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Examining Thought Processes to Understand the Impact of Water Conservation Messages on Attitude

Joy N. Rumble[1], Alexa J. Lamm[2], Emmett T. Martin[3], & Laura A. Warner[4]

Abstract

Water availability issues have plagued many regions around the world and is viewed as the top issue facing the world. As a result, encouraging water conservation has become a priority for agricultural communicators. Previous research suggests strategically framed messages can impact attitudes about water conservation, but whether this change is a result of deep thoughts or simple cues has not been explored. This study used semi-structured qualitative interviews to explore the thought processes of individuals who irrigate their home landscape by presenting them with strategically framed messages. This audience was targeted due to the high volumes of water they use for irrigation. The interview process sought to understand how this group processed communication by asking participants to list their thoughts and verbalize their feelings toward a personal and a social message. The analysis was guided by the Elaboration Likelihood Model. The findings suggested participants processed the messages peripherally or retained their initial attitude. The findings implied this particular audience had more favorable thoughts toward the social benefits of water conservation than personal benefits. Future messages developed to promote water conservation should focus on the social benefits to promote increased change.

Keywords: thought processing; water conservation; messages; Elaboration Likelihood Model

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Introduction

Water conservation has become a major point of discussion globally and has been recurrently identified as the top issue facing the world as the climate changes and the population grows (Huang, Lamm, & Dukes, 2016; Lamm, Lundy, Warner, & Lamm, 2016; Willis, Steward, Panuwatwanich, Williams, & Hollingsworth, 2011). Due to increases in population and higher demands for water, many countries are currently not able to meet water needs for domestic and agricultural use (Lamm, Owens, Telg & Lamm, 2016; Ward & Pulido-Velazquez, 2008). As water sources deplete, conservationists have urged individuals to become more conscious of their water

[1] Joy N. Rumble is an Assistant Professor of Agricultural Communication in the Department of Agricultural Education and Communication as well as the UF/IFAS Center for Public Issues Education at the University of Florida, 121D Bryant Hall, Gainesville, FL 32611, jnrumble@ufl.edu.
[2] Alexa J. Lamm is an Associate Professor of Extension Education in the Department of Agricultural Education and Communication and is the Associate Director of the UF/IFAS Center for Public Issues Education at the University of Florida, 121E Bryant Hall, Gainesville, FL 32611, alamm@ufl.edu.
[3] Emmett T. Martin is a Research Coordinator in the UF/IFAS Center for Public Issues Education at the University of Florida, 126A Bryant Hall, Gainesville, FL 32611, emmett1986@ufl.edu.
[4] Laura A. Warner is an Assistant Professor of Extension Education in the Department of Agricultural Education and Communication as well as the UF/IFAS Center for Landscape Conservation and Ecology at the University of Florida, 117A Bryant Hall, Gainesville, FL 32611, lsanagorski@ufl.edu.

usage (Hogue & Pincetl, 2015; Lamm, Lamm, & Carter, 2015). In fact, "the importance of water conservation is increasing every year" (Ash, 2012, p. 67).

In the United States, residential water usage is estimated at nearly 320 gallons per day per household, with 30% of that water being used outdoors (Environmental Protection Agency, 2016). Approximately 9 billion gallons of water is used daily in the United States for irrigation (EPA, 2016). Many families regularly use large amounts of water to maintain the appearance of their home landscape (Boyer, Dukes, Young, & Wang, 2014; Huang et al., 2016). However, much of the water used to irrigate the home landscape is wasted due to overwatering (Ward & Pulido-Velazquez, 2008; Warner, Rumble, Martin, Lamm, & Cantrell, 2015).

Regulations on water usage in the home landscape are imposed on residents based on geographic location. In Florida, the Department of Environment Protection (FDEP) has set restrictions on how frequently residents can irrigate, as well as recommendations for drought resistant plants to assist in water savings (FDEP, 2007; Felter, 2013). Although water restrictions are put in place in an effort to save this limited resource, changing residents' behaviors and irrigation practices is essential to achieving water conservation (Huang & Lamm, 2015a; Huang & Lamm, 2015b).

Communication strategies have been effective in changing attitude and behaviors in natural resources conservation (Leal, Rumble, & Lamm, 2015). Warner et al. (2015) found that using strategically framed messages impacts residents' attitude and perceived behavioral control (PBC) toward good irrigation practices. Tversky and Kahnerman (1981) suggested "framing of an action sometimes affect the actual experience of its outcomes" (p. 458). While strategically framed messages have been shown to impact attitudes and PBC, it is unknown how this information is processed and whether the resulting attitudes are formed through careful and deep thought (Gorham, Lamm, & Rumble, 2014) or based on simple cues.

This study sought to explore how strategically framed messages about water conservation are processed by a targeted segment of the public in order to assess the strength of the resulting attitude. Understanding how information is processed could enhance agricultural communicators' ability to bring about the efforts that focus on adoption of conservation behaviors and closely aligns with priority one of the American Association for Agricultural Education national research agenda: 2016-2020 (Roberts, Harder, & Brashears, 2016) that emphasizes the need for public understanding and engagement in agricultural issues.

Theoretical Framework

The study was guided by the Elaboration Likelihood Model (ELM; Petty & Cacioppo, 1986). ELM is a model that is used to explain how individuals process and use information that they have encountered (White, 2011). ELM suggests there are two routes that lead to persuasion. These two routes are the central route and the peripheral route. Petty and Cacioppo (1986) described the central route as a type of persuasion "which likely resulted from a person's careful and thoughtful consideration of the true merits of the information presented in support of an advocacy" (p. 125). The peripheral route has been described as a type of persuasion "which more likely occurred as a result of some simple cue in the persuasion context that induced change without necessitating scrutiny of the true merits of the information presented" (Petty & Cacioppo, 1986, p. 125). According to Petty, Brinol, and Priester (2009) an individual's motivation and ability to process information is a determining factor as to which processing route will be effective in persuasion. Once motivation and ability is achieved, individuals proceed through the process defined by the model to the potential of more thoughts and a change in cognitive structure. If more

thoughts are not produced or a change in cognitive structure is not achieved, then the individual will either return to their initial attitude or experience a peripheral attitude change (Petty et al., 2009). If more thoughts are produced and a change in cognitive structure is achieved, then an attitude change through the central processing route occurs (see Figure 1).

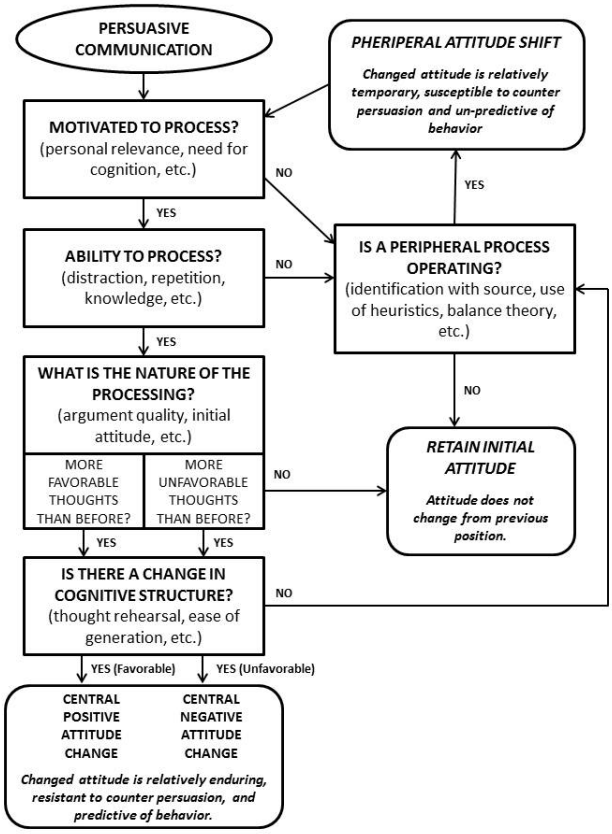

Figure 1. The Elaboration Likelihood Model of Persuasion (Petty et al., 2009)

Historically, ELM was developed as a theory to examine processes that lead to attitude change, and measure the degree to which the attitude has changed (Petty & Brinol, 2012). ELM recognizes that persuasion is a multi-dimensional process. It measures outcomes of attitude based on the information processing route, as well as the context of the situation (Goodwin, 2013). ELM has been used in many disciplines including nutrition (Sparks, Raats, Geekie, Shepard, & Dale, 1996), public health (Dinoff & Kowalski, 1999), gender studies (Brooke-Harris, Heesacker, & MejiaMilan, 1996), and political studies (Chmielewski, 2012). Many studies utilizing ELM have examined the model through quantitative methods; however, Cacioppo and Petty (1981) provided recommendations for assessing cognitive processes within the ELM through thought listing techniques. In these cases, messages were developed specifically within a context area targeting specific individuals that would have a tendency toward a behavior already with the greatest potential for change.

For example, Kreuter and Wray (2003) used thought listing to examine the impact of health communication messages on weight loss. The results showed that messages tailored to the individual resulted in central processing, more positive attitudes, and intent to implement weight

loss behaviors. In this study, individually tailored messages were more impactful than messages targeted to a more general audience (Kreuter & Wray, 2003). Carpenter (2015) also conducted a meta-analysis to determine if strong persuasive communication resulted in central processing. The study found the strength of persuasion does impact processing route (Carpenter, 2015). Lazard and Atkinson (2015) sought to explore if images included in messages could impact persuasion and found that incorporating images and text could increase engagement of processing pro-environmental messages and could ultimately have a lasting impact on behavior. Based on this review of literature, it is expected that targeted messages about water conservation using visual messages may drive individuals, that are already primed to engage in water conservation behaviors, to process the message centrally resulting in greater potential change.

Purpose and Research Question

The purpose of this study was to understand how individuals with a pre-existing interest in water conservation process a visual persuasive message focused on the personal or social impacts of water conservation using the ELM. This study was guided by the following research question: How do individuals who use an excessive amount of water in their home landscape, but are interested in water conservation, process a water conservation message focused on the personal or social impacts of their behavior?

Methods

The present study was qualitative in nature. In-depth one-on-one interviews were used to collect data. Participation was limited to Florida residents who use irrigation in their home landscape, a group known to use an excessive amount of water. Eligibility criteria for participants included: (a) must be 18 years-old and over, (b) live in a home with a lawn and landscaping, (c) have an irrigation system, and be (d) responsible for controlling irrigation system.

In order to ensure participants in the interview process were interested in water conservation, they were screened for eligibility. Using a specific set of survey questions and stepwise discriminant analysis, Warner et al. (2016) were able to place their respondents into three categories: (a) the Water Considerate Majority; (b) The Water Savvy Conservationists; and (c) The Unconcerned Water Users (see Table 1). Their research suggested programs targeting the Water Considerate Majority subgroup would be more impactful because they have a substantial capacity to conserve water paired with the ability and motivation to do so. Using this research as the foundation, a short survey was created using the scale previously developed by Warner et al. (2016). A short recruitment advertisement was posted on a North Central Florida county social networking page providing a brief description of the study and a link to the screening survey. The Facebook recruitment post include the following information and was accompanied by a picture of a staged interview setting: "Researchers at The University of Florida are seeking participants for interviews about landscape and irrigation practices. Those who are selected will receive a $20 gift card for completing an interview. Click here to see if you qualify" This method limited participation to Facebook users who liked the county Facebook page and must be recognized as a limitation of the study. Those who would meet the selection criteria, but were not active on Facebook, or did not like the county's Facebook page, or did not complete the screening survey may have been different than those interviewed in this study. In total, 74 respondents completed the screening survey.

Table 1

Categories of Respondents who use Irrigation in the Home Landscape

Cluster Identification	Group Characteristics
Group 1: Water considerate majority	Moderate rate of adoption of residential landscape water conservation practices
	Moderate normative beliefs, perceived behavioral control, and attitudes toward good irrigation practices
Group 2: Water savvy conservationists	Highest rate of adoption of residential landscape water conservation practices
	High normative beliefs, perceived behavioral control, and attitudes toward good irrigation practices
Group 3: Unconcerned water users	Lowest rate of adoption of residential landscape water conservation practices
	Low normative beliefs, perceived behavioral control, and attitudes toward good irrigation practices

Note. Adapted from "Classifying Residents who use Landscape Irrigation: Implications for Encouraging Water Conservation," by Warner, Lamm, Rumble, Martin, and Cantrell (2016).

Interview participants were selected systematically in order of screening survey completion. In total, 39% of respondents were grouped into the Water Considerate Majority (n = 29), 47% were grouped as the Water Savvy Conservationists (n = 35), and 14% were grouped as Unconcerned Water Users (n = 10). The research team contacted the first 15 completes from the Water Considerate Majority. In less than 24 hours, 10 individuals confirmed they would participate in an in-depth interview.

The interview guide was developed by a panel of experts whose area of specialization included agricultural communication, Extension education, and water quality and quantity issues. The interview guide was semi-structured, which allowed us to probe for more information when deemed necessary (Bryman, 2008). During the interviews, participants were asked a series of questions regarding water usage in their home landscape as well as questions designed to capture their initial attitudes and behaviors toward water conservation. The participants were then exposed to two framed message that encouraged water conservation. They were asked to write out and discuss their thoughts as they processed (a) a personal and (b) a social framed message (see Figure 2). Each participant was given a sheet of paper to list their positive, neutral, and negative thoughts as they viewed the two messages (Cacioppo & Petty, 1981; Cacioppo, Petty, Kao, & Rodriguez, 1986). The process of thought listing was used to ensure that ELM was the primary focus of the study. The presentation of the messages was randomly assigned to participants in an effort to decrease bias. Some participants received the personal message first, while others received the social message first. The interviews concluded by asking participants to discuss their attitude and

intended future behaviors associated with water conservation after receiving the messages. Each participant received a $20 gift card for their participation.

Figure 2. Personal message (left) and social message (right) shown to participants.

All interviews were conducted in a conference room at the University of Florida. A designated researcher conducted individual interviews with the 10 participants over the course of one week. The shortest interview was 26 minutes, while the longest interview was 43 minutes. The interviews were audio recorded and professionally transcribed for data analysis. Recordings and transcriptions allowed us to revisit the data to ensure a thorough understanding (Bryman, 2003). Triangulation was achieved through the lead researcher's field notes and discussion of the interviews with the research team to ensure a consistent interpretation of the data (Tong, Sainsbury, & Craig, 2007). In addition, transferability was sought through thick, rich descriptions of the methods and results (Lincoln & Guba, 1985). Each interviewee was assigned a pseudonym before the data analysis process began. The use of pseudonyms added an extra layer of confidentiality for participants so that only members of the research team could identity the study participants (Kaiser, 2009).

We used thematic analysis, guided by Figure 1, to analyze the participants' collective responses to answer the research question. The unique thoughts listed and discussed by the participants after viewing each message were used to determine processing route based on whether they used peripheral cues or if their thoughts were representative of the central process (Cacioppo & Petty, 1981). For example, thoughts that focused on a word, color, or part of the image were classified as based on peripheral cues (Petty & Cacioppo, 1986). Thoughts that extended beyond the participant's initial attitude and demonstrated depth of thought were classified as thoughts representative of the central processing route (Petty & Cacioppo, 1986). Thoughts that aligned with the initial attitude, but did not go beyond it, were also recorded. This process allowed us to conclude if the participants retained their initial attitude or experienced a change in attitude after receiving the persuasive messages (Petty & Cacioppo, 1986). The lead researcher kept an audit trail of the analysis so the findings could be confirmed by co-researchers, thus increasing the confirmability and dependability of the results (Creswell, 2007). The analysis of the 10 interviews revealed data saturation, thus no further individuals were contacted for participation (Creswell, 2007).

Participants were mostly female (eight female and two male). None of the participants were originally from North Central Florida. The majority of participants belonged to a homeowners' association. Table 2 shows the characteristics of the individuals who took part in the study.

Table 2

Description of Study Participants

Pseudonym	Gender	Occupation	Years in North Central Florida	Age
Allison	Female	Urban forestry Researcher	14 years	60
Barbara	Female	Self-employed	15 years	36
Carol	Female	Operations Research Analyst	15 years	62
Glenda	Female	Regulatory affairs manager	8 years	39
John	Male	Information technology manager	12 years	31
Kathy	Female	Retired/ Administrator	37 years	74
Martha	Female	Homemaker	3 years	40
Nancy	Female	Retired	9 years	74
Sue	Female	Retired Librarian	28 years	64
Thomas	Male	Nursery manager	11 months	51

Results

Participants had to have an irrigation system they had control over at their home to be included in the study. Although each participant had an irrigation system, methods of irrigating varied. Many participants did not use their irrigation system and relied on rainwater for irrigation. Glenda stated, "We have an irrigation system [that] we don't use because of me. [We] just depend on the rain for our grass to get water." When asked about the how frequently she used her in-ground irrigation system, Carol replied, "We've had an adequate amount of rain. I keep it off and just turn it on when I see the grass looking pretty sad." Barbara made a similar remark, "The woman who owned the house put in an irrigation system, but I have never used it. I try to collect rainwater."

Participants shared measures they had taken to conserve water inside the home. Installing technologies such as water efficient appliances was a method used to save water in the home. John shared, "Inside the house we made sure that we purchased our shower nozzles and everything, we made sure we bought the ones that conserve water." Nancy informed, "I have the high efficiency dishwasher [and] clothes washer." Glenda described her in-home water conservation efforts by

adding, "We didn't remodel to put new fancy flooring and stuff. The first thing we did was change our toilets [and] faucets."

Participants also shared water conservation practices related to water usage in the home. Allison said, "we take short showers; we don't run water when we're not using it. I wash dishes, [and] rinse at once. Short showers, sailor showers my mom used to call them." Kathy shared, "I may only run the dishwasher once a week; I usually do dishes by hand, rather than run the dishwasher and use all that water." Sue stated, "When we do laundry, we pay attention to the size of the load. We usually do a full load. If we have a smaller load we set the water to the smallest amount possible."

Attitudes toward water conservation prior to receiving a message

Initial attitudes toward water conservation were generally positive. Living in the State of Florida seemed to increase participants' awareness of how essential water is to every aspect of life. When asked about attitude toward water conservation John stated:

> I think it's important, because obviously using water, that's depleting the springs. I've read about that in news articles and about how much water is ending up coming out of the springs. It lowers the water levels and directly affects the environment.

Allison expressed her attitude toward water conservation by sharing details of her upbringing. She said, "Growing up in the Washington D.C. area, I was extremely conscious of water conservation. Our house was on the desalination plant." Allison went on to passionately state:

> My feelings are that [water conservation is] critical, and I don't think there can be enough education. I think people are complacent when it comes to understanding how much of a limiting factor that is in the state of Florida. I see a lot of [water] waste, and it concerns me.

Concerns around water issues in Florida emerged as a theme that shaped participants' attitudes toward water conservation. "In Florida, our source of fresh water, is going down. I am a very strong pusher for conservation of water," said Glenda. Kathy discussed why water conservation was important by mentioning Florida's water table. She added:

> With the water table being what it is in Florida; and the fact that, at least in our yard, when it rains, everything soaks up, and it's dry an hour after it rains; it says to me that we have to be very conscious of what we do with our watering.

Motivators of water conservation seemed to be associated with factors that impacted participants personally. Carol, John, and Thomas mentioned that economics motivated them to save water. Carol said, "Cost has to be the biggest motivator." Thomas explained that what motivated him to conserve water was "more economics" due to using city water and paying quarterly. John added, "A lot of it is the price of water." He went on to say:

> I know that the more we use the more it's going to end up costing down the line. It's not necessarily just that month's water bill, it's down the line if more people are using water, the cost is going to go up later on. It's an economic issue primarily for me.

Perception of water availability globally was also a motivating factor for water conservation. Some participants expressed thoughts about how others wastefulness have made them more conscious about conserving water. Barbara passionately stated:

> I think that Americans have this sense of entitlement to water, and they don't realize what a limited resource that it is. I get a little upset about it. I feel like it's a precious resource. I feel like it gets wasted so much and taken for granted. I don't really know what to do about it besides my own practices and support education of the community at large to make changes.

A similar remark was made by Allison, when she expressed insights regarding her views toward water conservation. "Just being American and tending to take water for granted, I have to remind myself to turn the water off." She shared the root of her concerns by revealing, "I've been to other countries, and I know you can't take that for granted."

Processing of a personal water conservation message

ELM suggests that in order for an individual to reach elaboration they must possess the motivation and ability to process information. Because all participants were pre-screened to ensure they were part of the Water Considerate Majority (Warner et al., 2016), the research team determined each person interviewed was motivated and had the ability to process information related to water conservation. Additionally, it was evident in the findings that the participants were motivated and had the ability to conserve water. The nature of cognitive processing for the personal message was generally positive. Participants were asked to write down their thought process in response to the message presented.

When discussing his initial attitude toward water conservation, John focused primarily on the cost associated with water usage. In an effort to cut cost, John purchased a low-flow shower nozzle that reduces water flow. When asked how efficiently he believed this action to be, he stated, "As long as you're not increasing how long of a shower you're taking, you should be conserving water." When asked if he measured his shower time, John replied, "I don't notice myself having to take any longer of a shower with the decreased water flow rate."

John's initial reaction to the personal message was "positive." About half of John's thoughts were peripheral in nature focusing on the elements in the message. The word "waste" grabbed his attention and had an effect on how he viewed his own water usage. After receiving the personal message, John reflected on his own actions. He shared, "Yeah. I do waste water sometimes." John elaborated by adding, "The word 'lifetime' really jumped at me, because it showed that you have to think about how much water you're using over your whole life." When asked about future plans to save water, John replied that "being cognizant of how much water you're using each day in your life" was a way to ensure that he wastes less water.

Thomas was also motivated by the economics associated with saving water and expressed positive, neutral, and negative feelings toward the personal message. Many of his thoughts focused on simple cues in the message, such as the words used. While processing the message, Thomas expressed that the words "throughout your lifetime" was the positive aspect of the message. He went on to say that "Waste less water" was neutral. The negative feelings about the message was the term "conserve water." He said, "This may sound weird but conserve water sounded negative to me. It's like waste less [is] just [a] softer message than conserve water- [the words] just seems, I guess, harsh." After processing the personal message, Thomas expressed his plans to ensure that he would waste less water throughout his lifetime. As a nursery manager, Thomas mentioned that

he would use different methods for water at work. He also expressed that he would change his personal habits such as "Not letting the water run when I brush my teeth [and] fix the toilet if the flapper starts leaking."

Sue, a retired librarian, expressed that she was "all for water conservation." She revealed measures that she used to save water inside and outside of the home. Her water conservation behaviors included installing low-flow toilets, shower nozzles, and using her irrigation on a limited basis. When presented with the personal message, Sue focused on peripheral cues for most of her thoughts. Sue stated that her thought process was toward the word "waste" which she thought "could be a neutral or a negative connotation." The colors in the ad also impacted Sue's attitude toward the personal message. She added, "Blue is sort of a depressing color in an ad." She stated that the color of the ad was "negative."

When asked about her personal water conservation practices, Sue replied, "I don't really know what the correlation would be between the steps that I take at home in the overall big scale." However, she did describe steps that she would like to take to ensure her personal water usage is less throughout her lifetime. She shared:

> I want to convince my husband that we could plant more plants that don't take as much water as grass does. I think that we have cut back a lot there…take a look at the yard and see okay, what can I take out, what can we change, how could we improve our irrigation methods, and still have something that's pretty to look at, but not so water hoggish.

Barbara (self-employed) described her feelings about water conservation as "really important." She expressed her distaste for the way water is used in her neighborhood. She shared, "I get really aggravated when I'm out and about in town and I see businesses with sprinkler systems out on the sidewalks, or it's raining and people have their sprinkler systems on." Her thoughts about her own water savings behavior was "extreme." She reflected, "When I was younger I would use bathwater— after I would bathe I would use bath water to water plants with or flush the toilet."

Barbara revealed the expense associated with purchasing water efficient appliances was a barrier to conserving water. After receiving the personal message Barbara believed the message was clear. She also added, "I felt like it's a little confrontational, but I kind of liked it." Few of Barbara's thoughts were peripheral in nature and many were reflective of her initial attitude. She mentioned that she liked the gender of the person in the message but did not like the action in the message. Her thoughts of the image were "equally" positive and negative. When asked about changes she would make, Barbara informed, "Eventually I'm going to get a barrel and low-flow toilets…I'm going to get a barrel before the rain picks up again… I'll probably wait [until] spring [for] sales…That's one thing I want to do [to] make a big difference."

Glenda's reaction to the personal message was somewhat positive. "I can make a difference with my actions" was Glenda's initial reaction to the personal message. Similar to Barbara, Glenda's thoughts primarily spoke to her initial attitude and a few peripheral cues. When asked to discuss her feelings in detail, Glenda shared that the term "lifetime" was an overwhelming statement. She said, "I was ambivalent about lifetime. I [thought], 'Eh, a lifetime? That's a long period. Most people can't imagine in a lifetime what happens. It's just too infinite. It's not a finite period with measurable results." Glenda believed that her personal water conservation practices were extremely important. Her beliefs were that major change involves each individual's collective efforts adding up over time. When asked about future plans to ensure that she wastes less water throughout her lifetime, Glenda reiterated her initial plans to convert her current landscape to a

more natural Florida landscape. She also added, "We don't plan on doing anything further because we've sort of done it already."

Processing of a social water conservation message

Martha, a homemaker, had an initial attitude toward water conservation that focused on quality. As a home food producer, she explained that the quality of the soil and water determines the quality of the fruits and vegetables that she grows. Martha expressed she "could care less" about the look of her landscape. She added, "I care more about the water being good especially because we're on a well system."

Martha's reaction to the social message was positive. She primarily processed the message peripherally most of her thoughts focusing on peripheral cues. She stated that the words "be a role model" caught her attention. She also mentioned the source (link to website) pointed her in the right direction. As a mother, she believes that it is important to ensure future generations have an adequate amount of water to survive. Martha expressed her concerns about a possible water crisis in the future by saying, "we may think that's not a problem for us now; it could easily be in the future." Her thoughts were that "anything you can do preventative is better than reactive." When asked about her plans to ensure water was available for future generations, she simply stated, "I don't know." She then added, "It feels like we're in the generation between the ones who didn't care and the ones who really have to care because we're messing everything up for [future generations]."

Allison, who is retired and previously worked in urban forestry research, revealed that she is "really proud" of her water conservation practices. She only plants items in her home landscape that require small amounts of water. Most of Allison's thoughts focused on peripheral cues. When presented with the social message, Allison's initial reaction toward the slogan "be a role model" was positive. She then added, "The layout of that particular poster didn't appeal to me as much, because I don't see that it relates to water use so much." Allison's negative views of the social message primarily focused on the imagery. She went on to say, "I'm not sure whether we're looking at three generations or two generations. I can't tell whether she's a grandma or a mom…but as far as the poster itself, the color of it, it doesn't show water being used." When asked her plans to ensure water is available for future generations, Allison informed that she would educate her ten grandchildren on the importance of saving water. Her final thoughts were that educating her grandchildren on a personal family level would impact the adequacy of water sources for future generations.

Carol, an operations research analyst, described her feelings toward water conservation as "pretty strong." She credits her son for educating her and sparking her interest in natural resource conservation, including saving water. Carol, a native of Washington, D.C. compared her irrigation practices in Florida to her hometown by saying it was a "different environment." Her observation was that "It seemed like we had really adequate rainfall there. It just seemed more constant there than here in Florida. Here it seems like drought, then rainy, and then its drought."

When asked to describe her thought process toward the social message, Carol enthusiastically said, "Yes, yes, yes, yes, yes." Her thought was that the message "said a whole lot in a few words." Most of her thoughts were focused on peripheral cues, such as words, within the message. She expressed her opinion that each individual should work on their personal conservation practices to ensure that future generations are not faced with water problems. Her positive thoughts about the message also included the "fact that it just didn't tell you some things, but a place where you could go for more information. I like the website there."

Carol thought that ensuring future generations have enough water was "extremely" important and a number one priority. She also added, "You need water for everything you do. I guess, the most important thing is for your food. It's the only way you can have enough food. To me that's number one." To ensure that water is available for future generations, Carol plans to "not waste water." Additionally, she added that she was committed to using water more wisely in the future. She agreed that she would "not just say all these things, but really do them."

Nancy, a retired and "self-educated gardener," shared that she would love to have a turfgrass-free yard to avoid having to irrigate. She said that gardening has been therapeutic for her for many years. Her belief was that water conservation is "very important." Nancy revealed she is a full-time caretaker for her daughter whose daily routine includes consuming large amounts of water due to a health issue. Nancy's stance on saving water was that "Naturally, we can't live without water. I mean for health reasons, not so much for gardening reasons. You do have to take in agriculture because agriculture ties in with health so that has to be considered."

Nancy's reaction to the social message was also positive. Most of her thoughts focused on peripheral components of the message. She said that the term "be a role model" grabbed her attention. Her reaction to the 'Ensure water is available for future generations' was, "Aren't we as parents and people responsible. It takes a village." She added, "I'm on a mission [for] tomorrow already."

Conclusions

While previous research has shown strategically framed messages can influence attitudes and perceived behavioral control toward water conservation (Warner et al., 2015), this study sought to further understand how messages about water conservation are processed. Due to the qualitative nature of this study as well as the selection bias introduced through Facebook recruitment, these results and conclusions are limited to the participants interviewed as a part of this study. The participants interviewed were participating in good irrigation and water conservation practices despite using an excessive amount of water in their home landscape, confirming the findings of Warner et al. (2016). Several of the participants referenced using rain barrels, limiting the amount of time spent irrigating and limiting their home water use through the use of low flow appliances and fixtures. When discussing water conservation, the participants had a positive initial attitude toward water conservation and referenced experiences and knowledge they had regarding water conservation similar to the findings of Huang and Lamm (2015a). Additionally, they discussed economic motivators and the need to ensure a future global water supply.

From a theoretical perspective, the results show that different depths of processing occurred when participants viewed the personal and social message as predicted by the ELM. The following conclusions reference components of the ELM model seen in Figure 1. The characteristics of the participants, as well as their initial attitudes, revealed they did have the ability and motivation to process the messages (Petty et al., 2009; Warner et al., 2016). In the discussion following the presentation of the personal message, Barbara and Glenda's thoughts were limited and they seemed to return to their initial attitudes. Based on this, it is believed the personal message was not strong enough to facilitate a peripheral or central processing route in the minds of Barbara or Glenda (Carpenter, 2015; Petty et al., 2009). However, several other participants referenced peripheral cues after viewing the personal message and thus likely participated in peripheral processing (Petty & Cacioppo, 1986). While these participants produced more thoughts, they did not have a change in cognitive structure and reverted back to peripheral processing (Petty et al., 2009). John, Thomas, and Sue all referenced specific words in the personal message that stuck out to them while the color also cued Sue's peripheral attitude.

When discussing the social message Martha, Allison, Carol, and Nancy all seemed to process the message using the peripheral route. Martha, Allison, and Nancy were each cued to a peripheral attitude through certain words presented in the message (Petty et al., 2009). Additionally, the website URL, or the source of the message, was noticed by Martha and Carol further activating the peripheral attitude. Allison also cued in on the image in the social message, which led her to more favorable thoughts but did not seem to cause a change in cognitive structure (Petty et al., 2009). The focus on the image was closely aligned with Lazard and Atikinson's (2015) finding that images used as part of a persuasive message could increase engagement in processing.

The findings indicated that none of the participants reached elaboration through the central processing route, but rather took part in peripheral processing or in some cases retained their initial attitude (Petty et al., 2009). The short-term nature of the interviews may not have adequately allowed us to analyze the depth of thought, and the results may have been different if participants' attitudes were assessed at the conclusion of the interview rather than immediately after seeing each image (Cacioppo & Petty, 1981). Additionally, if the participants had multiple exposures to the message over a period of time, further strengthening the ELM ability factor, the depth of processing could have also been altered (Petty et al., 2009). The simple and short messages may have also lacked enough persuasive components or concrete recommendations to motivate an already water considerate audience and initiate a change in attitude. Furthermore, results may have been different if the messages were tailored to each individual rather than targeted to the more general water considerate audience (Kreuter & Wray, 2003).

Implications and Recommendations

Considering the importance of water conservation to the future of agricultural production and the sustainability of natural resources (Leal et al., 2015), agricultural communicators need to continue to work to identify water conservation messages that resonate with those using the most water with the motivation to make a change (Gorham et al., 2014). In this study the social message proved to be effective in initiating peripheral attitudes implying it may be used in programming or communicating to activate peripheral attitudes. Additionally, the findings imply the personal message may also be used to activate peripheral attitudes, but may not be as effective since initial attitudes were retained by some participants.

Even though water users that were primed for change were targeted in this study (Warner et al., 2015), barriers still seemed to limit their ability to process the communication at a deep level. For example, some participants said they could not afford to make changes and others seemed overwhelmed by the large-scale need to conserve water and struggled to identify what they could do differently to make a difference. Agricultural educators and communicators should help individuals reason through these barriers and identify tangible changes they can make to further improve their water conservation practices. Incorporating concrete actions and connecting them to a more tangible temporal frame may also increase the efficacy of water conservation messages targeting a motivated group of homeowners.

Additional research should be conducted to continue to test persuasive messages about water conservation with consumers primed for engagement in water conservation. Messages with different persuasive elements and varying levels of specificity should be tested and compared. Outside of those primed for engagement in water conservation, messages should be tested with all consumers to identify if messages are effective with those outside of the water considerate majority and if they have the potential to bring about change.

Research should also explore individually tailored messages as suggested by Kreuter and Wray (2003). Future research could also be conducted that allows for multiple exposures to a message before analyzing the participants' level of attitude change and elaboration. A longitudinal study examining attitudes initially, after exposure to a message, and then after a period of time could confirm the processing route by examining the endurance of the attitude and any behavioral changes resulting from the attitude change. Further examination of attitude processing as a result of communication is essential to the future of communicating about water conservation. Through continued work to improve agricultural communication around water conservation, water conservation attitudes and behaviors should become more positive.

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