Testing Social Media Water Conservation Messages that Convey Extension Evaluation Results

Laura A. Warner  
*University of Florida*, lsanagorski@ufl.edu

Colby Silvert  
*University of Florida*, Colby.silvert@ufl.edu

Jamie Loizzo  
*University of Florida*, jloizzo@ufl.edu

Jarred A. Shellhouse  
*University of Florida*, jshellhouse@ufl.edu

This work is licensed under a [Creative Commons Attribution-Noncommercial-Share Alike 4.0 License](https://creativecommons.org/licenses/by-nc-sa/4.0/).

**Recommended Citation**

Warner, L. A., Silvert, C., Loizzo, J., & Shellhouse, J. A. (2021). Testing Social Media Water Conservation Messages that Convey Extension Evaluation Results. *Journal of Extension, 59*(2), Article 12.  
[https://doi.org/10.34068/joe.59.02.12](https://doi.org/10.34068/joe.59.02.12)

This Research in Brief is brought to you for free and open access by the Conferences at TigerPrints. It has been accepted for inclusion in Journal of Extension by an authorized editor of TigerPrints. For more information, please contact kokeefe@clemson.edu.
Testing Social Media Water Conservation Messages that Convey Extension
Evaluation Results

Cover Page Footnote
The research reported here was supported by the UF/IFAS Center for Landscape Conservation and Ecology.

This research in brief is available in Journal of Extension: https://tigerprints.clemson.edu/joe/vol59/iss2/12
Testing Social Media Water Conservation Messages that Convey Extension Evaluation Results

LAURA A. WARNER1, COLBY SILVERT1, JAMIE LOIZZO1, AND JARRED A. SHELLHOUSE1

AUTHORS: 1University of Florida.

Abstract. In this study, we tested frames Extension professionals could use to promote residential water conservation through social media. We randomly assigned Florida residents to view one of six visual messages with water conservation facts or stories and then measured willingness to engage with education programs and conservation behaviors. There were clear differences in message frame performance, but better performance was highly dependent on outcome metrics used. Therefore, we were unable to identify a preferred frame. These findings need to be further examined in an authentic social media environment to inform best practices in social media message framing for Extension professionals.

INTRODUCTION

U.S. citizens use 9 billion gallons of water each day on their lawns, much of which is wasted and can be conserved (Environmental Protection Agency, 2013). Floridians use 1,680 million gallons of water per day for household purposes, including household irrigation (Dieter et al., 2017). When Extension programs lead to adoption of good irrigation practices, households can conserve water while maintaining healthy yards and saving money. In 2018, for example, Floridians saved over 386 million gallons of water after participating in educational programs offered by the University of Florida Institute of Food and Agricultural Sciences (UF/IFAS), an amount valued at more than $1 million in utility bill savings (UF/IFAS, 2019).

Extension professionals working on water issues through various programs encourage residential landscape water conservation using group classes, webinars, individual consultations, site visits, and communication methods such as social media. Social media is becoming increasingly important for Extension professionals (Campbell et al., 2019) and can be used to achieve the land-grant mission, including increasing clients’ knowledge and changing behavior (Gharis et al., 2014).

Social media offers a valuable way to present visual imagery. Compared to social media messages with text alone, those containing visuals may appeal more vividly to consumers’ senses and strengthen audience engagement and reactions (Childers & Houston, 1984; Lazard & Atkinson, 2015; Villarroel Ordenes et al., 2018). Social media can be used to provide clientele with ample information (Garcia et al., 2018); however, understanding of how to best use this medium is limited, especially in Extension contexts. Researchers agree that strategic communications alone (i.e., through social media) may not directly prompt behavior change but are critical components of educational programs (Warner et al., 2018; Warner et al., 2015). While there are many metrics available to measure social media outcomes (e.g., number of followers or mentions [Gharis et al., 2014]), little research has evaluated strategies to achieve greater impact.

Extension professionals may frame social media messages to engage, educate, and change attitudes of online audiences (Ardoin et al., 2013; Gharis et al., 2014). To date, no research exists examining framing to inform the best way Extension can communicate evaluation impacts through social media, even though research has shown that the way evaluation reports are designed and shared can influence readers’ attitudes (Mason & Azzam, 2019). This study applied framing theory to test visual messages, which shared information from UF/IFAS Extension evaluation reports. Frames provide a mechanism for change agents to cognitively organize information around a key idea (i.e., health, wealth, environment) to which a targeted audience may relate (Valenzuela et al., 2017). In this study, we used fact and story frames to characterize visual water conservation messages, comparing consumers’ reactions to state level statistical statements (facts) versus narrative-style personal quotes.
(stories) about Extension water conservation programming impacts.

**PURPOSE AND OBJECTIVES**

The purpose was to examine how social media posts containing different message frames (i.e., statewide level factual and household level narrative) conveying Florida water conservation outcomes and impacts could potentially influence viewers. Specific objectives were to examine Floridians’ (a) willingness to engage with Extension, (b) interest in learning about water, and (c) willingness to take action—all following a message intervention.

**METHODS**

We collected quantitative data in November and December of 2018 from an online, opt-in nonprobability sample of Floridians using a researcher developed instrument. Prior to data collection, the University of Florida Institutional Review Board reviewed our protocol for protection of human subjects and granted approval. We used a professional survey sampling company to recruit potential respondents who were Florida residents 18 years and older. From 4,882 potential respondents who belonged to the target audience, 3,596 provided complete responses, for a 73.7% participation rate (Baker et al., 2016). Respondents were randomly assigned to view one of six images (treatment groups; see Table 1) or to receive no treatment (control).

We designed treatments with the same base image portraying residential landscape irrigation and used font size and weight to highlight the most significant parts of each message. We overlaid three images with state level factual statistics drawn from UF/IFAS Extension 2017 water conservation outcomes (Treatments 1–3) and three with household level, personalized statements in the form of a quotation with a person’s silhouette (Treatments 4–6) to reinforce the idea that the quote came from a person (see Figure 1).

Respondents were required to view their assigned image for at least 10 seconds before proceeding to respond to the outcome variables (willingness to engage in Extension educational activities, interest in learning about water topics, and likelihood of engaging in actions to protect water). We measured interest in engaging with Extension by asking respondents to indicate their interest in eight educational opportunities, such as reading an Extension fact sheet. Responses were measured on a 5-point Likert scale with the following response options: strongly disagree, disagree, neither disagree nor agree, agree, strongly agree. We measured interest in learning about specific water topics with a check all that apply format where respondents could indicate interest in seven water-related topics, such as irrigation practices that save water.

We measured likelihood of taking action by using a 5-point Likert scale where respondents were instructed to, “Please indicate how likely or unlikely you are to engage in the following practices in the future.” There were four general actions, such as minimizing the amount of water used taking care of the yard, and six activism-related actions, such as donating to an organization that protects water. Responses included the following options: very unlikely, unlikely, undecided, likely, and very likely.

We used poststratification weighting methods to overcome limitations associated with nonprobability sampling and ensure responses were representative of the target population (Baker et al., 2013; Kalton & Flores-Cervantes, 2003; Lamm & Lamm, 2019). We used chi-square analyses to determine whether there was a relationship between the treatment and outcome variables. When we

| Treatment name                  | Treatment group | n   | Description                                                                 |
|---------------------------------|-----------------|-----|-----------------------------------------------------------------------------|
| Control                         | C               | 501 | No treatment/message                                                        |
| Gallons statewide fact          | Treatment 1     | 519 | Gallons of water saved statewide by UF/IFAS Extension participants in 2017 |
| Financial statewide fact        | Treatment 2     | 489 | Dollar value associated with gallons of water saved statewide by UF/IFAS Extension participants in 2017 |
| Increased supply statewide fact | Treatment 3     | 539 | Number of households supplied by gallons of water saved statewide by UF/IFAS Extension participants in 2017 |
| Gallons household story         | Treatment 4     | 487 | Quote about individual household level water savings over one year          |
| Financial household story       | Treatment 5     | 541 | Quote about individual household level financial water bill savings over one year |
| Increased supply household story| Treatment 6     | 519 | Quote about households supplied by individual household level water savings over one year |
identified a significant relationship, we used a post hoc modified Bonferroni test to determine which treatment groups were different from one another.

RESULTS

Treatment was related to interest in engaging in three of the eight Extension learning opportunities (see Table 2). Most of the differences among individual treatments were observed as less opposition (indicated by fewer strongly disagree or disagree responses) and a greater potential openness to learning in a particular way (indicated by neither disagree nor agree responses). Group 3 was most likely to express interest in visiting an Extension website to learn more about protecting water compared to two of the other treatment groups. Group 5 was more likely to indicate a neutral stance about visiting their local Extension office to learn about water compared to the control group and group 2.

Treatment was related to interest in learning about four of the seven water related topics (see Table 3). Group 6 was more interested in learning about irrigation practices that save water compared to the control group and group 1. Group 3 was more interested in learning about water restrictions compared to the control group and group 2. Group 3 was more interested in learning about irrigation management compared to group 2.

Treatment was related to likelihood of engaging in most of the water related actions (see Table 4). Group 2 expressed less opposition to avoiding wastage of water compared to the groups 1 and 5. Group 3 was more likely to visit springs or parks to learn about water compared to group 1. Group 2 indicated more indecision about joining an organization or...
Table 2. Chi-Square Analysis of Interest in Engaging with Extension Following Exposure to Randomly Assigned Visual Message Treatment

| Response                                                                 | Treatment | C   | 1     | 2     | 3     | 4     | 5     | 6     | \( p \) | \( \chi^2 \) | \( V \) |
|-------------------------------------------------------------------------|-----------|-----|-------|-------|-------|-------|-------|-------|---------|------------|--------|
| Visiting an Extension website to learn more about protecting water resources* | Disagree  | 25.6| 24.8  | 28.7  | 21.1  | 26.0  | 27.1  | 25.5  | .003    | 30.04      | .07    |
|                                                                          | NDNA      | 29.6\( _{ab} \) | 30.9\( _{ab} \) | 25.8\( _{ab} \) | 24.7\( _{ab} \) | 28.4\( _{ab} \) | 29.4\( _{ab} \) | 22.1\( _a \) |         |            |        |
|                                                                          | Agree     | 44.8\( _{abc} \) | 44.4\( _c \) | 45.5\( _{abc} \) | 54.2\( _b \) | 45.6\( _{abc} \) | 43.5\( _{abc} \) | 52.3\( _{abc} \) |         |            |        |
| Visiting local Extension office to learn about protecting water*         | Disagree  | 39.8| 38.1  | 39.9  | 35.4  | 38.2  | 32.6  | 37.4  | .023    | 23.57      | .06    |
|                                                                          | NDNA      | 30.8\( _{a} \) | 36.0\( _{ab} \) | 31.0\( _{a} \) | 32.1\( _{ab} \) | 35.7\( _{ab} \) | 41.1\( _{b} \) | 34.2\( _{ab} \) |         |            |        |
|                                                                          | Agree     | 29.4| 25.9  | 29.1  | 32.5  | 26.1  | 26.4  | 28.4  |         |            |        |
| Having a representative of my local Extension office visit my property to help me learn to protect water* | Disagree  | 40.9| 40.6  | 46.6  | 39.7  | 41.7  | 39.4  | 41.0  | .038    | 21.94      | .06    |
|                                                                          | NDNA      | 30.7| 34.1  | 27.6  | 27.6  | 33.5  | 34.3  | 29.5  |         |            |        |
|                                                                          | Agree     | 28.5| 25.3  | 25.8  | 32.7  | 24.7  | 26.4  | 29.5  |         |            |        |
| Attending a weekly Extension training to learn more about protecting water | Disagree  | 49.4| 49.2  | 52.6  | 47.9  | 47.4  | 46.9  | 51.3  | .166    | 15.68      | .05    |
|                                                                          | NDNA      | 30.4| 32.8  | 26.8  | 32.1  | 34.4  | 34.1  | 26.5  |         |            |        |
|                                                                          | Agree     | 20.2| 17.9  | 20.6  | 20.0  | 18.2  | 19.0  | 22.2  |         |            |        |
| Engaging with my local Extension office's social media sites to learn more about protecting water resources | Disagree  | 36.6| 37.3  | 39.2  | 36.0  | 35.8  | 33.7  | 37.0  | .192    | 15.99      | .05    |
|                                                                          | NDNA      | 30.2| 32.6  | 26.4  | 26.5  | 32.3  | 33.7  | 30.6  |         |            |        |
|                                                                          | Agree     | 33.2| 30.1  | 34.4  | 37.5  | 31.9  | 32.6  | 32.5  |         |            |        |
| Receiving an electronic Extension newsletter to learn more about protecting water resources | Disagree  | 26.4| 28.8  | 32.0  | 24.4  | 28.0  | 28.4  | 27.8  | .281    | 14.32      | .05    |
|                                                                          | NDNA      | 30.0| 28.6  | 27.4  | 27.6  | 31.7  | 28.4  | 26.5  |         |            |        |
|                                                                          | Agree     | 43.6| 42.7  | 40.6  | 48.0  | 40.3  | 43.1  | 45.8  |         |            |        |
| Attending one-time Extension workshop to learn more about protecting water resources | Disagree  | 35.3| 37.5  | 40.1  | 33.8  | 36.1  | 33.7  | 33.2  | .485    | 11.51      | .04    |
|                                                                          | NDNA      | 28.9| 29.9  | 29.3  | 29.1  | 31.2  | 32.2  | 32.3  |         |            |        |
|                                                                          | Agree     | 35.7| 32.6  | 30.6  | 37.1  | 32.7  | 34.1  | 34.5  |         |            |        |
| Reading a fact sheet to learn more about protecting water resources       | Disagree  | 25.1| 19.6  | 19.4  | 21.3  | 19.4  | 19.4  | 20.1  | .498    | 11.36      | .04    |
|                                                                          | NDNA      | 28.5| 30.3  | 31.2  | 27.8  | 29.9  | 32.8  | 29.1  |         |            |        |
|                                                                          | Agree     | 46.3| 50.1  | 49.4  | 50.9  | 50.7  | 47.8  | 50.8  |         |            |        |

Note. Numbers correspond to percentages of each treatment group selecting each response. C = Control; Treatment 1 = Gallons Statewide Fact; Treatment 2 = Financial Statewide Fact; Treatment 3 = Increased Supply Statewide Fact; Treatment 4 = Gallons Household Story; Treatment 5 = Financial Household Story; Treatment 6 = Increased Supply Household Story. Cramer’s V values were interpreted as 0.10 to 0.19 = weak effect (Rea & Parker, 1992). Strongly and somewhat disagree combined into one category (Disagree) and Strongly and somewhat agree combined into one category (Agree) to aid data presentation. Not applicable responses were excluded from this analysis. Frequencies with different subscript letters indicate subset of treatment groups whose proportions differ from one another at \( p = .05 \) (\( p \) values adjusted using Bonferroni method).

* \( p < .05 \).
buying a license plate to protect water, compared to group 4 and group 3, respectively. Group 2 was more likely to conserve water taking care of the landscape compared to group 4. Group 1 expressed less opposition to minimizing the water used to take care of their yard compared to the control.

**CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS**

Through this study, we drew insights into how different water conservation message frames influenced an audience's interest and participation in water issues and educational programs. No treatment had a clear advantage in terms of impact on viewers. Instead, the preferred frame was highly dependent on the outcome metric. If an Extension professional seeks to increase interest in learning about irrigation practices that save water, they would likely choose the increased supply household story frame. With a goal of influencing interest in engaging with Extension, there is promise in using four frames: the gallons statewide fact, financial statewide fact, increased supply statewide fact, and financial household story. The variability in the preferred frame based on outcome metric underscores the need to integrate an intentional social media strategy into an Extension program's planning process. Ideally, Extension professionals should identify social media goals early on, gather feedback, and test different frames with their audiences.

| Water conservation topic | Treatment | C | 1 | 2 | 3 | 4 | 5 | 6 | p | χ² | V |
|--------------------------|-----------|---|---|---|---|---|---|---|---|----|---|
| Irrigation practices that save water* | 17.8 | 17.1 | 19.2 | 24.8 | 22.2 | 20.9 | 26.7 | .001 | 23.67 | .08 |
| Understanding water restrictions* | 14.8 | 21.3 | 14.2 | 22.6 | 15.7 | 20.0 | 18.2 | .001 | 22.46 | .08 |
| Private well protection* | 9.0 | 8.8 | 13.6 | 13.7 | 11.6 | 8.9 | 9.8 | .016 | 15.64 | .07 |
| Irrigation management* | 14.4 | 15.0 | 13.8 | 21.1 | 16.6 | 14.7 | 15.2 | .025 | 14.44 | .06 |
| Plants that need less water | 18.6 | 21.0 | 21.2 | 23.2 | 21.9 | 21.1 | 22.0 | .726 | 3.64 | .03 |
| Irrigation technologies that save water | 19.0 | 18.1 | 16.5 | 21.3 | 20.4 | 18.6 | 20.6 | .484 | 5.476 | .04 |

* p < .05.

**Note.** Yes responses presented. C = Control; Treatment 1 = Gallons Statewide Fact; Treatment 2 = Financial Statewide Fact; Treatment 3 = Increased Supply Statewide Fact; Treatment 4 = Gallons Household Story; Treatment 5 = Financial Household Story; Treatment 6 = Increased Supply Household Story. Cramer’s V values were interpreted as 0.10 to 0.19 = weak effect (Rea & Parker, 1992). Frequencies with different subscript indicate subset of treatments whose proportions differ from one another at p = .05 (p values adjusted using Bonferroni method).

Significant differences in interest among those who viewed the statewide increased supply message in learning more about water on an Extension website and learning more about water restrictions indicate that presenting bigger evaluation impacts can potentially shift people toward seeking greater awareness of water issues. On the other hand, after viewing the increased supply household story message, there was a significant level of interest in learning about irrigation practices to save water, suggesting viewers related to the household level narrative, which may have led to contemplation of household level behavior changes. In these cases, both the household story and statewide fact frames likely grew interest in learning more. Therefore, Extension professionals should design and test messages based on specific intended outcomes, such as household level contemplation or more general awareness of water issues. Further, results indicate that both factual and narrative frames can have impacts and Extension professionals might consider varying communications to include both frames for appealing to a variety of audiences who might be driven by facts or emotions.

Our findings do not suggest people would take action after briefly viewing a social media water conservation visual message. Yet behavior change occurs incrementally, and small shifts in awareness or intention may be the intermediate steps in a complex behavior change journey (Conroy & Allen, 2010; Warner et al., 2014). Our findings imply that people are less opposed to taking action or advocating to protect
Table 4. Chi-Square Analysis of Likelihood of Engaging in Water Activism Following Exposure to Randomly Assigned Visual Message Treatment

| Response                                    | Treatment | p     | \( \chi^2 \) | V   |
|---------------------------------------------|-----------|-------|--------------|-----|
|                                             | C         | 1     | 2            | 3   | 4   | 5   | 6   |      |
| Avoid wasting water when taking care of my yard** |           |       |              |     |     |     |     | <.001|
| Unlikely                                    | 3.1cde    | 6.0a  | 1.8          | 2.4bcde | 5.7e  | 6.3c  | 2.3cde | 35.30 | .07  |
| Undecided                                   | 12.1      | 9.4   | 9.2          | 9.6   | 11.5 | 8.4  | 9.2  |       |
| Likely                                      | 84.8      | 84.6  | 89.1         | 88.0  | 82.8 | 85.4 | 88.5 |       |
|                                             |           |       |              |     |     |     |     |       |
| Visit springs, lakes, state parks, etc., to learn about water issues* |           |       |              |     |     |     |     |       |
| Unlikely                                    | 18.3      | 20.7ab| 27.1b         | 21.6ab| 22.2ab| 20.6ab| 21.9ab | 31.70 | .07  |
| Undecided                                   | 31.9      | 30.8ab| 26.0b         | 22.7b | 32.6b | 30.1b | 25.4b  |       |
| Likely                                      | 49.8abc   | 48.5ab| 46.9b         | 55.7b | 45.2 | 49.3bc| 52.7ab |       |
|                                             |           |       |              |     |     |     |     |       |
| Join an organization that protects water*    |           |       |              |     |     |     |     |       |
| Unlikely                                    | 42.2      | 39.4  | 45.9         | 38.4  | 39.6 | 39.2 | 41.9 |       |
| Undecided                                   | 33.3abc   | 33.3abc| 25.4         | 33.1abc| 36.9b | 31.5abc| 27.2abc | .009  | .06  |
| Likely                                      | 24.5      | 27.2  | 28.6         | 28.5  | 23.5 | 29.3 | 30.9 |       |
|                                             |           |       |              |     |     |     |     |       |
| Buy a specialty license plate that supports water protection efforts* |           |       |              |     |     |     |     |       |
| Unlikely                                    | 54.0ab    | 47.4ab| 57.1ab       | 45.3a | 52.1ab| 47.6ab| 48.4ab |       |
| Undecided                                   | 25.2ab    | 27.4ab| 20.3ab       | 29.1ab| 25.4ab| 25.5ab| 27.0ab | .019  | .06  |
| Likely                                      | 20.8      | 25.2  | 22.6         | 25.5  | 22.5 | 26.9 | 24.7 |       |
|                                             |           |       |              |     |     |     |     |       |
| Manage my landscape using the smallest amount of water possible* |           |       |              |     |     |     |     |       |
| Unlikely                                    | 4.1       | 5.3   | 3.1          | 4.6   | 2.9  | 6.5  | 4.7  | .021  | .06  |
| Undecided                                   | 15.8      | 9.1b  | 12.1ab        | 12.7ab| 14.9ab| 12.3ab| 10.7ab |       |
| Likely                                      | 80.2      | 85.5  | 84.8         | 82.7  | 82.3 | 81.2 | 84.6 |       |
|                                             |           |       |              |     |     |     |     |       |
| Vote to support water protection programs*   |           |       |              |     |     |     |     |       |
| Unlikely                                    | 9.9ab     | 5.9ab | 12.3a         | 9.6ab | 12.5a | 12.1ab| 11.0ab | .021  | .06  |
| Undecided                                   | 16.1      | 17.0  | 14.8         | 13.9  | 16.7 | 17.6 | 13.1 |       |
| Likely                                      | 74.0      | 77.0  | 72.9         | 76.6  | 70.8 | 70.3 | 75.8 |       |
|                                             |           |       |              |     |     |     |     |       |
| Conserve water when taking care of my home landscape* |           |       |              |     |     |     |     |       |
| Unlikely                                    | 4.7       | 2.8   | 3.1          | 3.7   | 4.2  | 5.3  | 3.5  | .023  | .06  |
| Undecided                                   | 13.6bc    | 12.0bc| 8.8          | 10.6bc| 15.5bc| 10.7bc| 8.9bc  |       |
| Likely                                      | 81.8abc   | 85.2abc| 88.1         | 85.7abc| 80.3abc| 84.0abc| 87.6abc |       |
|                                             |           |       |              |     |     |     |     |       |
| Minimize the amount of water I use taking care of my yard** |           |       |              |     |     |     |     |       |
| Unlikely                                    | 5.9ab     | 4.0ab | 2.0          | 3.8ab | 4.3ab | 5.3ab | 5.6ab  | .033  | .06  |
| Undecided                                   | 14.2      | 10.7  | 12.5         | 12.7  | 16.7 | 11.7 | 11.9 |       |
| Likely                                      | 79.9      | 85.2  | 85.6         | 83.5  | 79.0 | 83.0 | 82.5 |       |
|                                             |           |       |              |     |     |     |     |       |
| Donate to an organization that protects water |           |       |              |     |     |     |     |       |
| Unlikely                                    | 33.1      | 31.1  | 37.4         | 31.0  | 32.6 | 34.0 | 32.6 |       |
| Undecided                                   | 36.9      | 33.7  | 31.0         | 34.4  | 30.1 | 33.4 | 28.5 | .065  | .05  |
| Likely                                      | 30.0      | 35.1  | 31.6         | 34.6  | 37.3 | 32.6 | 39.0 |       |
|                                             |           |       |              |     |     |     |     |       |
| Volunteer for a stream cleanup or wetland restoration event |           |       |              |     |     |     |     |       |
| Unlikely                                    | 41.4      | 39.3  | 47.5         | 40.2  | 41.2 | 41.9 | 39.2 | .088  | .05  |
| Undecided                                   | 30.0      | 26.6  | 23.3         | 28.4  | 31.1 | 25.2 | 27.8 |       |
| Likely                                      | 28.6      | 34.1  | 29.1         | 31.4  | 27.7 | 32.9 | 33.0 |       |

Note. Numbers correspond to percentages of each treatment selecting each response. Very likely and likely combined into one category (Likely) and unlikely and very unlikely combined into one category (Unlikely) to aid data presentation. C = Control; Treatment 1 = Gallons Statewide Fact; Treatment 2 = Financial Statewide Fact; Treatment 3 = Increased Supply Statewide Fact; Treatment 4 = Gallons Household Story; Treatment 5 = Financial Household Story; Treatment 6 = Increased Supply Household Story. Cramer’s V values were interpreted as 0.10 to 0.19 = weak effect (Rea & Parker, 1992). Not applicable responses were excluded from this analysis. Frequencies with different subscript letters indicate subset of treatments whose proportions differ from one another at \( p < .05 \) (p values adjusted using Bonferroni method).

* \( p < .05 \), ** \( p < .001 \).
water after viewing the gallons and financial statewide fact frames. Specifically, people who may have voted against water protection programs or who lacked interest in joining an organization to protect water may shift toward a more neutral stance or be open to learning more. Based on these results, additional testing of visual messages to facilitate water-related advocacy would be valuable, considering different forms of civic action, such as political involvement or engagement with environmental organizations.

Social media can be an effective Extension tool when used thoughtfully and intentionally (Garcia et al., 2018). Much more research is needed to explore how Extension professionals can most effectively frame social media posts, tailor messages for intended audiences, and integrate evaluation data into impactful communications. Our study was situated within a water conservation context, and both the findings and methods are applicable for Extension work being done using social media within any area of focus.

Not surprisingly, the magnitude of relationships we identified through this research was very small, given that we measured outcome variables following a single view of the message. While our findings warrant further research and consideration, the lack of a clear preferred frame highlights the need for future research and the complexity of identifying best practices in social media communication. An additional limitation is the use of an online survey rather than an authentic context. There would likely be differences between a statewide audience responding to an online survey compared to those individuals following a UF/IFAS Extension social media page who would see the message multiple times. For this reason, we recommend a replication of the current study embedded in Extension social media pages on different platforms, to target the true followership.

ACKNOWLEDGMENT

The research reported here was supported by the UF/IFAS Center for Landscape Conservation and Ecology.

REFERENCES

Ardoin, N. M., Clark, C., & Kelsey, E. (2013). An exploration of future trends in environmental education research. Environmental Education Research, 19(4), 499–520. https://doi.org/10.1080/13504622.2012.709823

Baker, R., Brick, J. M., Bates, N. A., Battaglia, M., Couper, M. P., Dever, J. A., Gile, K. J., & Tourangeau, R. (2013). Summary report of the AAPOR task force on non-probability sampling. Journal of Survey Statistics and Methodology, 1(2), 90–143. https://doi.org/10.1093/jssam/smt008

Baker, R., Brick, J. M., Keeter, S., Biemer, P., Kennedy, C., Kreuter, F., Mercer, A., & Terhanian, G. (2016). Evaluating survey quality in today’s complex environment. http://www.aapor.org/AAPOR_Main/media/MainSiteFiles/AAPOR_Reassessing_Survey_Methods_Report_Final.pdf

Campbell, T., Shaw, B., Rao, A., & Klink, J. (2019). Evaluating promotional efforts for driving traffic to an extension outreach website. Journal of Extension, 57(3), Article v57-3rb1. Available at https://archives.joe.org/joe/2019june/rb1.php

Childers, T. L., & Houston, M. J. (1984). Conditions for a picture superiority effect on consumer memory. Journal of Consumer Research, 11(2), 643–654. https://doi.org/10.1086/209001

Conroy, D. M., & Allen, W. (2010). Who do you think you are? An examination of how systems thinking can help social marketing support new identities and more sustainable living patterns. Australasian Marketing Journal, 18(3), 195–197. https://doi.org/10.1016/j.ausmj.2010.06.006

Dieter, C. A., Maupin, M. A., Caldwell, R. R., Harris, M. A., Ivahnenko, T. I., Lovelace, J. K., Barber, N. L., & Linsey, K.S. (2017). Estimated use of water in the United States in 2015 (Circular 1441). Reston, VA: United State Geological Survey. https://doi.org/10.3133/cir1441

Environmental Protection Agency. (2013). Reduce your outdoor water use. https://www.epa.gov/watersense/factsheet_outdoor_water_use_508.pdf

Garcia, A. S., Dev, D., McGinnis, C. M., Thomas, T., & The Learning Child Team. (2018). Impact of an extension social media tool kit on audience engagement. Journal of Extension, 56(2), Article v56-2rb1. Available at https://archives.joe.org/joe/2018april/rb1.php

Gharis, L. W., Bardon, R. E., Evans, J. L., Hubbard, W. G., & Taylor, E. (2014). Expanding the reach of Extension through social media. Journal of Extension, 52(3), Article v52-3a3. Available at https://archives.joe.org/joe/2014june/a3.php

Kalten, G., & Flores-Cervantes, I. (2003). Weighting methods. Journal of Official Statistics, 19(2), 81–97. https://www.scb.se/contentassets/ca21efb41fee47d293bbe5bf7be7f3/weighting-methods.pdf

Lamm, A. J., & Lamm, K. W. (2019). Using non-probability sampling methods in agricultural and extension education research. Journal of International Agricultural and Extension Education, 26(1), 52–59. https://doi.org/10.5191/jiaee.2019.26105

Lazard, A., & Atkinson, L. (2015). Putting environmental infographics center stage: The role of visuals at the elaboration likelihood model’s critical point of persua-
Mason, S., & Azzam, T. (2019). In need of an attitude adjustment? The role of data visualization in attitude change and evaluation influence. *American Journal of Evaluation, 40*(2), 249–267. https://doi.org/10.1177/1098214018778808

Ordenes, F. V., Grewal, D., Ludwig, S., Ruyter, K. D., Mahr, D., & Wetzels, M. (2019). Cutting through content clutter: How speech and image acts drive consumer sharing of social media brand messages. *Journal of Consumer Research, 45*(5), 988–1012. https://doi-org.lp.hscl.ufl.edu/10.1093/jcr/ucy032

Rea, L. M., & Parker, R. A. (1992). *Designing and conducting survey research: A comprehensive guide*. San Francisco, CA: Wiley.

UF/IFAS Extension. (2019). *Savings Florida’s water supply, drop by drop* [Infographic]. https://pdec.ifas.ufl.edu/impacts/LandscapeWaterConservation.pdf

Valenzuela, S., Piña, M., & Ramírez, J. (2017). Behavioral effects of framing on social media users: How conflict, economic, human interest, and morality frames drive news sharing. *Journal of Communication, 67*(5), 803–826. https://doi.org/10.1111/jcom.12325

Warner, L., Galindo-Gonzalez, S., & Gutter, M. S. (2014). *Building impactful extension programs by understanding how people change*. University of Florida Cooperative Extension Electronic Data Information Source (AEC527). http://edis.ifas.ufl.edu/wc189

Warner, L. A., Lamm, A. J., & Rumble, J. N. (2018). Can videos play a role in good landscape management practices? *Applied Environmental Education & Communication, 17*(3), 187–197. https://doi.org/10.1080/1533015X.2017.1388199

Warner, L. A., Rumble, J. N., Martin, E., Lamm, A. J., & Cantrell, R. A. (2015). The effect of strategic message selection on residents’ intent to conserve water in the landscape. *Journal of Agricultural Education, 56*(4), 59–74. https://doi.org/10.5032/iae.2015.04059