of items than it took to create them in the first place (Micks, 2012).

At the same time, the American public does not have a firm grasp on methods of waste processing, which can lead to contamination. Proper recycling requires many items to be rinsed, stripped of labels, and sorted correctly. However, most consumers are unaware or unwilling to complete the necessary preparation. This leads to contamination that occurs when residents include non-recyclable items or put garbage items in recycling containers.

The goal of efforts to promote recycling is, therefore, twofold: to encourage greater rates of recycling among residents who are not currently recycling, and to educate those who are actively engaged in recycling on the proper ways of identifying recyclable items while retaining high rates of recycling. Strategic communication, defined as focused organizational efforts to achieve long-term goals with the help of coordinated and evidence-based communication activities, can be used to plan, execute, and evaluate recycling promotion and education. Some of the most commonly used message development tools include the use of audience segmentation, message framing, and message tailoring. The use of these methods makes the communication of information strategic and effective, rather than passive and arbitrary.

## **PROJECT AIMS**

The main goal of this project was to develop a tool for recycling education that could (a) be tailored and used by recycling coordinators in Florida counties, (b) promote general awareness and positive attitude toward recycling among all Floridians, and (c) educate residents about recycling contamination. The development of the tool was guided by strategic communication principles and the social learning theory that posits that a person's behavior is influenced by the three groups of factors: (1) personal factors that include knowledge and attitude toward a behavior, (2) behavioral factors that include skills and ability to practice a behavior. Human learning and behavior is viewed as a cognitive process that takes place in a social context and can be supported through information, observation of a promoted behavior, and practice. To promote recycling, therefore, communication and education efforts need to include a comprehensive tool that will supply relevant information to audiences with different levels of knowledge and facilitate community engagement and peer-to-peer feedback. The following specific aims were implemented to develop a comprehensive set of communication recommendations.

# Aim 1. Create a Technical Awareness Group and develop clearinghouse of recycling education messages in the State of Florida to evaluate their core text and visual components.

Approach: We will identify various recycling education messages being used throughout the State of Florida and conduct a quantitative content analysis to understand the most common textual and visual components of these messages.

#### Aim 2. Identify characteristics of high- and low-recyclers through formative research.

Approach: We will conduct focus groups and a Florida-wide survey to identify core issues in knowledge about recycling among residents. This assessment will inform the development of communication strategies.

#### Aim 3. Develop a set of best practice recommendations for recycling communication.

The best practice recommendations can serve as the basis of a comprehensive toolkit for county recycling coordinators. Grounded in the existing recycling education and communication materials and informed by communication science, our project will result in a set of evidence-based recommendations for the promotion of recycling and prevention of contamination.

## **METHODS**

## Aim 1

#### Florida County Website Content Analysis

A quantitative content analysis of the communication present on Florida county recycling webpages was conducted to gain a comprehensive understanding of what recycling and waste management information is available to Florida residents. Considering that acceptable recyclable materials and recycling systems differ across counties, county websites provide residents with the most accurate information unique to the recycling practices for that location. Additionally, county websites serve as a convenient information source for residents. The state of Florida was chosen as the pilot state for this analysis due to its' population size as the fourth largest state in the U.S. Additionally, Florida's demographic and socioeconomic makeup makes it an ideal pilot state to analyze recycling messages.

Content analysis is a coding method used to analyze and interpret messages with a goal of identifying specific themes and patterns (Holsti, 1969). This content analysis was conducted utilizing a mix of the emergent and *a priori* methods. As part of the emergent coding method, coding categories, codes and definitions are determined by researchers following an initial review of the data (Stemler, 2001). In contrast, in the *a priori* coding method coding categories are determined based on a specific theory or theme, and coders mutually agree on these themes and make revisions when necessary (Weber, 1990 & Stemler, 2001).

## Website Selection and Codebook Formation

Initially, coders performed a separate review of five Florida county recycling webpages. Investigators specifically noted reoccurring themes, sections and content seen on webpages. After this review, investigators met to discuss findings and the following coding categories were determined: textual content and visual content.

Two members of the research team then discussed differences and 35 codes and respective definitions were agreed upon. Following this review, members of the research team determined that the constructs associated with the media richness theory would be used as a guide to construct the remaining codes. The theory contains four main features of a medium that can make it richer: immediate feedback, personal focus, multiple cues, and language variety (Daft et al., 1987). Immediate feedback, was defined as the ability to facilitate timely communication and coded for interactive communicability of the website (Lodhia, 2012). Personal focus was defined as a type of message or content that is "tailored to the frame of reference, needs, and current situation of the receiver," (Daft et al., 1987, p. 358). Multiple cues refer to a wide range of presentation features such as words, numbers, graphic symbols, multimedia, and animation (Daft et al., 1987; Lodhia, 2012). Language variety refers to symbols and organizational tools that can enhance the media user's ability to understand (Daft & et al., 1987; Lodhia, 2012). Lastly, language variety assessed the presence of information concerning Florida's campaign to reach a recycling rate of 75% by the year 2020 and the social system.

Fifty-eight Florida county recycling webpages were coded over a period of three months, from September 2016 through December 2016. Only recycling webpages associated with official Florida county websites were reviewed. Webpages were accessed by navigating to a Florida county website and locating the waste management and/or recycling webpage. All data collected resulted exclusively from information provided on Florida county websites.

For coding and testing inter-coder reliability, SPSS Statistics, version 24 was used. Prior to the official coding of the county websites, two members of the research team obtained inter-coder reliability from sample recycling webpages with Cohens Kappa coefficients of  $\geq 0.78$  for forty-three codes on three pages.

## Aim 2

## Statewide Focus Groups

To gain a better understanding of facilitators and barriers to recycling practices, as well as to receive feedback from residents on current message strategies utilized by recycling programs, a series of focus groups were held across the state of Florida. A total of 11 focus groups were held in various counties, including: Alachua, Orange, Leon, Levy, DeSoto, and Columbia counties. Focus groups were held in public libraries, community centers, and university and community college conference rooms.

Participants for these focus group were recruited via social media and from face-to-face invitation at the focus group venues themselves. There was a total of 57 participants across all focus groups. Number of participants per group ranged from 1 - 11, with an average of 5 participants per group.

As part of the focus groups, participants were asked to discuss their opinions, thoughts, feelings, and viewpoints about several aspects of recycling. These topics included: general opinions on recycling; preferred sources for information, both in general and for recycling specifically; perceived barriers and facilitators for recycling behaviors; and opinions on some sample recycling messages.

## Codebook Creation and Transcript Coding

The 11 focus groups were audio recorded and professionally transcribed for analysis. A codebook assessing the aforementioned topics was developed, and the transcripts were coded line-by-line.

## Florida Resident Recycling Survey

An online survey was administered to adults aged 18 and over living in the state of Florida (N = 1083). Participants were recruited from every county in Florida, and the overall sample was matched as closely as possible to the current demographic makeup of the state. The survey took place over August 2017 to January 2018. Participants were queried on their current recycling habits, willingness to use various channels (such as county websites) to find recycling information, knowledge about recycling contamination, perceptions of recycling activities, and levels of trust they ascribed to the recycling information displayed on different information channels.

As part of the survey, respondents participated in a pre-post test recycling message evaluation. Participants were asked to self-report their feelings of recycling self-efficacy. They were then randomized into one of 14 groups that were each exposed to a different recycling message. Participants were asked to rate these message in terms of how well they felt they encouraged recycling and informed on how, what, why, and where to recycle. After rating the messages, participants were given the same recycling self-efficacy items to measure any changes in their self-perceived ability to recycle. Results of the survey were analyzed in SPSS, version 24.

## Aim 3

## Toolkit Creation

Using data and insights gleaned through our website content analysis, statewide focus groups, and Florida resident recycling survey, an electronic toolkit was created for recycling coordinators across the state. This toolkit contains recycling information for each county, recommendations for best practices for communicating about recycling and designing recycling messages, research-based answers to common recycling communicator questions, and a selection of empirically tested, effective messages.

## RESULTS

#### Florida County Website Content Analysis

#### The Websites in looks and numbers

- 58 of the 67 Florida counties had a website dedicated to waste management and/or recycling, had a webpage or section devoted to waste management and recycling or provided information about recycling and/or waste management directly on the main county website.
- Locating the recycling content of county websites was not intuitive. Often, counties presented recycling information on different sections and coders would have to navigate to different sections of the site to find information
- Forty-six (68.7%) websites included all their recycling information on the waste management site for the county.
- Only five (7.5%) websites had distinct recycling section on the county website

## Type of information presented in the websites

- The information presented on most websites was up to date. However, a few sites had information that was outdated by three to four years.
- Forty (67%) of the county sites provided residents with a list of materials that were recyclable
- o 36 (62%) included information on materials that were not recyclable
- Twenty-one of the county websites outlined discrete behaviors necessary (remove bottle caps, break down boxes, etc.) to recycle items the right way
- Only 16 county websites (21%) provided information to residents with instructions on how to prevent contamination of recyclable materials. This includes language such as "remove all food particles before recycling, rinse out cans before placing them in the recycling bin and completely empty bottles before recycling." This dearth of information is a major concern, and increased communication about contamination should be a major priority for counties.
- Over half of the county websites (67%) provided information on how to correctly recycle non-traditional items like electronics, appliances and oil assists. This was important because often, residents partake in "wish-cycling," or seeking to recycle these items along with their other recyclables. How and where to properly recycle electronics was most common and was included on 26 sites.
- Twelve (21%) of the websites included a call to action. A call to action included language present on the website intentionally used to encourage the pursuit of more information about recycling (i.e., visiting other websites for additional information, contact information for knowledgeable organizations or people, and language encouraging volunteer opportunities).

Recurring themes on "why recycle" or "impact of not recycling"

- Twenty-four (41%) of the websites listed the environment as a reason to recycle, eight stated that recycling is "the right thing to do," six included information on energy conservation and five stated waste reductions as a reason to recycle.
- $\circ~$  The advantages of recycling properly were explained on eleven (19%) of the county websites.
- Seven websites noted that saving waste facilities money was the advantage of recycling correctly.
- One website mentioned saving facility resources as the advantage and another website listed saving facilities money and resources as a relative advantage.
- Thirty-three websites (37.3%) included information about fines and other forms of punishment for failing to recycle or recycling incorrectly.

## Availability of contact information

- Fifty-two (90%) of the websites contained telephone numbers, email addresses, physical locations, and office hours of their corresponding county's recycling facilities.
- Twenty websites (34%) contained social media icons or links. Seventeen of these twenty websites (85%) had more than one social media icons.

## Use of images

- Fifty-two (90%) websites had images.
- Nineteen (33%) websites had images of recyclable objects such as paper, plastic and glass, and twelve websites had images that depicted the landfill or waste facility in the county.
- Twenty-two (38%) sites included a recycling triangle on their site.
- 38% of websites contained facility maps.
- Six websites provided users with an interactive map (i.e., Google map or MapQuest).
- Eight websites contained recycling videos.

#### Consideration of consumer diversity

- 12 sites (20.7%) provided at least some information about recycling in Spanish and one site, Miami-Dade, had recycling information in Spanish and Creole.
- 15 of the 25 sites provided specific information for educators.
- Five of the sites had targeted information for children which was generally presented as a "kid's corner" with a game.
- Only twelve (21%) county websites include information to residents on how to recycle in a non-single-family home. (This is important because recycling system varies according to the building type such as apartments vs. houses.)

#### **Statewide Focus Groups**

Alachua County

Three focus groups were conducted in Alachua County. Of the three focus groups, two were completed on the University of Florida's (UF) campus. It is possible that the focus groups conducted on UF's campus, with solely student participants, contain results only generalizable to a specialized population. Thus, they are not necessarily representative of all Florida residents. Overall, the Alachua County focus groups preferred messages that were simple with less text. All participants noted that providing recycling information via a variety of formats and channels would be most effective.

In terms of barriers to participation in the county recycling program, students mentioned that unless their apartment complex or residence hall provided them with specific receptacles for recyclable materials, they were less likely to recycle. Non-student residents mentioned that they were more likely to recycle if curbside pick-up was provided.

In all three focus groups, there was a positive perception of people who recycle regularly, and frequent recycling was often related to being a good person and caring about the environment and others.

## Orange County

The Orange County focus groups were conducted in Orlando. One focus group was comprised of eight participants. However, due to scheduling conflicts, only one participant attended the second focus group. During the one-on-one interview, the interviewee discussed ways in which recycling and sustainability were often "politicized" - pointing out that people's inclination to recycle may, at times, be at odds with how they perceive the concept and social image of sustainability. This information was important - as such a unique viewpoint may not have been discussed in a group setting.

A theme that emerged in the second focus group was the discussion of whether preparing (i.e., cleaning and sorting) recyclable items was a valuable use of one's time. A few members mentioned that machines at waste manage facilities sorted out the necessary items and were certain that all materials end up at the same place. Throughout the focus group, participants made references to how sorting recyclables and preparing recyclable items is "someone's job," and that because of this, they felt less inclined to engage in proper recycling behavior.

Interestingly, a few participants in the second focus group provided insight into other recycling programs that they have had exposure to over time. Several participants noted that they lived in other states prior to moving to Florida, and had more engagement with those recycling programs. For example, one participant mentioned that in New York, improper recycling resulted in fines. Other participants mentioned the convenience and ease as factors that increased their recycling participation.

As noted in other focus groups, Orlando participants stated that the more complicated recycling became, or the more effort that was required on their behalf, the less likely they were to follow through. Similar to other focus groups, participants in Orange County appreciated recycling messages with less text and a clear messaging strategy.

## Leon County

The Tallahassee focus groups were comprised of individuals who frequently and consistently engage in recycling at home and in the community. Convenience was a key factor in the discussion about recycling during this focus group but, recycling pick-up was just as important. Participants mentioned that the proximity of a recycling bin could influence the recycling habits of an individual, while items requiring special recycling care (such as batteries) were more likely to get thrown into the trash due to the effort and location of facilities that accept these materials for recycling.

Like the focus groups in Orange County, participants expressed a dislike for the idea of negative reinforcement for poor recycling practices, pointing out that it would dissuade those who were attempting to recycle from recycling altogether. A consistent theme throughout all focus groups, was positive reinforcement and providing incentives (especially those that were financial in nature). These factors were viewed as something that would be very appealing and effective in terms of increasing participation in recycling programs. Once again, simple messages that could be translated to magnets, flyers, and billboards were also viewed as strategies that might be effective. Participants stressed that most people do want to recycle, but simply do not know what to do. Thus, clarity and accessibility were viewed as being important.

## Levy County

The two Levy County focus groups were unique as this population did not have access to a curbside recycling program. This, along with the lack of information distributed by their county regarding recycling resulted in almost all the participants stating that they do not recycle at home. Most participants mentioned that they burn their trash because of the lack of accessibility to recycling facilities as well as the cost and inconvenience associated with recycling. Although residential recycling practices were sub-optimal in Levy, participants did mention that they felt recycling was important and noted that when they are out in the community, have access to, and know where a recycling bin is, that they will engage in recycling behavior.

Like the Orange county focus group, these focus group participants provided anecdotes of their experience with other recycling programs. All the other programs were viewed more favorably than the Levy County program. Participants mentioned that financial incentives would be a facilitator to increased recycling behavior.

In contrast to other focus groups, Levy County residents preferred materials that provided more information and were more detailed than those preferred by other groups.

## DeSoto County

The DeSoto County focus group was a one-on-one interview with a single participant. As seen in other groups, this participant praised those that took part in recycling and environmental activities and expressed some admiration for them. However, this participant did not have access to recycling infrastructure where they lived, nor did they have a good grasp on what they could recycle when the

opportunity presented itself. This lead to feelings of shame and apathy, along with little desire to recycle (even when they could).

Further, this participant did not feel that they could make a difference through recycling, nor did they see any practical benefit to themselves by doing so. They did engage in some environmental behaviors such as conserving power and water when possible, mostly for the financial benefit of doing so. They did express a willingness to recycle if some direct benefit was presented to them when doing so.

This participant was similar to those in the Levy County group when it came to messaging, preferring more information-heavy, detail-oriented messages.

## Columbia County

One focus group was held in Columbia County, with 9 participants. Participants in this group thought well of those that recycled regularly and felt that it was something that people should do but felt frustrated by what they perceived as a lack of consistency from their city commissioners. Recycling pick-ups were not uniform across the city, and even those areas that had scheduled weekly pickup times would sometimes go weeks without service, leading to frustration. Participants expressed strongly that they felt that recycling was not being presented as an important activity in their county, and that if more messaging existed to stress the importance of individuals recycling, that more people would be likely to do it.

Though some participants were in favor of imposing a fine on those that did not recycle properly, the majority though that positive reinforcement (most popularly in the form of discounts on the normal trash handling fees) could have an impact on local recycling rates.

Simple, colorful messages were favored by this group. Messages that explained the impact of recycling were also favored, as were those that explained how to recycle when they did so succinctly.

## Florida Resident Recycling Survey

## Demographics

Demographic information was collected for 1083 participants of the statewide survey. A summary of the information can be found in Table 1.

Variables	Breakdown	Count	Percent
Sex	Female	546	50.4
	Male	532	49.1
	I prefer not to answer	4	0.4
Age	18-25	250	23.1
	26-34	290	26.8
	35-44	201	18.6
	45-64	263	24.3
	65/+	79	7.3
Rurality	Urban	933	86.1
	Rural	150	13.9
Education	Grade 1-8	9	0.8
	Some high school	58	5.4
	High school graduate or GED certificate	215	19.9
	Technical, trade or vocational school	57	5.3
	Some college or associate degree	291	26.9
	College graduate (B.S., B.A. or other 4 year degree)	313	28.9
	Post-graduate training or professional school (M.A., Ph.D., JD or MD)	140	12.9
Income	Less than \$10,000	96	8.9
	\$10,000 to \$19,999	89	8.2
	\$20,000 - \$34,999	186	17.2
	\$35,000 - \$49,999	169	15.6
	\$50,000 - \$74,999	195	18
	\$75,000 - \$99,999	128	11.8
	\$100,000 or more	158	14.6
	I prefer not to answer	62	5.7
Race	White	626	57.8
	Black	187	17.3
	Asian	21	1.9
	Native American	22	2
	Other	227	21
Ethnicity	Hispanic	519	47.9
-	Latino	80	7.4
	Both Hispanic and Latino	165	15.2
	Neither Hispanic nor Latino	319	29.5

Table 1: Demographics from the Florida Resident Recycling Survey.

## Recycling habits and environmental attitudes

Age was a significant factor in many of the recycling habit items that participants were asked to respond to. 18-25-year-olds reported that they recycled in their households significantly less than the 35-44 and 45-64 age groups (response means shown in Figure 1).

18-25-year-olds also considered themselves to be significantly less environmentally conscious than all other age groups (response means shown in Figure 2).

Interestingly, 18-25-year-olds were significantly more likely to think that it was easy to recycle outside of their home compared to all other age groups (response means shown in Figure 3).

Income also played a role in one of our item responses, with those that earned \$100,000 or more per year considering themselves to be significantly more environmentally conscious than those that made less than \$10,000 per year (response means shown in Figure 4).



Figure 1: Response Means to "How often do you recycle in your household?" by Age Group



Figure 2: Response Means to "How environmentally conscious do you consider yourself to be?" by Age Group



Figure 3: Response Means to "Do you think it's easy to recycle outside of your home?" by Age Group





## Recycling Self-efficacy Pre/Post Message Test

Participants were asked to rate how well they felt they could recycle certain items if they wished to, as well as whether they felt that they had the knowledge, tools, and information to recycle as they wished. These items comprised a recycling self-efficacy scale (Cronbach's Alpha = .874). Across all respondents, the mean score on the self-efficacy scale pre-message exposure was 3.85 (on a scale of 5). After message exposure, the mean self-efficacy scale response rose to 4.04 (t = 7.731, p < .0001).

Age had a significant impact on both pre- and post-image self-efficacy, with those in the 18-25 bracket reporting the lowest levels of self-efficacy at both testing points. The results of a one-way ANOVA comparing age groups is summarized in Table 2.

	Me	ean	Pre-Test Mean Difference				Post-Te	st Mean Di	fference			
Age	Pre-Test	Post-Test	18-25	26-34	35-44	45-64	65+	18-25	26-34	35-44	45-64	65+
18-25	3.55	3.8		-0.18	-0.44	-0.58	-0.46		-0.07	-0.34	-0.47	-0.52
26-34	3.72	3.88										
35-44	3.99	4.14										
45-64	4.12	4.28										
65+	4.01	4.32										

## Table 2: One-way ANOVA for Pre-/Post-Test Recycling Self-Efficacy by Age Group

\*Red text significant a p < .05

#### Message Evaluation

To determine any differences seen in the opinions of the 14 tested messages, they were divide into several different categories: Simple/Complex messages (those that provide very little specific information vs. those that provided a lot), and Non-governmental/Governmental (whether the source of the message was a government agency or state department or not). In addition, the responses of urban and rural respondents were compared to one another. Results of these groupings are summarized below.

Though exposure to any kind of recycling message lead to an increase in self-efficacy, certain types of messages were found to be more generally motivating. Complex messages scored significantly higher than simple messages in all evaluation categories except for how often respondents felt they needed to see the message, in which they were no different. Governmental messages were considered more directly informative, scoring significantly higher than non-governmental message in explain what and how to recycle. Non-governmental messages scored significantly higher on why people should recycle.



Figure 5: Response Means to Perceived Message Characteristics for Simple/Complex Messages

Table 3: Response Means to Perceived Message Characteristics for Simple/Complex Messages

	Mea	an		
Message Component	Simple	Complex	t	p-value
Encourage to Recycle	7.31	7.81	-3.22	0.001*
What to Recycle	6.94	8.08	-6.86	<.0001**
How to Recycle	5.93	7.53	-8.74	<.0001**
Why to Recycle	5.71	6.51	-4.01	<.0001**
How often would you need to see message?	1.89	1.82	1.51	0.133

\* result is significant at p < .01

\*\* result is significant at p < .0001

Figure 6: Response Means to Perceived Message Characteristics for Non-Governmental/Governmental Messages



Table 4: Response Means to Perceived Message Characteristics for Non-Governmental/Governmental Messages

	Mean			
Message Component	Non-Government	Government	t	p-value
Encourage to Recycle	7.56	7.61	-0.33	0.75
What to Recycle	7	8.01	-6.03	<.0001**
How to Recycle	6.58	7.02	-2.38	0.02*
Why to Recycle	6.51	5.9	3.13	.002*
How often would you need to see message?	1.84	1.85	-0.271	0.79

\* result is significant at p < .05

\*\* result is significant at p < .0001



Figure 7: Response Means to Perceived Message Characteristics from Urban/Rural Respondents

Table 5: Response Means to Perceived Message Characteristics from Urban/Rural Respondents

	Mea	n		
Message Component	Urban	Rural	t	p-value
Encourage to Recycle	7.63	7.34	1.17	0.243
What to Recycle	7.59	7.51	0.374	0.709
How to Recycle	6.91	6.36	2.1	.036*
Why to Recycle	6.22	5.79	1.485	0.138
How often would you need to see message?	1.82	2.01	-2.9	.004*

\* result is significant at p < .05

## Message Channel Preferences

Respondents were asked to indicate through which channels they would prefer to receive the messages they were exposed to. As in the message evaluation section, messages were grouped as Simple/Complex and Non-governmental/Governmental, and respondents were grouped as Urban/Rural. Results of the  $\chi$ -square tests are summarized in Table 6.

	Percent		Percent		Percent	
Message Channel	Urban	Rural	Simple	Complex	Non-government	Government
Paper (Flyers, Brochures)	44.6	36	39.7*	46.3*	39.9	46
Social Media	51*	39.3*	50.8	48.3	47.5	50.8
Websites	29.6*	21.3*	28.7	28.2	29.5	27.7
On Recycling Bins	46.8*	57.3*	50.4	46.6	48.2	48.4
Mail	33.8	30	30.6	35.3	29.9	35.7
Newspaper and Magazines	20.8	24.7	23.4	19.7	22.6	20.4

Table 6:  $\chi^2$  Comparisons for Message Channel Preferences by Respondent and Message Type

\* $\chi$ -square test significant at p < .05

## CONCLUSIONS

## Florida County Website Content Analysis

Overall, the results of our content analysis indicate that although all the Florida counties are striving to reach the same recycling goals, there is no apparent strategy or guidelines in place for recycling communication. Specifically, sites did not communicate effectively to residents and oftentimes solely provided residents with information on what to recycle (without presenting information on how to recycle and more importantly, how to prevent contamination). In addition to lacking key content, websites were visually unappealing and often not up-to-date.

A recycling plan that utilizes effective and strategic communication could significantly improve current rates of recycling, while simultaneously decreasing recycling contamination in Florida. Residents directly impact the county recycling rate daily and unless they are provided with accurate and complete recycling information, they will be unable to adjust their current recycling behavior. Core guidelines for recycling communication include contamination prevention information, direct instructions on how to recycle, clear messaging denoting which items are recyclable as well as the provision of the relative advantage associated with recycling. Recycling communication should also be distributed throughout a variety of channels, not solely on the county's website. Finally, all messaging should be consistent as a myriad of communication messages has the potential to confuse the resident.

## **Statewide Focus Groups**

Overall, resident engagement with current recycling programs was primarily influenced by convenience. Participants with curbside pick-up were most likely to participate in residential recycling. In general, participants expressed a willingness to recycle in community locations as long as information was included on the bin, detailing what to recycle. Positive incentives were expressed throughout all focus groups as a way to increase participation in county recycling programs. In terms of message strategy for communication information about recycling, participants in more urban areas and younger participants were more likely to engage with materials with less text and more images. Older participants as well as those that lived in rural areas preferred more thorough recycling information. All focus groups agreed that a variety in communication channel would be the best strategy to distribute the recycling message. However, rural participants preferred print materials more often than web-based materials.

#### Florida Resident Recycling Survey

Despite the view that younger people are more likely to understand recycling and be environmentally conscious, our data speak to quite the opposite. This highlights the need to focus on younger adults in the age range of 18-25 especially in order to foster environmentally friendly attitudes and make them feel like they can recycle if they want to. Luckily, our data suggest that recycling messages are working; any type of message was able to lead to an increase in recycling self-efficacy, and efforts to get messages in front of as many people as possible are worth continuing.

With that, our results show that it is important to remember that not all messages are created equal. There is a time and a place for simple recycling messages, but more complex information should be made easily available to recyclers as well. In a similar vein, focusing on only one type of distribution channel is unlikely to be enough if mass audiences want to be reached. While message type was not a significant indicator of channel preference in most instances, *audience* type clearly matters, furthering highlighting the basic communication tenant of understanding how to talk to your audience.

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