Communications Apprehension of Agricultural Doctoral Students at [University]

The purpose of this study was to determine the communication apprehension level of doctoral students enrolled in a college of agricultural sciences at a western university. Participants were given a communications apprehension survey (PRCA-24) using Qualtrics. A mean communications score for all respondents was 96.25, which indicated moderate communications apprehension. Neither mean communications apprehension scores for academic disciplines or nationalities showed significant levels of communications apprehension for any groups. Students within the agricultural and applied economics department scored the lowest, indicating the lowest level of communications apprehension, Overall, international students also had a lower communications apprehension average score than American students. The differences between the scores of American and international students was found to be significant. This study should be repeated with doctoral students in agricultural colleges within other universities. Future studies could also be conducted to see if there are certain subcategories of communications, such as meetings or group discussions, that make doctoral agricultural students more apprehensive than others.

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Introduction

The public is skeptical about science (Wren & Lane, 2015), and that skepticism extends into agricultural sciences as well. Engaging with the public, storytelling, sharing data, seeking public feedback, and explaining the value of science are important steps scientists need to make (Wren & Lane, 2015). "Ag needs to improve communication efforts," (Smith, 2014, p. 16). This was the headline of an article in an agricultural publication arguing that the agricultural industry needed to educate the public about the challenges of growing food and fiber—in a sustainable manner—for a world population set to exceed nine billion by 2050.

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A contributing factor to the challenge of communicating about agriculture is the public, generally speaking, is becoming further removed from production agriculture. As Americans have moved away from the farm, knowledge and understanding of the complexities involved in the agricultural system have regressed (Doerfert, 2011; Roberts, Harder, & Brashears, 2016).

Paradoxically, consumers are interested in food production and are demanding to know how their food is produced but do not know where to go for information (American Farm Bureau Federation [AFBF], 2002; Roberts et al., 2016). This goes beyond individual grocery buying behaviors as these consumers will ultimately be the ones making policy decisions through the passing of laws and ballot initiatives. However, this voting public does not understand the macro implications sustainable agriculture has on society, as agriculture impacts the environment, economy, government, global marketplace, national security, and science to make informed decisions (Thomson, 1996).

Consumers have become media and information dependent and form their opinions about agriculture based on increased attention on sensational aspects of the industry (Anderson, 2010). Negative stories involving agricultural science have made major news headlines, often leaving consumers with a skewed perception (Goodwin & Shoulders, 2013). Three-fourths of consumers indicate the agricultural industry is doing a "fair" or "poor" job of explaining food production

techniques (AFBF, 2002). Hartz and Chapell (1997) stated that scientists (including agricultural scientists) and reporters are both to blame for the public's lack of scientific knowledge regarding agriculture. To solve the problem, scientists and journalists, the main contributors to the flow of information, will need to work together to take action (Hartz & Chappell, 1997). However, consumers do not accept what scientists say as truth (Ruth, Gay, Rumble, & Rodriguez, 2015; Center for Food Integrity, 2014).

Many scientists attempt to avoid media attention for fear of being misrepresented; however, Eyck (2000) suggested that scientists should seek out the media to become a known and consistent source of information. When possible, scientists are encouraged to communicate their research and the greater impact it may have on society through interpersonal communication, small group communication, and/or social media so that the message is spread, even without media intervention. There are scientists who are willing to share their story, but many do not know how to do so.

Doctoral students are up-and-coming scientists and will soon represent the agricultural community as credible sources. These students need to be given the tools to be able to comfortably communicate with the media and public before they graduate. To address this communications need, [University's] Departments of Plant and Soil Sciences and Agricultural Education and Communications partnered with an agricultural funding agency to launch the Center for Agri-Science Communications. The objectives of the program are to teach and train emerging scientists how to engage the public through social and traditional media channels, public speaking, and interpersonal communications. The ultimate goal is to for the students to be actively engaged in advocating for agricultural science with the general public. The pilot year of the program was completed in May 2018 with aspirations to open the program to all doctoral students in [University's] college of agriculture. However, before offering a program to the more than 180 doctoral students within the college, it is important to know how comfortable they are with communicating in various capacities and with various audiences.

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Purpose/Objectives

The purpose of this study was to determine the communication apprehension level of doctoral students enrolled in a college of agricultural sciences at a western university. Three research questions and three hypotheses guided this study:

RQ1: What is the general communications apprehension of all agricultural doctoral students?

RQ2: What are the students' general communications apprehension levels based on academic discipline?

H1: Doctoral students studying agricultural education and communications will have a lower communications apprehension than other disciplines.

H2: Agricultural doctoral students' communication apprehension will differ based on academic discipline.

RQ3: Do international students have a higher level of general communications apprehension than American students?

H3: Communications apprehension will differ based on whether students are American or international students.

This study was limited to the doctoral students at one university and results should not be generalized to other institutions. Also, the PRCA-24 is a self-report instrument, so it is only based on how participants view their own communications apprehension in different situations. Many plant and soil science students who participated in the study had already received communications training, which may made their communications apprehensions scores lower than students in similar disciplines in other institutions who have not received training. Additionally, data were collected during finals week, which likely lowered the response rate.

Conceptual Framework

Communication apprehension (CA) is fear or anxiety perceived by an individual when communicating with or anticipating communications with others (McCroskey, 1982b; 1984). It is a "cognitive response to communication that arouses one internally," (Richmond, Wrench, & McCroskey, 2013, p. 42). CA relates to a person's ability to orally communicate, one-on-one, or in front of an audience (Richmond et al., 2013). CA is tied to social cognitive theory whereby human function is explained in a triadic reciprocity that involves behavior, environment, and personal determinants (Bandura, 1977). To measure self-perceived CA, McCroskey (1977) developed the Personal Report of Communication Apprehension-24 (PRCA), a 24-question instrument to measure apprehensions of certain communications traits: group, meeting, face-to-face, and public.

The lower CA one has, the less discomfort he or she feels. Blume, Baldwin, and Ryan (2013) conducted a study to measure how CA affects students' leadership, adaptability, and multicultural appreciation. The researchers found that if a student is fearful, he or she will avoid the situation completely, and choose not to communicate (Richmond et al., 2013). Other research suggested that students had higher communication apprehension related to group work and public speaking, but were more receptive to communicating in small classes and interpersonal settings (Ahrens, Meyers, Irlbeck, Burris, & Roach, 2016). Besley and Nisbet (2012) argued the understanding of the public by scientists reflects a failure of scientists in communicating with the public in meaningful ways and has yielded a decline in public trust of science (Bauer, Allum & Miller, 2007). In an era when most consumers are removed from the production of food, fiber, and livestock, it is important that agricultural scientists develop and hone-in on strong communication skills to effectively communicate their research findings.

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Methods

All (*N = 186*) doctoral students in the college of agriculture were emailed a link to a Qualtrics survey instrument to measure their CA; 43 responded ($n = 43$). The survey consisted of 24 seven-point Likert-type questions based on the PRCA-24 (McCroskey, Beatty, Kearney, & Plax, 1985) and demographic questions. The PRCA-24 was found to have an alpha reliability of

approximately .97 (McCroskey et al., 1985). The reliability of the test was determined by comparing it to the Rathus Assertiveness Schedule (Rathus, 1973). Data were analyzed using SPSS and descriptive statistics were recorded. CA scores for each participant were calculated by adding points based on participants' answers to the PRCA-24 where 1 = lowest CA and 7 = highest CA for each question. The scores could range from 24 to 168. A score below 51 is considered low CA; 51-80 is average CA; and above an 80 is high CA (McCroskey et al., 1985). Although the data can be reduced into the group, meeting, face-to-face, and public communications categories, for the purposes of this study, only overall CA scores were reported below.

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Of the respondents, 61.4% (n = 27) were female, 36.4% (n = 16) were male. They ranged in age from 20 to 48. A majority of the students were white (non-Hispanic) (47.7%; n = 21) followed by Hispanic (15.9%; n = 7), Asian (13.6%; n = 6), Other (11.4%; n = 5), and African American (2.3%; n = 1).

Results

Research Question One sought to determine the CA of all doctoral agricultural students within [University's] college of agriculture. CA scores could range from 7 to 168 where a score of 7 indicated the lowest CA possible. The mean communications apprehension score for all respondents was 96.25 (SD = 7.61) with a minimum score of 73 and a maximum score of 111.

Research Question Two sought to determine the students' CA levels based on academic discipline. Mean CA levels were calculated based on departments within the college of agriculture at a western university (Table 1). Hypothesis One theorized that doctoral students studying agricultural education and communications would have a lower CA score than all other disciplines. This hypothesis was rejected. Agricultural and applied economics students scored the lowest (M = 92.50; SD = 9.62) and agricultural education and communications students scored second-lowest (M = 94.00; SD = 6.12).

Hypothesis Two stated that agricultural doctoral students' CA would differ based on academic discipline. The alpha level was set at .05 a priori. Table 2 displays the results of the one-way ANOVA. There was not a significant difference in communications apprehension between academic disciplines. The hypothesis was rejected.

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Table 1

Communications Apprehension by Academic Discipline (N = 43)

Department	Score (M)	Frequency (n)	Frequency Percent (%)
Natural Resources Management	100.75	4	9.1
Animal Science	98.00	11	25.0
Plant and Soil Science	96.13	15	34.1

Agricultural Education & Communications	94.00	5	11.4
Agricultural & Applied Economics	92.50	8	18.2
Total	96.25	43	100.0

Table 2

Differences in Communications Apprehension by Academic Discipline

	Mean Square	$F_{(4,38)}$	*p*-value
Department	62.98	1.08	.38

Research Question Three asked if international students would have a higher level of CA than American students. Mean CA levels were calculated for American and international students (Table 3). International students ($M = 93.18$; SD = 8.53) did not score higher than American students ($M = 99.52$; SD = 5.14).

Hypothesis Three stated that communications apprehension would differ based on whether students were American or international. An independent samples t-test was used to calculate a significant difference in scores. The alpha level was set at .05 a priori. A significant difference was found ($t_{43} = 2.93$, $p = .01$) between international and American students. The hypothesis was not rejected.

Table 3

Communications Apprehension Compared to Nationality

Nationality	Frequency	Mean	Standard Deviation	t-value	p-value
International	22	93.18	8.54	2.93	.01
American	21	99.52	5.14		

Note. American = 1, International = 2

Conclusions/Recommendations

A communications apprehension score of 120 or greater would signify significant communication apprehension (McCrosky et al., 1985). Neither mean scores by academic discipline or nationality showed a mean greater than 100.75 (students in natural resources management). The mean scores from all academic departments signified a moderate level of communication apprehension, indicating a need for some sort of communications training, but not rudimentary training. Although two of the three hypotheses were rejected, the data provides good direction in preparing scientists to communicate. Training sessions do not need to focus on basic communications, such as interpersonal skills, public speaking, or group dynamics.

Instead, training can address heavier topics. It is important for scientists to understand the public's lack of trust in science (Wren & Lane, 2015). Scientists typically avoid media attention

(Eyck, 2000), so media spokesperson training can be emphasized. Utilizing social media to promote research findings can help in improving the poor perceptions (AFBF, 2002) that the public has of the way that food production is explained. Finally, a general overtone of the trainings can constantly stress the importance of scientists being an advocate for science, especially agricultural science.

More research should be conducted to understand why agricultural and applied economics students scored lower than agricultural education and communications students. Similarly, research should be conducted to understand why international students scored significantly lower than American students. Future studies could delve deeper into the instrument's subcategories, to determine if a specific area of communications, such as meetings, group discussions, public speaking, or interpersonal communications, should be specifically addressed. Finally, this research should be conducted in other colleges of agriculture to obtain a richer data set and allow the researchers to compare results amongst other universities.

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Wren & Lane 2015