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Perceptions and Attitudes: Analyzing Opinion Leaders in Relation to Genetically Modified Foods

Levy G. Randolph II
University of Florida

Joy N. Rumble
The Ohio State University

Hannah S. Carter
University of Florida

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Abstract
Controversial issues in agriculture arise, and it falls on opinion leaders to disseminate information to their networks and the public. Agriculturalists are often blamed for not taken consumers' concerns into consideration. This study sought to add to previous research by identifying the current perceptions of Florida agricultural leaders toward GM food, what percentage of them identify as opinion leaders with respect to GM food, and what they identify as sources of information regarding GM food. Through an online survey, the trust and attitudes towards GM foods and science, of agricultural leaders who participated in the Wedgworth Leadership Institute, were measured as well as their sources and channels of information. By identifying opinion leaders and helping them understand how to create and disseminate effective agricultural messages, agricultural educators and communicators can reach consumers and reduce the current knowledge gap more successfully. The results of this study confirm previous literature which states that both "what one knows" and "who one knows" impacts the level of influence an opinion leader may have with their peers. Agricultural educators should work with both agricultural opinion leaders and communicators to identify current consumer perceptions and how to address any differences or concerns that arise in interactions.

Keywords
opinion leaders, GM food, perceptions, information sources, attitudes

Cover Page Footnote/Acknowledgements
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Perceptions and Attitudes: Analyzing Opinion Leaders in Relation to Genetically Modified Foods

Every day, the gap between the public and agriculturalist is increasing (American Farm Bureau Federation, 2017). A result of this gap is the confusion, concern, and misunderstanding surrounding genetically modified (GM) crops and food (Kovar & Ball, 2013). In regard to GM food, there has been a shift in industry communications to focus on consumers, but there is still a struggle to effectively communicate with them (Telg & Irani, 2012). In order for agricultural production to stay innovative and growing, agricultural leaders must be given the right information through the right channels to help consumers better understand industry practices and technologies. Furthermore, these leaders must be knowledgeable of consumer perceptions, so they can effectively communicate about agricultural practices and help the industry to make decisions that align with consumers' needs.

Leaders within the agricultural industry have the challenge of sorting through messages competing for their support. Sometimes these messages are presenting conflicting information (Huffman, Rousu, Shogren & Tegene, 2004). While there are numerous sources of information available to industry leaders, it is important that agricultural communication practitioners know where leaders receive information and how that information is influencing their current perceptions and trust. Additionally, industry leaders often differ culturally from general consumers in their behaviors and in the way that they obtain and disseminate information (Higgins, 1991). "Information is likely to be effective only when it addresses specific information needs and can be processed and used by its target audience" (Verbeke, 2005, p. 348)." The increase in the demand for food is coinciding with the population growth, and consumers want information about what is safe and of high quality (Verbeke, 2005). This information can be efficiently provided to consumers through agriculture industry leaders who are educated on the issues that consumers care about. Opinion leaders can influence consumers' attitudes about a topic positively or negatively. Thus, understanding industry leaders' information sources, current perceptions, and level of opinion leadership, regarding GM crops and food, will provide insight on how to best educate and disseminate information to agricultural leaders who could serve a conduit between the industry and consumers concerned with these technologies. This research contributes to understanding the diffusion of agricultural information to the public (Lindner, Rodriguez, Strong, Jones, & Layfield, 2016) and the resulting influence on public understanding of agriculture (Enns, Martin, & Spielmaker, 2016).

Literature Review

The decisions of individuals to adopt new technologies or be persuaded are often encouraged by corroboration with specific individuals known as opinion leaders. Opinion leadership first appeared with a study of the presidential election in 1940 where the researchers found that information flowed from the media to opinion leaders, and from opinion leaders to the less involved public (Rogers & Cartano, 1962). Specifically related to agriculture, opinion leadership has been found to be significant in the adoption of technologies and information (Rogers & Cartano, 1962). Rogers and Cartano (1962) provided three generalizations of opinion leaders: (a) "Opinion leaders deviate less from group norms than the average group member; (b) there is little overlap among the different types of opinion leaders; (c) opinion leaders differ from their 'followers' in information sources, cosmopolitan, social participation, social status, and

innovativeness" (p. 437). Opinion leaders provide validation to their peers' informational claims through the influence, advice, and information they have to offer (Rogers & Cartano, 1962). "In a typical distribution of opinion leadership in a social system, a few individuals receive a great deal of opinion leadership, while most individuals have none or very little" (Rogers, 2005, p. 312). In this "social system" described by Rogers (2005), the strength of the opinion leader depends on their degree of influence, and not simply the ability to influence their peers. So, for agricultural social systems, whether it is industry-wide or for a specific organization, an opinion leader does not necessarily have to be a senior executive and, in fact, could be an entry-level worker. Ruth and Lundy (2004) discussed the degree of opinion leaders and stated that it is related to three personal attributes: (a) who one is, (b) what one knows, and (c) whom one knows. The opinion leader's strength is determined by their location in the social system, their knowledge level of a particular topic, and the values they exude in their personal interactions. The behavior of opinion leaders is just as important as their knowledge if they wish to increase their influence. Additionally, Wickstrom and Specht (2016) argued that "opinion leaders are not a demographically homogeneous group" (p. 4).

There are two types or levels of opinion leadership: monomorphic and polymorphic (Rogers, 2005). The difference between the two is the degree to which an individual may act as an opinion leader and the number of topics in which they serve as an opinion leader. A monomorphic opinion leader operates as an opinion leader for one topic. A polymorphic opinion leader operates as an opinion leader for a variety of topics (Rogers, 2005). This study focused on identifying whether a group of agricultural leaders were opinion leaders for a specific topic and what their sources of information were. These individuals should have more knowledge or focus on specific agricultural topics than their colleagues. Additionally, these individuals who serve as opinion leaders are more likely to offer their opinions often and be sought after by others who value their thoughts (Wickstrom & Specht, 2016). To measure opinion leadership, a researcher can approach it in a variety of ways which include key informants, self-designation, and a sociometric technique. Self-designation is a very common technique used to identify opinion leaders in research (Rogers, 2005). This is a process in which respondents rate their own leadership. Through this method, respondents are asked a series of questions to determine the degree to which they perceive their personal level of opinion leadership (Rogers, 2005).

Research focusing on opinion leadership, specifically with regard to agriculture, has found that opinion leaders operate as significant channels through which information about the agricultural industry can be shared with the general public and within the industry as well (Telg et al., 2012; Ruth & Lundy, 2004). Finding opinion leaders in the agricultural industry and educating them to communicate effectively will be beneficial to the future of the industry (Ruth & Lundy, 2004). In today's modern media platforms, opinion leaders are taking on different roles (Wickstrom & Specht, 2016). Some opinion leaders are now involved with online conversations which have replaced the "traditional" interpersonal communication; however, agriculturalists lack a presence with some of these online platforms. Wickstrom and Specht (2016) found that individuals of activist-type organizations or groups are the most outspoken on agriculture-related topics and are often speaking against the industry. This study seeks to add to previous research by identifying the current perceptions of Florida agricultural leaders toward GM food, what percentage of them identify as opinion leaders with respect to GM food, and what they identify as sources of information regarding GM food. Based on the findings and previous literature the researcher will discuss implications for the future education of agricultural leaders.

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Purpose and Objectives

For agricultural educators and communicators who disseminate information to industry professionals, knowing the variety of demographics of opinion leaders and their sources of information allows for the stronger development of programs that focus on professional development for agricultural leaders. This study sought to add to previous research by identifying the current perceptions of Florida agricultural leaders toward GM food, what percentage of them identify as opinion leaders with respect to GM food, and what they identify as sources of information regarding GM food. In addition to identifying current perceptions industry leaders, this study evaluated the similarities and differences shared between each class of the Wedgworth Leadership Institute. The following research objectives guided the study:

Objective 1: Identify Florida agricultural leaders' perceptions of and sources of information for GM science and GM food.

Objective 2: Compare perceptions of and sources of information for GM science and GM food for each class of the Wedgworth Leadership Institute.

Objective 3: Determine which variables are predictors of opinion leadership.

Methods

Survey methodology was used to collect data from the Wedgworth Leadership Institute. Since 1989 the Wedgworth Leadership Institute for Agriculture and Natural Resources (WLIANR) has aimed to develop leadership capabilities of leaders in agriculture to become involved in policy formation (Wedgworth Leadership Institute for Agriculture and Natural Resources, 2016). The program operates in Florida and is sponsored by the University of Florida Institute of Food and Agricultural Sciences. The target audience of the WLIANR consists of people involved in agriculture who have experienced leadership roles and desire even more responsibility. WLIANR works to help its participating leaders build networks, create alliances, and analyze complex issues across Florida agriculture (Wedgworth Leadership Institute for Agriculture and Natural Resources, 2016).

The Wedgworth Leadership Institute has had a total of 10 classes that various agricultural leaders have gone through. Each class is a two-year program that has up to 30 participants. A census was carried out, and Qualtrics was used to deliver the survey to all 259 potential respondents. A list of current and former participants, along with their contact information was provided by the Wedgworth Leadership Institute staff. The Wedgworth Leadership Institute participants were targeted for this study as they represented a diverse range of industry leaders who have a desire for leadership development and an interest in contentious agricultural issues.

The average age of the respondents was 51 years old. Potential respondents were contacted four times in an effort to achieve a high response rate, as suggested by Dillman, Smyth, and Christian (2009). An initial email was sent to inform the respondents that they had been selected to participate in a study. Follow-up emails were later sent out over the course of a twenty-day period to encourage response. After unusable responses were discarded, there were 114 usable responses recorded from the Wedgworth Leadership Institute. The response rate was 44%.

This study used 16 questions, from a larger study, for analysis regarding GM foods, in addition to demographic questions. The face and construct validity of the instrument was assessed by a panel of experts prior to data collection. Additionally, the instrument was replicated from a consumer survey that previously found the instrument to be valid and reliable (Anderson, Ruth, &

Rumble, 2014). The variables for this study included trust in GM science, attitudes toward GM science, information sources for GM science, and opinion leadership. All of the constructs in the study were found to be reliable at a Cronbach's alpha of .70 or greater (Field, 2013). The survey was open from May 3, 2017, to May 23, 2017.

The researcher created an index for trust in GM science by calculating the average of the seven items (a = .88). Trust was measured with a seven-item, five-point Likert-type scale. The seven statements included, "Developments in genetically modified food help make society better," "Scientists developing genetically modified food contribute to the well-being of society," "Research on genetically modified food should be supported by the federal government," "Research on genetically modified food is essential for improving the quality of human lives," "Overall, genetically modified food does more good than harm," "New technology used in genetically modified food allows people to live longer," and "New technology used in genetically modified food allows people to live better lives." A trust in science scale used by the National Science Board (2014) was used as the foundation and guided the development of the scale in this study.

The attitudes toward genetically modified food, held by the participants and alumni of the Wedgworth Leadership Institute, were measured with a seven-item, five-point Likert-type scale, ranging from Strongly Disagree (1.00) to Strongly Agree (5.00). To guide the interpretation of the scale, the real limits of 1.00 – 1.49 (Strongly Disagree), 1.50 – 2.49 (Disagree), 2.50 – 3.49 (Neither Agree nor Disagree), 3.50 – 4.49 (Agree), and 4.50 – 5.00 (Strongly Agree) were used. The statements included, "I believe that the development of genetically modified food tampers with nature," "I believe genetically modified food is a possible solution to world hunger," "I believe genetically modified food provides solutions to pest and disease problems," "I believe genetically modified food carries little risk to the person consuming them," "I believe that the growing of genetically modified food threatens the environment," "I believe that genetically modified fruits and vegetables can be modified to contain higher levels of certain nutrients," and "I believe that genetically modified foods are safe to consume." An index for attitudes toward genetically modified food was created by calculating the average of the seven items (a = .80).

Opinion leadership was measured with a six-item, five-point bipolar semantic differential scale. The statements included, "I have told no one about genetically modified food/I have told a number of people about genetically modified food," "I never talk to friends and colleagues about genetically modified food/I talk to my friends and colleagues about genetically modified food very often," "Your friends tell you about GM issues including new developments/You tell friends about GM issues including new developments," and "I am not used as a source of advice for GM food/I am often used as a source of advice for GM food." Positive statements were coded as a five, and negative statements were coded as a one. The researcher created an index for opinion leadership by calculating an average of the six items (a = .87). Respondents were considered to be opinion leaders if their individual mean on the index was 3.50 or higher. The advantage to self-designating/self-reporting opinion leadership is that it allows for the researcher to "measure the individual's perceptions of his/her opinion leadership, which influences his/her behavior" (Rogers, 2005, p. 309). The limitation, however, is that the data is dependent on how accurately the respondent self-reports his or her self-image as an opinion leader (Rogers, 2005).

Information sources and channels for GM science was measured with a list of sources from which respondents could check all that apply. To identify sources, respondents were asked "who provided them with information," and to identify channels of information, respondents were asked, "where they have gathered information." Sources under "who provided them with information"

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included the government, parents, relatives, scientists, friends, etc. The section regarding "where they have gathered information" included channels such as television news, Facebook, newspapers, industry communications, etc. To address objective one and two, the researcher used descriptive statistics to identify and compare frequencies and percentages of both sources and channels. In order to run a linear regression, the researcher created a count variable by adding all of the sources of information for each respondent and all of the information channels for each respondent. The two count variables were used to identify if information sources and channels of GM science were predictors of opinion leadership.

For the purposes of this study, all data were analyzed in SPSS. The researcher used descriptive statistics for objective one and two. For objective three, the researcher ran linear regression models informed by Ruth and Lundy (2004). The first model determined the influence of who one is (operationalized as demographic variables) on opinion leadership. The second model determined the influence of what one knows (operationalized as GM beliefs, GM trust in science) on opinion leadership. The third model determined the influence of whom one knows (sources and channels of information) on opinion leadership.

Results

Objectives 1 & 2

The Wedgworth Leadership Institute survey was comprised of ten (10) separate classes and 114 respondents. Classes one through nine were alumni of the Wedgworth Leadership Institute, and class ten was the current Wedgworth class. The average age of a participant in the Wedgworth Leadership Institute was 51.5 years old. The youngest participant was 27, and the oldest participant was 72. There were 79 males (69.3%) and 35 females (30.7%) who made up the total respondents. The average age of the females was 49, and the average age of males was 53. These variables, age, and sex are what the first regression model was comprised of.

Trust in GM science.

Each Wedgworth Leadership Institute class demonstrated a positive level of trust with most statements regarding GM science (Table 1). The class participants, however, responded with lower, more neutral, scores to the statement, "New technology used in GM food allows people to live longer," and, "New technology used in GM food allows people to live better lives." The lowest class mean (3.00) was attributed to Class IV, and the statement, "New technology used in GM food allows people to live longer." The class with the highest overall mean for trust in GM science was Class II (M = 4.14; SD = .616). The class with the lowest overall mean was Class X (M = 3.84; SD = .957). Additionally, a majority of the classes reported scores to this aforementioned statement between 2.50 and 3.49. The overall group mean for the Wedgworth Leadership Institute was 3.99 with a standard deviation of .738. According to the real limits, this meant that as a whole, the Wedgworth Leadership Institute showed positive trust in GM science.

Attitudes toward GM food.

Wedgworth Leadership Institute classes were consistently average across the board. They agreed with positive-driven statements provided under the GM food belief construct shown in Table 2. Additionally, the classes disagreed with the negative statements regarding GM food. The statement that had the highest reported average score for each class was, "GM food is a possible solution to world hunger." The overall mean for the Wedgworth Leadership Institute was 4.14 which showed that participants had positive attitudes towards GM foods. Class VIII had the highest overall mean (4.36) and Class I had the lowest overall mean (3.95).

Sources of information.

Surveying the respondents on their sources of information and the channels gave an insight into the prominent resources for agricultural leaders. The top three sources of information (Table 3) were friends (46.5%), the government (46.5%), and scientists (76.3%). The top three channels of information (Table 4) for the Wedgworth Leadership Institute participants were magazine articles (57%), websites (60.5%), and industry communications (78.9%). The lowest channels for information were both cookbooks and cooking classes (0.9%). The lowest source of information were parents (6.1%).

GM food opinion leadership.

The overall mean score for the Wedgworth Leadership Institute was 3.25 (*SD* = .903) for the opinion leadership index. When asked if they were likely to be asked about GM info, the Wedgworth Leadership Institute self-reported their highest average score of 3.51 (Table 5). The lowest self-reported average score was 3.01 regarding how often they talked to friends and colleagues about GM food. 50 (44%) individuals from the Wedgworth Leadership Institute had a grand mean of 3.50 or higher, self-reporting themselves as opinion leaders.

Objective 3:

The first regression model, examining who one is, was significant ($F(2, 107) = 4.252$, $p = .017$). Sex was the only significant predictor. Women had .48 less opinion leadership as compared to males. The model accounted for 7.4% of the variance in opinion leadership. In model two, what one knows was examined. The second model was significant ($F(4, 105) = 9.128$, $p = .000$). Sex continued to be a significant predictor, and attitude was found to be a significant predictor. For each increase in attitude, opinion leadership increased by .49. This model accounted for 25.8% of the variance in opinion leadership. The third model examined whom one knows. This model was significant ($F(6, 103) = 8.007$, $p = .000$) and trust, attitude, and information sources were all significant predictors. As trust, attitude, and information sources increased by one point, opinion leadership increased by .23, .45, and .12 respectively. This model accounted for 31.8% of the variance in opinion leadership.

Table 1

Wedgworth Leadership Institute Trust in GM Science Mean Score by Class

	Class I	Class II	Class III	Class IV	Class V	Class VI	Class VII	Class VIII	Class IX	Class X	WLI
Developments in GM food help make society better.	4.33 (*SD* = .71)	4.38 (*SD* = .52)	4.33 (*SD* = .87)	4.43 (*SD* = .79)	4.20 (*SD* = .63)	4.14 (*SD* = 1.07)	4.50 (*SD* = .67)	4.36 (*SD* = .75)	4.08 (*SD* = 1.04)	3.90 (*SD* = 1.22)	4.23 (*SD* = .89)
Scientists developing GM food contribute to the well-being of society.	4.44 (*SD* = .73)	4.25 (*SD* = .71)	4.33 (*SD* = .87)	4.29 (*SD* = 1.12)	4.20 (*SD* = .63)	4.14 (*SD* = 1.07)	4.42 (*SD* = .68)	4.43 (*SD* = .65)	4.31 (*SD* = .75)	4.00 (*SD* = 1.14)	4.26 (*SD* = .84)
Research on GM food should be supported by the federal government.	4.22 (*SD* = .97)	4.38 (*SD* = .52)	3.89 (*SD* = 1.27)	4.00 (*SD* = 1.29)	3.90 (*SD* = .88)	4.14 (*SD* = 1.07)	3.42 (*SD* = 1.24)	4.57 (*SD* = .65)	4.08 (*SD* = 1.04)	3.90 (*SD* = 1.26)	4.04 (*SD* = 1.07)
Research on GM food is essential for improving the quality of human lives.	4.33 (*SD*=.87)	4.13 (*SD* = .84)	4.11 (*SD* = .93)	4.14 (*SD* = 1.22)	3.90 (*SD* = .74)	4.29 (*SD* = 1.11)	4.58 (*SD* = .67)	4.14 (*SD* = .77)	4.08 (*SD* = .86)	4.00 (*SD* = 1.10)	4.15 (*SD* = .90)
New technology used in GM food allows people to live longer.	3.22 (*SD* = .67)	3.50 (*SD* = 1.20)	3.44 (*SD* = .88)	3.00 (*SD* = .58)	3.30 (*SD* = .48)	3.14 (*SD* = .90)	3.58 (*SD* = .90)	3.43 (*SD* = .94)	3.69 (*SD* = 1.25)	3.43 (*SD* = .98)	3.41 (*SD* = .91)
New Technology allows people to live better lives.	3.78 (*SD* = .97)	4.13 (*SD* = .64)	3.78 (*SD* = .83)	3.71 (*SD* = 1.11)	3.60 (*SD* = .67)	3.71 (*SD* = 1.11)	4.08 (*SD* = 1.00)	3.50 (*SD* = .94)	3.92 (*SD* = 1.19)	3.71 (*SD* = 1.01)	3.78 (*SD* = .95)
Overall, GM food does better than harm.	3.89 (*SD* = 1.36)	4.25 (*SD* = 1.04)	4.44 (*SD* = .88)	3.86 (*SD* = 1.68)	4.20 (*SD* = .63)	4.29 (*SD* = 1.11)	4.33 (*SD* = .99)	3.85 (*SD* = 1.51)	4.15 (*SD* = 1.07)	3.95 (*SD* = 1.20)	4.10 (*SD* = 1.15)

NOTE: *Mean score of respondents, scale ranges from 1-5: 1.00 – 1.49 = strongly disagree, 1.50 – 2.49 = disagree, 2.50 –3.49 = neither agree nor disagree, 3.50 – 4.49 = agree, 4.50 – 5.00 = strongly agree

Table 2

Wedgworth Leadership Institute Attitude Toward GM Food Mean Score by Class

	Class I	Class II	Class III	Class IV	Class V	Class VI	Class VII	Class VIII	Class IX	Class X	WLI
GM food tampers with nature.	3.11 (*SD* = .93)	2.50 (*SD* = 1.41)	2.78 (*SD* = 1.1)	2.71 (*SD* = 1.38)	2.30 (*SD* = 1.34)	2.29 (*SD* = .95)	2.50 (*SD* = 1.38)	2.50 (*SD* = .86)	2.69 (*SD* = 1.25)	2.62 (*SD* = 1.12)	2.60 (*SD* = 1.14)
GM food is a possible solution to world hunger.	3.89 (*SD* = 1.27)	4.63 (*SD* = .52)	4.56 (*SD* = .73)	4.14 (*SD* = 1.07)	4.40 (*SD* = .70)	4.14 (*SD* = 1.46)	4.42 (*SD* = .70)	4.64 (*SD* = .63)	4.23 (*SD* = .60)	4.24 (*SD* = 1.09)	4.34 (*SD* = .89)
GM food provides solutions to pest and disease problems.	4.11 (*SD* = 1.27)	4.75 (*SD* = .46)	4.56 (*SD* = .72)	4.43 (*SD* = .54)	4.40 (*SD* = .70)	4.14 (*SD*=1.07)	4.42 (*SD* = .52)	4.64 (*SD*=.63)	4.46 (*SD*=.52)	4.38 (*SD* = .92)	4.44 (*SD* = .76)
GM food threatens environment.	1.78 (*SD* = .44)	1.88 (*SD* = 1.13)	1.56 (*SD* = .73)	1.86 (*SD* = .38)	2.30 (*SD* = 1.16)	2.14 (*SD* = 1.35)	1.92 (*SD* = .90)	1.71 (*SD* = .61)	2.15 (*SD* = 1.35)	2.14 (*SD* = .96)	1.96 (*SD* = .95)
GM food carries little risk to the person consuming them.	3.22 (*SD* = 1.17)	4.13 (*SD* = .64)	4.33 (*SD* = .87)	4.14 (*SD* = .69)	4.00 (*SD* = .94)	3.57 (*SD* = .98)	4.08 (*SD* = 1.00)	4.36 (*SD* = .63)	4.46 (*SD* = .66)	4.14 (*SD* = .85)	4.15 (*SD* = .84)
GM fruits and vegetables can be modified to contain higher levels of certain nutrients.	3.78 (*SD* = .67)	4.25 (*SD* = .71)	4.33 (*SD* = .87)	4.43 (*SD* = .79)	4.20 (*SD* = .63)	4.14 (*SD* = .69)	3.83 (*SD* = 1.15)	4.50 (*SD* = .52)	4.54 (*SD* = .52)	4.33 (*SD* = .73)	4.29 (*SD* = .73)
GM foods are safe to consume.	3.89 (*SD* = .53)	4.13 (*SD* = .64)	4.56 (*SD* =.73)	4.43 (*SD* = .54)	4.10 (*SD* = .74)	4.14 (*SD* = .69)	4.33 (*SD* = .78)	4.57 (*SD* = .51)	4.69 (*SD* = .48)	4.33 (*SD* = .66)	4.39 (*SD* = .64)

NOTE: *Mean score of respondents, scale ranges from 1-5: 1.00 – 1.49 = strongly disagree, 1.50 – 2.49 = disagree, 2.50 –3.49 = neither agree nor disagree, 3.50 – 4.49 = agree, 4.50 – 5.00 = strongly agree

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Table 3

Wedgworth Leadership Institute Sources of Information

	Class I	Class II	Class III	Class IV	Class V	Class VI	Class VII	Class VIII	Class IX	Class X	WLI
Parents	0 (0%)	0 (0%)	0 (0%)	1 (14.3%)	0 (0%)	0 (0%)	1 (8.3%)	2 (14.3%)	1 (7.7%)	2 (9.5%)	7 (6.1%)
Relatives	2 (20%)	1 (11.1%)	2 (22.2%)	1 (14.3%)	0 (0%)	1 (11.1%)	2 (16.7%)	1 (7.1%)	0 (0%)	4 (19%)	14 (12.3%)
Health Professionals	0 (0%)	2 (22.2%)	2 (22.2%)	2 (28.6%)	1 (0%)	1 (11.1%)	4 (33.3%)	1 (7.1%)	3 (23.1%)	4 (19%)	20 (17.5%)
The Government	6 (60%)	8 (88.9%)	5 (55.6%)	5 (71.4%)	3 (30%)	2 (22.2%)	6 (50%)	8 (57.1%)	4 (30.8%)	6 (28.6%)	53 (46.5%)
Food Manufacturers	5 (50%)	4 (44.4%)	1 (11.1%)	2 (28.6%)	2 (20%)	3 (33.3%)	3 (25%)	6 (42.9%)	2 (15.4%)	7 (33.3%)	35 (30.7%)
Scientists	6 (60%)	8 (88.9%)	6 (66.7%)	7 (100%)	5 (50%)	5 (55.6%)	11 (91.7%)	11 (78.6%)	13 (100%)	15 (71.4%)	87 (76.3%)
Friends	3 (30%)	4 (44.4%)	1 (11.1%)	3 (42.9%)	4 (40%)	5 (55.6%)	7 (58.3%)	8 (57.1%)	7 (53.8%)	11 (52.4%)	53 (46.5%)
Supervisor	0 (0%)	0 (0%)	0 (0%)	1 (14.3%)	0 (0%)	2 (22.2%)	1 (8.3%)	0 (0%)	2 (15.4%)	4 (19%)	10 (8.8%)
Co-worker	1 (10%)	1 (11.1%)	2 (22.2%)	2 (28.6%)	1 (10%)	2 (22.2%)	4 (33.3%)	5 (35.7%)	4 (30.8%)	7 (33.3%)	29 (25.4%)
Other	3 (30%)	2 (22.2%)	2 (22.2%)	1 (14.3%)	3 (30%)	2 (22.2%)	7 (58.3%)	3 (21.4%)	2 (15.4%)	4 (19%)	29 (25.4%)
Total Count	2.60	3.33	2.33	3.57	1.90	2.56	3.83	3.21	2.92	3.05	

NOTE: *Frequencies and percentages of respondents "yes" scores. **Total count is the Mean score of respondents, scale ranges from Yes (1) and No (2).

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Table 4

Wedgworth Leadership Institute Sources of Information

	Class I	Class II	Class III	Class IV	Class V	Class VI	Class VII	Class VIII	Class IX	Class X	WLI
Newspaper	5 (50%)	6 (66.7%)	3 (33.3%)	4 (57.1%)	5 (50%)	1 (11.1%)	8 (66.7%)	5 (35.7%)	3 (23.1%)	4 (19%)	44 (38.6%)
Food safety class	1 (10%)	1 (11.1%)	4 (44.4%)	0 (0%)	2 (20%)	1 (11.1%)	3 (25%)	2 (14.3%)	1 (7.7%)	2 (9.5%)	17 (14.9%)
Cooking class	0 (0%)	0 (0%)	0 (0%)	1 (14.3%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (0.9%)
Job training	2 (20%)	2 (22.2%)	2 (22.2%)	2 (28.6%)	2 (20%)	2 (22.2%)	2 (16.7%)	6 (42.9%)	2 (15.4%)	7 (33.3%)	29 (25.4%)
Magazine article	7 (70%)	6 (66.7%)	4 (44.4%)	5 (71.4%)	8 (80%)	3 (33.3%)	7 (58.3%)	12 (85.7%)	6 (46.2%)	7 (33.3%)	65 (57%)
YouTube	1 (10%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	3 (25%)	0 (0%)	0 (0%)	3 (14.3%)	7 (6.1%)
Cookbook	0 (0%)	0 (0%)	0 (0%)	1 (14.3%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (0.9%)
Website	5 (50%)	7 (77.8%)	5 (55.6%)	5 (71.4%)	2 (20%)	5 (55.6%)	10 (83.3%)	10 (71.4%)	8 (61.5%)	12 (57.1%)	69 (60.5%)
Television news	4 (40%)	3 (33.3%)	3 (33.3%)	4 (57.1%)	6 (60%)	2 (22.2%)	5 (41.7%)	5 (35.7%)	2 (15.4%)	5 (23.8%)	39 (34.2%)
Cooking shows	1 (10%)	0 (0%)	0 (0%)	1 (14.3%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	2 (1.8%)
Online news	4 (40%)	7 (77.8%)	6 (66.7%)	4 (57.1%)	4 (40%)	4 (44.4%)	9 (75%)	5 (35.7%)	9 (69.2%)	9 (42.9%)	61 (53.5%)
Facebook	2 (20%)	2 (22.2%)	0 (0%)	0 (0%)	3 (30%)	2 (22.2%)	4 (33.3%)	3 (21.4%)	4 (30.8%)	2 (9.5%)	22 (19.3%)
Twitter	1 (10%)	1 (11.1%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	2 (16.7%)	1 (7.1%)	0 (0%)	0 (0%)	5 (4.4%)
Brochure/ pamphlets	5 (50%)	3 (33.3%)	3 (33.3%)	0 (0%)	1 (10%)	0 (0%)	5 (41.7%)	3 (21.4%)	3 (23.1%)	2 (9.5%)	25 (21.9%)
Industry communications	6 (60%)	7 (77.8%)	8 (88.9%)	7 (100%)	7 (70%)	6 (66.7%)	10 (83.3%)	12 (85.7%)	11 (84.6%)	16 (76.2%)	90 (78.9%)
Other	1 (10%)	0 (0%)	4 (44.4%)	2 (28.6%)	4 (40%)	2 (22.2%)	4 (33.3%)	1 (7.1%)	4 (30.8%)	4 (19%)	26 (22.8%)
Total Count	4.50	5.00	4.67	5.14	4.40	3.11	6.00	4.64	4.08	3.48	

NOTE: *Frequencies and percentages of respondents “yes” scores. **Total count is the Mean score of respondents, scale ranges from Yes (1) and No (2).

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2

Table 5

Wedgworth Leadership Institute Self-Reported Leadership Mean Scores by Class

	Class I	Class II	Class III	Class IV	Class V	Class VI	Class VII	Class VIII	Class IX	Class X	WLI
During the past six months, how many people have you told about GM food? (Told no one – Told a number of people)	3.11 (*SD* = 1.45)	3.25 (*SD* = 1.49)	3.22 (*SD* = 1.39)	3.00 (*SD* = 1.41)	2.40 (*SD* = 1.43)	2.71 (*SD* = 1.38)	3.75 (*SD* = 1.42)	3.00 (*SD* = 1.41)	3.46 (*SD* = .97)	2.71 (*SD* = 1.42)	3.05 (*SD* = 1.37)
In general, do you talk to your friends and colleagues about GM food? (Never – Very Often)	3.33 (*SD* = 1.23)	3.25 (*SD* = 1.17)	3.11 (*SD* = 1.27)	2.86 (*SD* = 1.07)	2.70 (*SD* = 1.06)	2.71 (*SD* = 1.60)	3.25 (*SD* = 1.28)	2.93 (*SD* = .92)	2.92 (*SD* = .95)	3.10 (*SD* = 1.34)	3.03 (*SD* = 1.16)
In a discussion about GM food, which of the following happens most? (Your friends tell you about issues – You tell friends about issues)	3.44 (*SD* = .88)	3.88 (*SD* = .64)	2.78 (*SD* = 1.30)	3.29 (*SD* = 1.11)	3.20 (*SD* = 1.40)	3.86 (*SD* = .90)	3.58 (*SD* = 1.17)	3.57 (*SD* = .94)	3.54 (*SD* = 1.27)	3.33 (*SD* = 1.16)	3.44 (*SD* = 1.11)
When you talk to your friends and colleagues about GM food do you: (Give very little information – Great deal of information)	3.00 (*SD* = 1.23)	3.50 (*SD* = .54)	2.67 (*SD* = 1.32)	3.43 (*SD* = .79)	2.80 (*SD* = 1.48)	3.29 (*SD* = .95)	3.33 (*SD* = .65)	3.36 (*SD* = .75)	3.54 (*SD* = .88)	3.14 (*SD* = 1.24)	3.21 (*SD* = 1.03)
Compared with your circle of friends, how likely are you to be asked about new information relating to GM food? (Not likely to be asked – Very likely to be asked)	3.33 (*SD* = 1.66)	4.00 (*SD* = .00)	2.67 (*SD* = 1.23)	2.43 (*SD* = 1.13)	3.00 (*SD* = 1.63)	3.86 (*SD* = 1.07)	3.92 (*SD* = 1.00)	3.50 (*SD* = .76)	3.92 (*SD* = .95)	3.76 (*SD* = 1.04)	3.51 (*SD* = 1.17)
Overall, in all your discussions with friends and colleagues, regarding GM food are you: (Not used as a source of advice – Often used as a source of advice)	3.33 (*SD* = 1.23)	3.38 (*SD* = .52)	2.44 (*SD* = 1.13)	2.86 (*SD* = 1.46)	2.80 (*SD* = 1.14)	3.14 (*SD* = 1.22)	3.33 (*SD* = 1.07)	3.64 (*SD* = .63)	3.62 (*SD* = 1.04)	3.38 (*SD* = 1.32)	3.25 (*SD* = 1.12)

NOTE: *Mean score of respondents, scale ranges from 1-5: 1.00 – 1.49 = strongly disagree, 1.50 – 2.49 = disagree, 2.50 –3.49 = neither agree nor disagree, 3.50 – 4.49 = agree, 4.50 – 5.00 = strongly agree

Table 6

Linear Regression for Predictors of Opinion Leadership

Model		Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
	(Constant)	3.72	.25		14.86	>.001
1	Age	-.01	.004	-.13	-1.44	.15
	What is your sex?	-.48	.18	-.25	-2.66	.009
	(Constant)	.96	.59		1.63	.11
	Age	-.01	.004	-.16	-0.20	.055
2	What is your sex?	-.34	.17	-.17	-2.00	.047
	GM Trust Index	.21	.12	.16	1.80	.074
	GM Attitude Index	.49	.12	.37	4.17	>.001
	(Constant)	.46	.59		0.77	.44
	Age	-.006	.004	-.13	-1.54	.13
	What is your sex?	-.25	.17	-.13	-1.50	.14
3	GM Trust Index	.23	.11	.18	2.05	.043
	GM Attitude Index	.45	.11	.35	3.99	>.001
	GM Information Sources	.12	.06	.22	2.16	.03
	GM Channel Sources	.02	.04	.05	0.48	.64

NOTE: *Dependent Variable: GM Opinion Leadership

Table 7

Linear Regression Model Summary

Model	*R*	R^2	Adjusted R^2	Std. Error of the Estimate	R^2 Change	*F* Change	*df1*	*df2*	Sig. *F* Change
1	.271	.074	.056	.87691	.074	4.252	2	107	.017
2	.508	.258	.230	.79224	.184	13.046	2	105	>.001
3	.564	.318	.278	.76684	.060	4.536	2	103	.013

NOTE: *Dependent Variable: GM Opinion Leadership

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Discussions, Implications, and Recommendations

This study found that while attitudes and trust toward GM science may be positive, there is still room to improve communication efforts. While the average means reported positive results, there were a handful of agricultural leaders who reported that they either disagreed with a statement regarding GM foods and science or indicated that they were neutral.

Additionally, the survey results identified the top sources and channels of information regarding GM foods. The sources were friends, the government, and scientists. The top channels were magazine articles, websites, and industry communications. Lastly, the study found that "whom one is," "what one knows," and "whom one knows" are significant predictors of one's opinion leadership influence.

The findings from this study confirm the three attributes that were studied in previous literature (Ruth & Lundy, 2004). What one knows was the strongest predictor of opinion leaders within the Wedgworth Leadership Institute. Furthermore, Rogers and Cartano (1962) discussed how opinion leaders differ from their followers with regard to their information sources. This was confirmed in the study as the agricultural leaders who reported having more information sources and connections also reported higher self-evaluations of opinion leadership. This study found that some opinion leaders also reported gathering information through online sources which confirmed Ruth and Lundy's (2004) statement that opinion leaders are shifting from "traditional" conversations to online interactions.

Based on what the results identified, the researchers recommend that opinion leadership on specific topics be explored further. The researchers recommend that this study is replicated on a larger scale beyond Florida. Further research could also focus on opinion leadership with agricultural leaders on various online platforms. As the findings show, there is room for improvement of communication and education among agricultural leaders. Wickstrom and Specht (2016) stated how activists are more outspoken. Perhaps, if education programs and communication outreach are delivered through the right channels that agricultural opinion leaders' access, those involved in the industry could deliver a message that could stand up against the activists' messages. Thus, a content analysis of the Wedgworth Leadership Institute's programs from class to class could provide insight into the correlation, if any, between the informational material and the individuals' self-reporting. Additionally, the predictors of opinion leadership should be studied further. This includes sex, age, attitudes, trust, and sources. In the classroom, educators can use this data in conjunction with courses on communication theory to explore and discuss how sources of information might affect opinion leaders or other various audiences. Agricultural communication professors can develop curricula that help prepare their students to become skilled-practitioners who are proficient at communicating messages through preferred channels of information such as magazines and websites. Additionally, by identifying, examining, and exploring the sources of information most trusted or accessed by opinion leaders, educators can help prepare students to become opinion leaders as well.

Looking back at the literature, specifically related to agricultural opinion leadership, Rogers and Cartano (1962) stated "Opinion leaders differ from their 'followers' in information sources, cosmopolitan, social participation, social status, and innovativeness" (p. 437). It would be interesting to look at who the followers might be on this issue and where their sources of information might align with opinion leaders, if at all. If opinion leaders are looking to magazines, websites, and the industry as their top three sources of information, future research should address what communication about technologies is actually occurring.

The Wedgworth Leadership Institute is not the only leadership program for agricultural industry leaders, and the researchers recommend that further research is conducted with similar programs. With a growing population and lots of conflicting information about the industry (Verbeke, 2005) it's important the agricultural communicators are aware of who (opinion leaders) to reach and how (information channels and sources) to reach them. Through these efforts, practitioners and opinion leaders alike can reach consumers with a unified, educated, and persuasive message.

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ABOUT THE AUTHORS:

Levy Randolph is a third year Ph.D. graduate assistant in the Department of Agricultural Education and Communication at the University of Florida. His specialization is agricultural communications.

Joy Rumble is an assistant professor in the Department of Agricultural Communication, Education, and Leadership at The Ohio State University.

Hannah Carter is an associate professor in the Department of Agricultural Education and Communication at the University of Florida. She serves as the director for the Wedgworth Leadership Institute for Agriculture and Natural Resources.