

# Using Critical Thinking Styles of Opinion Leaders to Drive Extension Communication

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## Abstract

*In order to address the complex challenges facing the agricultural and natural resource industry, extension educators must collaborate with opinion leaders. Extension educators can use the assistance of opinion leaders in program design and implementation in order to best meet the needs of stakeholders and the public. Collaboration between extension educators and opinion leaders is more easily conducted when each party understands one another's cognitive style and communication channel preference. This study explored the relationship between opinion leader critical thinking style among three contextual issue groups in agriculture and natural resources and preferred communication preferences used by extension educators. The three contextual issue groups included opinion leaders from the areas of water, food safety, and genetic modification (GM). Researchers used the University of Florida Critical Thinking Inventory (UFCTI) to measure critical thinking style of 300 respondents in Florida. Each of the contextual issue groups preferred engagement with information as their preferred critical thinking style. Among the contextual issue groups, significant differences were identified between the water and food safety groups in the information seeking UFCTI score and the GM and food safety groups in the information engagement score. The preferred method of receiving information overall was visiting a website.*

**Keywords:** critical thinking style, opinion leaders, water, food safety, genetic modification, UFCTI

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## Introduction

Historically, the work of extension professionals was characterized as individualistic due to the flat organizational structure of the Cooperative Extension Service (Bruce & Carter, 1967). Working as individuals, extension professionals have always been asked to do more with less. They are provided only minimal resources and have to find ways to best communicate with stakeholders while dealing with organizational limitations (Bruce & Carter, 1967). Part of this is being constantly confronted with transdisciplinary issues and expected to come up with solutions to satisfy both industry leaders and the public (Braverman, Franz, & Rennekamp, 2012). Although a collaborative work environment is a change from the historic individualistic nature of extension,

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extension professionals are still expected to meet stakeholder needs with very limited resources (Braverman et al., 2012; Bruce & Carter, 1967).

The complex challenges the agricultural and natural resource industry are facing have been classified into five areas: space, agricultural production, natural resource management, energy consumption, and climate change (Andenoro, Baker, Stedman, & Weeks, 2016). The impending population of 9.2 billion by 2050 has contributed to the complexity of problems the agriculture and natural resource industry are facing (Food and Agriculture Organization of the United Nations, 2009). Priority seven of the national research agenda calls for researchers to identify more methods of providing the public with opportunities to seek information and engage in activities focused on developing the next generation of leaders able to address these complex challenges (Andenoro et al., 2016).

In order to best communicate with target audiences and conserve resources, extension professionals must collaborate with opinion leaders in the complex challenge areas (Lamm, Lamm & Carter, 2015; Lamm, Lamm & Carter, 2014; Taylor & Lamm, 2016). Opinion leaders provide a powerful means of communicating innovative ideas to the public (Valente & Davis, 1999). To begin with, opinion leaders can use their heightened credibility with the target audience to convey messages developed by extension professionals (Lamm et al., 2015; Valente & Davis, 1999; Valente & Pumpuang, 2007). In addition, opinion leaders are able to act as role models for the programs being implemented while communicating feedback from their communities to extension professionals. In the same way, one of the more beneficial outcomes of enlisting the assistance of opinion leaders is their value as a recurrent implementer of the program or idea even after the extension professional is no longer leading program implementation (Valente & Pumpuang, 2007). When extension professionals properly collaborate with opinion leaders, it allows for an environment which fosters more innovative solutions which individually might not have been possible (Andenoro et al., 2016; Gokhale, 1995; Lamm et al., 2014). This partnership will allow extension professionals to optimize the use of their resources (Taylor & Lamm, 2016).

Extension professionals must also collaborate with opinion leaders to create attitude shifts that lead to positive behavior changes in order to sustain the unprecedented global population in the future (Andenoro et al., 2016). With this in mind, extension professionals must work to best understand the preferred communication channels of opinion leaders and their followership. A method to better understand the thought processes and preferred communication channels of opinion leaders is through the assessment of individual critical thinking style (Gorham, Lamm, & Rumble, 2014; Lamm, 2015a). Without a proper assessment of critical thinking styles among group members working towards a common goal, communication is likely to be more difficult which in turn will prolong decision-making and solution identification (Lamm, 2015e). In a study by Gay, Terry, and Lamm (2015) critical thinking styles were measured in order to best align programming with the needs of extension volunteers. Gay et al. (2015) highlighted the effectiveness of applying the results of critical thinking style assessments to volunteer training by both enhancing the volunteer's retention of the program information, as well as encouraging the retention of volunteer involvement by increasing perceived confidence in tasks involved with service. By assessing critical thinking style, extension professionals can gain a better understanding of how to properly communicate messages to opinion leaders that enhance their ability to make correct inferences and deduce conclusions from data, heighten their awareness of biased messages disseminated from unaccredited sources, and improve leadership development (Lamm, 2015b; Pascarella & Terenzini, 1991).

### **Conceptual Framework**

The conceptual framework for this study incorporated the use of both the principles of critical thinking style and the theory of opinion leadership. The classification of critical thinking style falls on a continuum ranging from engagement to seeking information (Lamm, 2015c). An individual who is classified as one who seeks information is also known as a “seeker.” A seeker is one who is open to the opinions of others and actively seeks to increase their knowledge through objective decision-making (Lamm & Irani, 2011; Lamm, 2015c). A seeker recognizes every problem as complex and investigates every aspect of the issue often finding more than one solution. Seekers will actively seek the truth to a statement, even if the statement contradicts the individual’s own opinion or belief (Lamm, 2015c). On the other end of the continuum, an individual who practices engagement with others in order to critically think is also known as an “engager.” Engagers easily communicate their reasoning processes to others when approaching a decision or solution (Lamm, 2015c). Engagers are aware of their environment and tend to look for opportunities to use more hands on and collaborative approaches to reasoning and problem solving for situations in which they feel a higher level of perceived competence (Lamm, 2015c; 2015d). Verbal reflections among group members with an engagement critical thinking style will encourage the application of the information being communicated (Lamm, 2015d).

Commonly researched in the areas of public opinion and communication, the theory of opinion leadership describes the process by which an individual with social influence identifies messages communicated to him/her and relays the messages to the groups of people within his/her realm of influence in a way that causes behavioral change (Aral, 2011; Rogers & Cartano, 1962; Schafer & Taddicken, 2015). Opinion leadership is categorized as a two-step communication process where an opinion leader receives a message and decides whether or not to disseminate the information to his/her group of influence (Lazarsfeld, Berelson, & Gaudet, 1948). Rogers and Cartano (1962) define opinion leaders as those who are sought out by others for advice and information. Expanding on the idea, Aral (2011) defined an opinion leader as an individual with social influence who can elicit behavioral change within a network as opposed to just being connected to a network and relaying a message. For example, behavioral change could be illustrated by an opinion leader advocating for a new product or idea to gain social acceptance among his/her network (Aral, 2011).

Three facets of opinion leadership commonly referred to in the literature include a description of the opinion leaders themselves in terms of how they are identified, the relationship between opinion leaders and their network, and which communication channels are preferred and selected by opinion leaders (Schafer & Taddicken, 2015). Opinion leaders have been identified as those who are able to reach the “less active sections of the population” using social influence and interpersonal communication strategies (Rogers & Cartano, 1962, p. 436). The social relationship referred to in opinion leadership is illustrated by the idea of an interconnected network of individuals interacting through multiple outlets of communication guided by social influence (Aral, 2011; Rogers & Cartano, 1962). Additionally, opinion leaders tend to engage with their networks in a way that coordinates understanding of a product or idea. For example, an opinion leader might connect the new idea or product to existing social norms in order to gain more rapid acceptance (Rogers, 2003). In terms of preferred communication channels, opinion leaders seek more impersonal and technically accurate sources of information (Rogers & Cartano, 1962).

The literature supports a strong connection between information seeking and communication behaviors and opinion leadership (Arndt, 1972). The tendency of opinion leaders to engage and connect new ideas to preexisting social norms to increase understanding reflects the engaging critical thinking style, whereas the tendency to seek more impersonal and technically

accurate sources of information is associated with the characteristics of an information seeking critical thinking style (Lamm & Irani, 2011). In addition, the presence of monomorphic tendencies are more common among opinion leaders. Opinion leaders described as monomorphic only show social influence on a single topic (Rogers & Cartano, 1962). This tendency is similar to the engagement critical thinking style, as engagers look for circumstances where they can actively collaborate with other individuals on topics where they have high levels of perceived competence (Lamm & Irani, 2011). In regards to issues involving individuals with social influence on a single topic in the agriculture and natural resources fields, opinion leaders have been characteristically described as less optimistic and less likely to take risks (Lamm et al., 2014). Likelihood to take risks has been observed as a reflection of the engagement critical thinking style due to the reservations of engagers to act on circumstances when perceived competence is low within a topic area (Lamm & Irani, 2011).

Based on the critical thinking style literature, group members working together towards a common vision are more likely to collaborate when attributes such as communication channel preference and critical thinking style are similar (Kirton, 2003; Lamm, 2015e). Although the process of decision-making might be slowed, groups of individuals with different viewpoints can benefit from the opportunity to incorporate the perspectives of others into their own perspective resulting in a solution that maximizes outreach efforts (Cole, 1985). In the same way, extension professionals can benefit from collaborating with opinion leaders to create an environment which fosters the maximization of outreach efforts to the public to address complex issues facing agriculture and natural resources.

### **Purpose and Objectives**

The purpose of this study was to explore the relationship between opinion leaders' critical thinking style and communication channel preferences and if those relationships varied depending upon expression of opinion leadership within diverse agriculture and natural resource contextual issue areas. The objectives for this study were to:

1. Describe opinion leaders emerging from the general public within three agriculture and natural resource contextual issues areas: water, food safety, and genetic modification (GM).
2. Identify opinion leaders' critical thinking styles within the three agriculture and natural resource contextual issues areas: water, food safety, and GM.
3. Determine if differences in critical thinking styles existed among those expressing opinion leadership within the within the three issues areas: water, food safety, and GM.
4. Identify the preferred communication channels among those expressing opinion leadership within the three contextual issues areas, and if preferred communication varied depending upon critical thinking style.

### **Methods**

In order to reach the objectives, this descriptive study used non-probability opt-in sampling procedures to reach the target audience of Florida residents age 18 or older. Respondents in the study completed an online questionnaire which assessed self-reported critical thinking style, opinion leadership within one of the three contextual areas (water, food safety, or GM), and communication channel preferences. The three contextual issue areas were selected in order to identify and compare critical thinking style and communication channel preferences among opinion leaders representing different contextual issue areas. A panel of experts were used to validate the

survey instrument. Members of the expert panel included the Director of the UF/IFAS Center for Public Issues Education in Agriculture and Natural Resources, an Assistant Professor specializing in evaluation and survey design and faculty with subject matter expertise in the three contextual areas of interest: water, food safety and GM.

Each of the respondents within the three contextual issue areas took one of two surveys: a water-focused survey and a food-focused survey (that included questions about both food safety and GM). The water survey was sent to 1,192 individuals with 749 responses received resulting in a participation rate of 63%. The food survey (which included questions about both GM and food safety) was sent to 770 individuals with 524 responses received resulting in a participation rate of 68%. The 524 responses to the food survey were then processed and weighted based on the population's demographics. After eliminating respondents that failed manipulation checks the sample included 450 individuals. After finalizing responses to the food survey, the respondents were divided into two separate data sets. One data set represented the respondents' answers from the food safety portion of the survey, and the other data set represented the respondents' answers from the GM portion of the survey. The three data sets (water, food safety and GM) were then combined to contain all 1,649 respondents representing responses within the three contextual issue areas.

Opinion leaders were then identified. A series of questions adapted from a previously established instrument (Childers, 1986) were used to identify level of leadership within each of the three context areas. The scale requested the respondent indicate their perceptions of six statements on a five-point semantic differential scale. The statements included: the amount of people he/she told about [the contextual issue], how often the respondent talked to their friends and colleagues about [the contextual issue], the likelihood of the respondent telling peers about new developments of a [contextual issue] versus peers telling the respondent, how much information the respondent gives his/her friends regarding the [contextual issue], how often the respondent is asked by his/her circle of friends about the [contextual issue], and how often the respondent is used as a source of advice on the [contextual issue]. Responses to the six items were averaged to create an overall opinion leadership score within the contextual area. Reliability analysis was run resulting in a Cronbach alpha coefficient of .89. A score of one reflected a low level of opinion leadership whereas a score of five reflected a high level of opinion leadership. The *z* score of the opinion leadership index score was then calculated. Respondents with a *z* score of one, based on their index score indicating they were one standard deviation or more above the mean, were identified as opinion leaders and used in further data analysis.

The 300 opinion leaders identified in this study were then categorized based on the contextual issue area represented by the online survey they took. The water group included 115 opinion leaders, the food safety group included 124 respondents, and the GM group included 61 respondents. Of the 300 opinion leaders, 38% were male and 62% were female. In regards to race, 1.3% self-identified as American Indian or Alaska Native, 3.0% self-identified as black or African American, 4.7% self-identified as Asian or Pacific Islander, 83.7% self-identified as white, and 2.3% self-identified as other. Respondents ranged in age from 19 to 81. Age was broken down into four generations including traditionalists (ages 71 to 85), baby boomers (ages 52 to 70), generation X (ages 36 to 51), and millennials (ages 18 to 35) to provide a more general comparison of the groups (Hammill, 2005). Results were analyzed using the Statistical Package for the Social Sciences® (SPSS) version 22.

In order to measure critical thinking style, the University of Florida Critical Thinking Inventory (UFCTI) was used (Lamm & Irani, 2011). The UFCTI requests respondents indicate their level of agreement with 20 statements on a five-point Likert-type scale that ranges from 1 =

*Strongly Disagree*, 2 = *Disagree*, 3 = *Neither Agree nor Disagree*, 4 = *Agree*, 5 = *Strongly Agree* (Lamm & Irani, 2011). An overall seeking information score is assigned based on responses to 13 items with an overall seeking information score that can range from 13 to 65. An overall engagement score is assigned based on responses to seven items with an overall engagement score that can range from seven to 35. To calculate the overall UFCTI score, the engagement item scores are transposed, summed and multiplied by 1.866 (Lamm & Irani, 2011). The new engagement score is then added to the seeking information score to result in the overall UFCTI score. The overall UFCTI score is then examined on a continuum with scores that can range from 27 to 130 and is used to categorize critical thinking disposition between engaging to seeking information. An overall score of 26 to 78.4 categorized an individual's critical thinking style as an engager, whereas an overall score of 78.5 to 130 categorized an individual's critical thinking style as a seeker (Lamm & Irani, 2011). Reliability was calculated *ex post facto* with the overall UFCTI resulting in a Cronbach's *a* of .94, the engager construct a Cronbach's *a* of .87, and the seeker construct a Cronbach's *a* of .90.

Respondents were presented with 11 statements to identify their communication channel preferences. They were asked to check all that applied from the following list: reading printed fact sheets, bulletins, or brochures; visiting a website; attending a short course or workshop; watching a demonstration or display; reading a newspaper article or series; watching television coverage; attending a one-time volunteer activity; getting trained for a regular volunteer position; attending a fair or festival; watching a video; and attending a seminar or conference.

Data was analyzed using SPSS version 22.0. The data was analyzed descriptively, then chi-square analysis was conducted to identify significant differences between communication channel preference and issue group. Finally, a series of ANOVAs were conducted to identify significant differences in critical thinking styles among the opinion leaders within the three contextual issue areas. A significance level of  $p \leq .05$  was identified *a priori*.

## Results

### Description of Opinion eaders

An analysis of the three groups revealed the majority of the overall opinion leaders were female. Among the three groups, the water group identified as 67% female, the food safety group identified as 59% female, and the GM group identified as 59% female. The average age for each of the three groups was 43 for the water group ( $M = 42.8$ ,  $SD = 16.7$ ), 42 for the food safety group ( $M = 42.1$ ,  $SD = 14.8$ ), and 42 for the GM group ( $M = 41.9$ ,  $SD = 14.5$ ). The range of ages for each of the three groups was between 19 and 81 for the water group, and between 19 and 74 for both the food safety and GM groups.

In regards to ethnicity 15% of the respondents in water group, 22% of the respondents from the food safety group, and 23% of the respondents from the GM group identified themselves as Hispanic/Latino(a)/Chicano(a). When examining race for the three groups, the majority of each of the groups identified themselves as white. Among the three groups, the water group identified as 77% white, the food safety group identified as 85% white, and the GM group identified as 84% white. A complete description of the demographic characteristics for each of the three groups can be found in Table 1.

Table 1

*Demographics of Opinion Leaders*

	Water ( <i>n</i> = 115)	Food Safety ( <i>n</i> = 124)	GM ( <i>n</i> = 61)
	%	%	%
<b>Age</b>			
18 to 35	43.0	40.0	38.0
36 to 51	20.0	30.0	36.0
52 to 70	31.0	27.0	25.0
71 to 85	6.0	3.0	1.0
<b>Ethnicity</b>			
Hispanic/Latino(a) Chicano(a)	14.8	21.8	23.0
<b>Race</b>			
White	81.7	85.5	83.6
Black or African American	14.8	5.6	3.3
Asian or Pacific Islander	3.5	7.3	8.2
Native American or Alaskan Native	3.5	1.6	3.3
Other	0.0	3.2	4.9
<b>Sex</b>			
Male	33.0	41	41.0
Female	67.0	59	59.0

**Opinion Leaders' Critical Thinking Styles**

Overall the opinion leaders' UFCTI scores ranged from 67.5 to 91.2 ( $M = 77.5$ ,  $SD = 6.58$ ). In addition, the overall seeking score was 55.3 ( $SD = 6.15$ ), and the mean engagement score was 54.8 ( $SD = 6.58$ ). The three issue groups were also evaluated individually to address individual descriptive statistics reflecting the seeking information, engaging, and overall UFCTI scores. The water group's overall UFCTI score was 77.88 which classified this group as the engagement thinking style. The water group's overall UFCTI score was the closest score to the information seeking critical thinking style category when compared to the other two groups. The food safety group's overall UFCTI score was 77.5. The GM group's overall UFCTI score was 76.9, which

classified this group as having the strongest affinity towards the engaging critical thinking style when compared to the other two groups. A complete description of the critical thinking style scores for each of the three groups can be found in Table 2.

Table 2

*Critical Thinking Styles of Opinion Leaders*

Critical Thinking Style	Water ( <i>n</i> = 115)		Food Safety ( <i>n</i> = 124)		GM ( <i>n</i> = 61)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Overall UFCTI Score	77.88	3.28	77.50	3.85	76.88	3.54
Seeker Score	56.17	6.25	54.16	5.87	56.12	6.22
Engager Score	55.28	6.92	53.65	6.39	56.22	5.98

**Differences in Critical Thinking Styles Among Opinion Leaders**

In order to identify if significant differences in critical thinking styles existed between issue groups, a one-way ANOVA was conducted. Although there were no significant differences in the overall UFCTI between groups, there were significant differences in seeking information and engaging scores ( $p = .02$  and  $p = .03$ , respectively). A *post hoc* test was conducted to identify where the differences between groups existed (see Table 3). A significant difference was found between the water and food safety groups in reference to the seeking information critical thinking style score ( $MD = 2.01, p = .03$ ). A significant difference was also identified between the GM and food safety groups in the engagement critical thinking style score ( $MD = 2.58$ ).

Table 3

*Differences in Critical Thinking Style among Opinion Leaders*

Issue Group Comparison		<i>p</i>	<i>MD</i>	<i>SE</i>	
Seeker Score	Water	Food Safety	.03*	2.01	0.79
		GM	1.00	.06	0.97
Engager Score	Food Safety	GM	.12	-1.95	0.95
	Food Safety	Water	.16	1.63	0.84
	GM	Water	1.00	0.95	1.03
		Food Safety	.04*	2.58	1.02

Note. \* $p < .05$

### Preferred Communication Channels of Opinion Leaders

Each respondent was asked to indicate which type(s) of communication method he/she would be interested in participating in to learn more about the issue topic under discussion (i.e. water, food safety, and GM). Descriptive statistics were run to calculate how many individuals from each group indicated they would take part in a specific communication method. A chi-square analysis was conducted to identify any significant differences between issue groups and communication channel preferences (see Table 4). The results revealed there were significant differences between the issue groups and the communication channel preferences for looking at a demonstration or display, taking part in a one-time volunteer activity, and attending a fair or festival (see Table 4).

Table 4

#### *Communication Channel Preferences of Opinion Leaders*

	Water ( <i>n</i> = 115) %	Food Safety ( <i>n</i> = 124) %	GM ( <i>n</i> = 61) %	<i>X</i> <sup>2</sup>	<i>p</i>
Attend a fair or festival	37	8	10	37.00	.00*
Look at a demonstration or display	30	15	16	9.10	.01*
Take part in a one-time volunteer activity	32	17	20	8.30	.02*
Watch a video	50	36	34	5.70	.06
Watch TV coverage	65	54	49	5.10	.08
Attend a seminar or conference	22	15	23	2.20	.33
Get trained for a regular volunteer position	19	15	15	1.10	.59
Attend a short course or workshop	29	24	25	.71	.70
Read printed fact sheets, bulletins, or brochures	46	48	52	.65	.72
Read a newspaper article or series	45	42	39	.61	.74
Visit a website	77	77	80	.39	.82

Note. \**p* < .05

## Conclusions

The results from the study supported the preexisting literature regarding common tendencies of opinion leaders. First, the data revealed the majority of the opinion leaders were white women ranging in age from 18 to 50 years old. The overall critical thinking score for the three groups collectively classified the sample as engager ( $M = 77.5$ ). This finding supports the notion that women exhibit strengths when networking found in the literature (Madsen, 2012; Mayer, 2001).

When examining the three issue groups separately, differences were identified among overall critical thinking styles. Although all three issue groups were classified as engagers, there were some subtle differences in the level of engagement among groups. These differences might exist due to the reasoning behind individual involvement with an issue topic. For example, water issue opinion leaders could be serving in this capacity for environmentally-conscious reasons, which could elicit behavior closer on the continuum to information seeking, compared to the other two issue groups. As stated by Lamm and Irani (2011), information seeking behavior describes individuals who prefer to think about information they sought out on their own. Thus, environmentally-conscious behavior could be subject change based on the new information released from accredited sources (Gorham et al., 2014).

Food safety opinion leaders may show signs of information seeking behavior based on the frequency with which new information concerning health concerns regarding food safety practices emerges. In this instance, individuals might seek information to find the true answer, even if it contradicts an individual's belief is categorized as information seeking critical thinking style (Lamm & Irani, 2011). The GM opinion leaders had the strongest engager tendencies. This finding aligns with previous literature on the subject. In a study by Ruth (2015), consumers' change in attitude was correlated with the message's source. Wunderlich and Gatto's (2015) study on consumer perceptions of GM products also supported this notion adding that most consumers utilize more interactive media and news outlets to find information on the topic of GM. The use of interactive information retrieval could be categorized as using an engagement critical thinking style (Lamm & Irani, 2011).

Furthermore, significant differences were identified among the opinion leaders depending upon the issue within the individual seeking and engagement critical thinking style scores. The significant difference identified between the water and food safety groups in information seeking scores could be attributed to the tendency of individuals involved in food safety issue groups to engage in behaviors that reflect ideas they feel personally competent in. For example, individuals who engage in opinion leadership of food safety that perceive a high level of competence may not be inclined to seek out additional information that could contrast existing behaviors (Gentry-Van Laanen & Nies, 1995; Roy, Francis, Shaw, & Rajagopal, 2016). However, information communicated through a means of engagement can create attitude and behavioral change in regards to food safety (Gentry-Van Laanen & Nies, 1995; Roy, Shaw, & Rajagopal, 2016). Another significant difference was between the GM and food safety opinion leaders and their engagement critical thinking style score. This difference was supported by the literature in reference to the prevalence of engagement with information behaviors leaders utilize when communicating with their followership about GM issues (Ruth, 2015; Wunderlich & Gatto, 2015).

After analyzing the communication channel preferences among opinion leaders in the three contextual issue groups, some significant differences existed. The water contextual issue group identified that looking at a demonstration or display, taking part in a one-time volunteering activity, and attending a festival were some of the highest ranked preferred communication channel

preferences. The water group's affinity for these communication channels resulted in significant differences when compared to the other two contextual issue groups. These communication channels were ranked highest among the water issues category. The literature also supports the tendency for environmentally conscious individuals to participate in workshops and events to establish meaningful interpersonal connections within the community (Diehl, Swenson & Wente, 2012).

### **Implications and Recommendations**

The findings from this study provide implications for how extension professionals should communicate with opinion leaders within issue areas. In terms of addressing complex problems facing the agriculture and natural resource industry, extension professionals need to effectively communicate with individuals from different disciplinary backgrounds in order to come up with more creative solutions (Andenoro et al., 2016). By understanding critical thinking styles, and associated communication channel preferences, extension professionals can more effectively collaborate with opinion leaders to disseminate important information regarding complex issues to the general public (Lamm, 2015e).

Opinion leaders expressing the engagement critical thinking style exhibit a high level of competence, therefore enhancing face-to-face communication between them and extension professionals could improve the likelihood of increasing their level of opinion leadership engagement resulting in a continuous cycle of two-way communication with their followership (Deci & Ryan, 2008; Lamm & Irani, 2011; Rogers, 2003). This continuous cycle could then enable extension programming to become a recurring social norm even after the extension professional is not directly affiliated with the program. The recurrence of the extension program without the need for direct contact with an extension professional will assist in resource conservation for Extension as a whole.

In addition, since this study found most opinion leaders within these important issue areas are women, extension programs should be made to appeal to women. Further research into when women are inclined to meet, the settings they prefer, and the type of learning opportunities they want to engage in could enhance this cause. Since the web was the most preferred communication channel, research examining the style of web-based content preferred by women, critical thinking style, and by topical issue would be helpful in creating materials best suited to the communication preferences of opinion leaders no matter the issue being addressed.

This finding also has implications for agricultural education in terms of developing a future workforce both in the high school classroom and at the postsecondary level. Since women are serving as opinion leaders within their communities, women should be targeted at an early age to engage them in roles where they can lead conversations around agricultural and natural resource topics. Perhaps research could be conducted to determine why female students pursue agricultural education and then programs be developed to incentivize this audience to enroll to increase female engagement and leadership with the agricultural industry.

Finally, since most of the opinion leaders were more inclined to engage when thinking critically, web materials including discussion boards or interactive webinars would be helpful to extension professionals when disseminating important information regarding complex issues. For information seeking styles, creating websites providing information regarding different perspectives of the same issue type, and including reflective questions, might be helpful. Additional research might investigate the communication preferences and critical thinking styles of the followership of the opinion leaders within each issue group. This assessment could allow

researchers to assess significant differences between opinion leaders and their followership. This information would enable extension professionals to provide recommendations to improve communication techniques between opinion leaders and their followership, increasing the ability for extension to reach an even larger target audience.

### References

- Andenoro, A. C., Baker, M., Stedman, N. L. P., & Weeks, P. P. (2016). Research priority seven: Addressing complex problems. In T. G. Roberts, A. Harder, & M. T. Brashears (Eds.), *American Association for Agricultural Education national research agenda: 2016-2020* (pp. 57-62). Gainesville, FL: Department of Agricultural Education and Communication.
- Aral, S. (2011). Identifying social influence: A comment on opinion leadership and social contagion in new product diffusion. *Marketing Science*, 30(2), 217-223. doi: 10.1287/mksc.1100.0596
- Arndt, J. (1972). Intrafamilial homogeneity for perceived risk and opinion leadership. *Journal of Advertising*, 1(1), 40-47. doi: 10.1080/00913367.1972.10672472
- Braverman, M. T., Franz, N. K., & Rennekamp, R. A. (2012). Extension's evolving alignment of programs serving families and youth: Organizational change and its implications. *Journal of Extension*, 50(6). Retrieved from <http://www.joe.org/joe/2012december/a1.php>
- Bruce, R. L., & Carter, G. L. (1967). Administrative climate. *Journal of Extension*, 5(1), 7-14. Retrieved from <http://www.joe.org/joe/1967spring/1967-1-a1.pdf>
- Childers, T. L. (1986). Assessment of the psychometric properties of an opinion leadership scale. *Journal of Marketing Research*, 23(2), 184-188.
- Cole, M. (1985). The zone of proximal development: Where culture and cognition create each other. In J. V. Wertsch (Ed.), *Culture, communication, and cognition: Vygotskian perspectives* (pp. 146-161). New York, NY: Cambridge University Press.
- Deci, E. L., & Ryan, R. M. (2008). Self-determination theory: A macrotheory of human motivation, development, and health. *Canadian Psychology*, 49(3), 182-185. doi: 10.1037/a0012801
- Diehl, D. C., Swenson, S. E., Wente, J. N. (2012). Evaluation of a sustainable Green Living Expo event: Attendee's reports of satisfaction, learning, and behavior change. *Journal of Extension*, 50(3). Retrieved from <http://www.joe.org/joe/2012june/a8.php>
- Food and Agriculture Organization of the United Nations (FAO). (2009). *How to feed the world in 2050*. Retrieved from [http://www.fao.org/fileadmin/templates/wsfs/docs/expert\\_paper/How\\_to\\_Feed\\_the\\_World\\_in\\_2050.pdf](http://www.fao.org/fileadmin/templates/wsfs/docs/expert_paper/How_to_Feed_the_World_in_2050.pdf).
- Gay, K. D., Terry, B., & Lamm, A. J. (2015). Identifying critical thinking styles to enhance volunteer development. *Journal of Extension*, 53(6). Retrieved from <http://www.joe.org/joe/2015december/tt2.php>

- Gokhale, A. A. (1995). Collaborative learning enhances critical thinking. *Journal of Technology Education*, 7(1), 22–30. Retrieved from <https://scholar.lib.vt.edu/ejournals/JTE/v7n1/gokhale.jte-v7n1.html>
- Gorham, L. M., Lamm, A. J., & Rumble, J. N. (2014). The critical target audience: Communicating water conservation behaviors to critical thinking styles. *Journal of Applied Communications*, 98(4), 42–55. Retrieved from [http://journalofappliedcommunications.org/images/stories/issues/2014/jac\\_v98\\_n4\\_article4.pdf](http://journalofappliedcommunications.org/images/stories/issues/2014/jac_v98_n4_article4.pdf)
- Hammill, G. (2005). Mixing and managing four generations of employees. *FDU Magazine*, 12(2). Retrieved from <http://www.fdu.edu/newspubs/magazine/05ws/generations.htm>
- Kirton, M. J. (2003). *Adaption-Innovation: In the context of diversity and change*. New York, NY: Routledge.
- Lamm, A. J. (2015a). *Integrating critical thinking into extension programming #1: Critical thinking defined* (AEC544). Gainesville: University of Florida Institute of Food and Agricultural Sciences. Retrieved from <http://www.edis.ifas.ufl.edu/wc206>
- Lamm, A. J. (2015b). *Integrating critical thinking into extension programming #2: Developing critical thinking skills* (AEC545). Retrieved from <http://www.edis.ifas.ufl.edu/wc207>
- Lamm, A. J. (2015c). *Integrating critical thinking into extension programming #3: Critical thinking style* (AEC546). Retrieved from <http://www.edis.ifas.ufl.edu/wc208>
- Lamm, A. J. (2015d). *Integrating critical thinking into extension programming #4: Measuring critical thinking styles using the UFCTI* (AEC547). Retrieved from <http://www.edis.ifas.ufl.edu/wc209>
- Lamm, A. J. (2015e). *Integrating critical thinking into extension programming #5: Using critical thinking styles to enhance team work* (AEC548). Retrieved from <http://www.edis.ifas.ufl.edu/wc210>
- Lamm, A. J., & Irani, T. (2011). *UFCTI manual*. Gainesville, FL: University of Florida.
- Lamm, K. W., Lamm, A. J., & Carter, H. (2015). Bridging water issue knowledge gaps between the general public and opinion leaders. *Journal of Agricultural Education*, 56(3), 146–161. DOI: 10.5032/jae.2015.03146
- Lamm, K. W., Lamm, A. J., & Carter, H. S. (2014). Opinion leadership development: Context and audience characteristics count. *Journal of Agricultural Education*, 55(2), 91–105. doi: 10.5032/jae.2014.02091
- Lazarfeld, P., Berelson, B., & Gaudet, H. (1948). *The people's choice* (2nd ed.). New York, NY: Columbia University Press
- Madsen, S. R. (2012). Women and leadership in higher education: Current realities, challenges, and future directions. *Advances in Developing Human Resources*, 14(2). doi: 10.1177/1523422311436299

- Mayer, L. C. (2001). Predictors of women's success in achieving senior-level administrative positions in CSREES. *Journal of Extension*, 39(2). Retrieved from <http://www.joe.org/joe/2001april/rb6.php>
- Pascarella, E., & Terenzini, P. (1991). *How college affects students: Findings and insights from twenty years of research*. San Francisco, CA: Jossey Bass.
- Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). New York, NY: Free Press.
- Rogers, E. M., & Cartano, D. G. (1962). Methods of measuring opinion leadership. *The Public Opinion Quarterly*, 26(3), 435-441. Retrieved from <http://www.jstor.org/stable/2747233>
- Ruth, T. K. (2015). *The influence of persuasive communication on Florida consumers' change in attitude and change in risk perception of genetically modified food* (Masters thesis). Retrieved from University of Florida Libraries Catalog. UF034054040
- Schafer, M. S., & Taddicken, M. (2015). Opinion leadership revisited: A classical concept in a changing media environment. *International Journal of Communication*, 9, 956-959.
- Taylor, M. R., & Lamm, A. J. (2016, February). *Identifying the needs of opinion leaders to encourage widespread adoption of water conservation and protection*. Paper presented at the American Association for Agricultural Education Southern Region Conference, San Antonio, TX.
- Valente, T. W., & Davis, R. L. (1999). Accelerating the diffusion of innovations using opinion leaders. *The Annals of the American Academy of Political and Social Science*, 566(1), 55-67. Retrieved from <http://www.jstor.org/stable/1048842>
- Valente, T. W., & Pumpuang, P. (2007). Identifying opinion leaders to promote behavior change. *Health Education and Behavior*, 34(6), 881-896. Retrieved from <http://heb.sagepub.com/content/34/6/881.full.pdf+html>
- Wunderlich, S., & Gatto, K. A. (2015). Consumer perception of genetically modified organisms and sources of information. *Advances in Nutrition*, 6(1), 841-851. doi: 10.3945/an.115.008870