

## Consumer Perceptions of Poultry Production: A Focus on Arkansas

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### Abstract

Poultry production holds an important place in Arkansas economically and as a food source. The viability of poultry production ultimately hinges on consumer demand and the perceptions that drive their purchases. With this in mind, this study surveyed consumers to assess their perceptions of poultry production in Arkansas. The instrument used to survey consumers was created by the researcher and an expert committee at the University of Arkansas. Consumers were surveyed through direct communication at grocery stores in Northwest Arkansas. Data gathered from the study were analyzed using descriptive and correlational statistics. Consumers were uncertain as to whether or not conventionally produced poultry possessed unsafe levels of antibiotics and hormones ( $M = 3.68$ ,  $SD = 1.45$ ). Consumers also thought the majority of poultry farms in Arkansas were factory farms ( $M = 4.15$ ,  $SD = 1.37$ ). Consumers perceived organic poultry as a more healthy food than conventionally produced poultry ( $M = 4.47$ ,  $SD = 1.39$ ). Based on these results, specific recommendations were made to maintain the viability of poultry production in Arkansas. Marketing and communication efforts should be tailored to improve consumer understanding of antibiotic and hormone use in poultry production and the healthiness of conventionally produced poultry. Messaging and marketing should depict the reality of conventional poultry production, and agricultural communicators should work to improve logic and reason for combatting campaigns that misinform the public about agriculture. This research also highlights the need for further research to better understand the ways consumers develop perceptions of poultry production.

### Keywords

Antibiotics vs. hormones, communications, consumer perceptions, marketing, poultry production, Association for Communication Excellence Conference

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*Poultry production holds an important place in Arkansas economically and as a food source. The viability of poultry production ultimately hinges on consumer demand and the perceptions that drive their purchases. With this in mind, this study surveyed consumers to assess their perceptions of poultry production in Arkansas. The instrument used to survey consumers was created by the researcher and an expert committee at the University of Arkansas. Consumers were surveyed through direct communication at grocery stores in Northwest Arkansas. Data gathered from the study were analyzed using descriptive and correlational statistics. Consumers were uncertain as to whether or not conventionally produced poultry possessed unsafe levels of antibiotics and hormones ( $M = 3.68$ ,  $SD = 1.45$ ). Consumers also thought the majority of poultry farms in Arkansas were factory farms ( $M = 4.15$ ,  $SD = 1.37$ ). Consumers perceived organic poultry as a more healthy food than conventionally produced poultry ( $M = 4.47$ ,  $SD = 1.39$ ). Based on these results, specific recommendations were made to maintain the viability of poultry production in Arkansas. Marketing and communication efforts should be tailored to improve consumer understanding of antibiotic and hormone use in poultry production and the healthiness of conventionally produced poultry. Messaging and marketing should depict the reality of conventional poultry production, and agricultural communicators should work to improve logic and reason for combatting campaigns that misinform the public about agriculture. This research also highlights the need for further research to better understand the ways consumers develop perceptions of poultry production.*

## Key Words

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## Introduction

In Arkansas, poultry production is a valuable part of the state's economy and agricultural landscape. Without the presence of poultry production in the state, a substantial amount of the state economy would be gone, not to mention the substantial number of jobs that would also be taken away from the market (McGraw, Popp, & Miller, 2012). Just as any other sector of the agricultural industry, poultry production is at its core driven by consumers, who ultimately keep the industry alive through purchasing poultry products. At the present time, research shows the general public is losing agricultural literacy; that is to say, the public is less knowledgeable about the processes and industry that provide them with their basic nutritional needs (Colbath & Morrish, 2010; Frick, Birkenholz & Machtmes, 1995; Hess & Trexler, 2011). Therefore, it is important that as consumers become less familiar with agriculture in general (and in Arkansas, poultry production) industry and producers understand consumers' perceptions of the industry.

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Because poultry production is a key component to the economy of Arkansas, it is important that research be conducted to allow for a better understanding of consumer perceptions of poultry production. Recognition and adaptation to consumer opinion will assist with poultry production viability. The goal of this research was to identify consumer perceptions of Arkansas poultry production through descriptive survey methodology. This study allows for a clearer knowledge of consumer understanding of poultry production, which can be instrumental in sustaining poultry production as a vital part of the Arkansas landscape.

### Literature Review

Arkansas is a national leader in poultry production, ranking second in broiler production and third in turkey production (Arkansas Division of Agriculture, 2015; Boehler, 2010). The poultry industry's reach makes it one of the most important parts of the agricultural economy and also a significant job creator in the state (McGraw et al., 2012). In 2010, the poultry production and processing sector in Arkansas contributed 37,343 jobs and \$1.8 billion in added value to the Arkansas economy (McGraw et al., 2012). By 2012, which was the most recent data during the time this article was published, the poultry industry in Arkansas provided 40,000 jobs and 40 percent of the total cash receipts in the state (Arkansas Division of Agriculture, 2015). Broiler production is in 53 of the 75 counties in the state and more than 1 billion broilers were raised in the state in 2012, which provided more than 6 billion pounds of poultry meat and \$2.82 billion during the year in production value (Arkansas Division of Agriculture, 2015).

There are three types of chicken enterprises: (a) egg production, (b) broiler production, and (c) replacement pullet production (Gillespie & Flanders, 2009). The poultry industry is designed in such a way that many of the larger companies, known as integrators, operate hatcheries, feed mills, and processing plants and contract with producers to raise animals for their organization (Boehler, 2010). These vertically integrated poultry firms are able to control all parts of the production, processing, and distribution processes. Some of the more prominent integrators in the state are Tyson Foods, Inc.; OK Foods, Inc.; Simmons Foods, Inc.; Cobb-Vantress, Inc.; and George's, Inc. (Boehler, 2010). Arkansas integrators have designed the production process to be geographically concentrated where all aspects of production are spatially located so as to enhance production logistics (Boehler, 2010).

Research has shown consumers have three major concerns about the safety of poultry products: (a) antibiotic residues, (b) hormone residues, and (c) food borne pathogens such as *E. coli* (Bruhn & Schutz, 2007; Donoghue, 2003; Verbeke & Viaene, 1999). Since approval by the Federal Drug Administration (FDA) in 1951, the use of antibiotics has been instituted in poultry feeding regimens to promote growth and prevent diseases (Jones & Ricke, 2003). In fact, over 30 antimicrobials are approved for use in U.S. feed for commercial broiler operations; these antimicrobials treat and prevent the spread of diseases like coccidiosis and allow for improved growth (Jones & Ricke, 2003). The National Antimicrobial Resistance Monitoring System has monitored the development of animal pathogen resistance in response to the use of antibiotics in poultry production since 1996, and the development of resistance patterns during the monitoring period has been relatively low and stable (Jones & Ricke, 2003).

According to Donoghue (2003), "the FDA and USDA provide extensive regulatory oversight to ensure the safety of our food supply" when referring to poultry production (p. 620). This is accomplished through a stringent, mandatory antibiotic approval process and through continued monitoring after antibiotics are introduced into the market. Federal monitoring reveals few, if any, violations of the amount or kind of antibiotic residues present in poultry tissues.

Brooks and Ellison (2014) surveyed a nationally representative sample of 1,039 U.S. consumers to determine their perceptions of the importance of seven production claims that commonly appear on meat and poultry product labels. In each product category (beef, pork and poultry), consumers rated the claim that “animals were not administered growth hormones” as being the most important claim. According to the researchers, “this was a particularly interesting finding in the case of chicken as the USDA prohibits the use of hormones in poultry already; whether consumers know this, however, is unclear” (Brooks & Ellison, 2014, p. 14). Research on the attribution of foodborne illnesses in the U.S. also noted that of the foods that serve as carriers for bacteria, chemicals, parasites, and viruses that cause foodborne illnesses poultry accounts for 9.8%, well below the largest attribution percent of 22.3%, which is attributed to leafy vegetables (Painter et al., 2013).

Along with the importance of the poultry industry to the state’s economy, studies also show chicken is one of the most affordable food products in not only Arkansas, but in the United States. As of 2007, the average annual per capita consumption of chicken was approximately 85 pounds, an increase of 115% since 1979 (American Meat Institute, 2009). Even though prices for poultry at the grocery store have increased over the years — approximately \$30 per capita from 1997 to 2007 — the increase has been significantly less than other meats like beef — which had nearly a \$75 per capita increase over the same time period (American Meat Institute, 2009).

The importance of poultry production in Arkansas requires that producers and consumers both possess at least a minimum level of knowledge about the processes and methods that constitute this industry. This level of knowledge is known as agricultural literacy, and it is vital to the relationship between producer and consumer (Frick et al., 1995). The National Research Agenda was revised in 2011 to guide research in agricultural education and communications and outlined six areas that serve as priorities for research. Priority area one of the National Research Agenda calls for a research emphasis in public and policy maker understanding of agriculture and natural resources; the agenda specifically calls for scientific focus in the area of “demonstrating the impact of agricultural literacy efforts on a variety of stakeholder behaviors including consumer behavior” (Doerfert, 2011, p. 8). Research focus in this area will ameliorate the negative impact associated with an uninformed population (Doerfert, 2011).

The issue of a public that is increasingly unaware of the processes that provide them with food is well researched. Much of the research about agricultural perceptions showed that consumers are losing literacy the farther they are generationally removed from the farm. Research noted those individuals who have any familiarity or contact with farming, including living in a rural area, are more aware and satisfied with agricultural practices (Boogard, Bock, Oosting, Wiskerke, & Van Der Zijpp, 2010; Frick et al., 1995). And as producers and consumers continue to be separated, tensions between the two parties will continue to grow (Wachenheim & Rathge, 2000). A study conducted with university students showed students held favorable views of food safety, but students in the agricultural programs held more favorable views than those students not in the agricultural programs (Terry & Lawver, 1995). Pense, Beebe, Leising, Wakefield, and Steffen (2006) found students in rural, suburban, and urban schools differed in their understanding of agriculture, namely students from rural schools were more knowledgeable than their urban/suburban counterparts. More current research by Hess and Trexler (2011) noted elementary students understand where their food comes from, but lack essential, necessary sub-concepts to allow them to develop schema related to agricultural and science benchmarks. Holloway (2004) saliently noted that public agricultural understanding plays a crucial role in how agriculture operates, affecting not only legislation, but consumption practices.

The arduous task of improving agricultural literacy may be improved by increasing media

coverage of agricultural issues (Lundy, Ruth, Telg, & Irani, 2006). Lundy and colleagues noted a diverse group of individuals attempt to communicate scientific topics to the public, including scientists, public information officers, and the media. One group specifically equipped to provide the public with agricultural information is agricultural communicators, and this group must be careful to create more convincing arguments that combat anti-agriculture campaigns that sway a public with a weak understanding of agriculture in the opposite direction (Goodwin & Rhoades, 2011). Research also noted a need for agricultural commodities to be more concerned with depicting reality than being entertaining during advertising efforts (Specht & Buck, 2014). Specht and Buck (2014) recommended “educating the public about current trends in animal husbandry while marketing products is a more responsible way to promote both the commodity and its producers” (p. 46).

### **Theoretical Framework**

It is important to have an understanding of what drives consumers to be active in the market. The theory of reasoned action states human actions are guided by three considerations: (a) beliefs about the consequences of an action (behavioral beliefs), (b) beliefs about the normative expectations of others (normative beliefs), and (c) beliefs about the presence of factors that may promote or hinder the behavior (control beliefs) (Ajzen & Fishbein, 1980). Research conducted by Belleau, Summers, Xu, and Pinel (2007) that used the theory of reasoned action as a theoretical underpinning indicated attitude toward a product had the most influence on purchasing intention and media coverage of a product to increase knowledge could have potential positive impacts on consumer attitude for the product. Consumers who believe there will be negative consequences associated with eating poultry will be less likely to purchase poultry (McEachern & Schroder, 2002). Consumers with family and peers who do not eat poultry will also be less likely to purchase it. Finally, consumer behavior will be affected by consumer beliefs about the availability of poultry products in the area. Research also shows “women shoulder the majority of shopping responsibility” and the association between gender and shopping responsibility is especially high in regard to grocery shopping (Dholakia, 1999, p. 158). Consumers are also primarily divided into low-involvement and high-involvement groups; meaning, those consumers with a low-involvement mindset focus on tangible considerations (e.g. price and visual characteristics), while highly involved consumers consider intangible attributes when making purchases (e.g. safety, health, animal welfare, and biodiversity) (McEachern & Schroder, 2002).

Although a sufficient amount of research exists to show that the general public is becoming less agriculturally literate (Frick et al., 1995; Hess & Trexler, 2011; Wachenheim & Rathge, 2000), little research has been conducted to address consumer perceptions of specific areas of agriculture. Because agriculture is a consumer-driven industry, it is important producers and the industry understand the perceptions held by consumers as outlined in the National Research Agenda (Doerfert, 2011). This will allow for proactive marketing and educational activities tailored to inform consumers and to educate and overcome inaccurate information.

### **Purpose/Research Objectives**

The purpose of this study was to understand consumers’ perceptions of the Arkansas poultry industry. Specific objectives were to:

1. Determine the perceptions of northwest Arkansas consumers about selected policies, procedures, and standards in the poultry industry;

2. Determine the perceptions of northwest Arkansas consumers' personal preferences and understanding of the poultry industry; and
3. Determine correlations between consumer perceptions and selected demographics.

### **Methods/Procedures**

This study used descriptive survey methodology. The statistical analysis was also descriptive in nature and the instrumentation followed Dillman's (2007) Tailored Design method to ensure accurate question development and data collection.

The sample for this study was consumers in three select areas of Arkansas; namely, Bentonville, Fayetteville, and Springdale. A total of 353 respondents formed the sample asked to participate in the survey with 198 agreeing to participate. Participants were selected at random through direct contact at five different local chain grocery stores that were also selected at random from 10 stores present in these three cities. The researcher and an assistant directly distributed the survey on 14 different occasions between 26 February and 18 April 2013. For a majority of the occasions, surveys were administered between the hours of 4 and 6 p.m.; a few were conducted during the 1 to 3 p.m. time period. Participation in the survey was incentivized by offering individuals who responded the opportunity to enter a drawing for an iPad.

A printed survey instrument was developed based on a review of literature (Frick et al., 1995; Terry & Lawver, 1995; Wachenheim & Rathge, 2000). The survey consisted of three parts: (a) a section that assessed consumer perceptions of poultry production in Arkansas, (b) a section that assessed consumer perceptions of knowledge of poultry production and the industry, and (c) a demographic section.

Part I of the questionnaire contained 13 statements to assess consumer perceptions of selected aspects of poultry production. Seven of these statements assessed consumer perceptions of policies, procedures, and standards in the poultry industry. The remaining six statements in this section assessed consumer preferences and personal understanding of the poultry industry in Arkansas. Participants responded to each of the statements using a 1 to 6 Likert-type scale, where 1 = strongly disagree, 2 = disagree, 3 = moderately disagree, 4 = moderately agree, 5 = agree, and 6 = strongly agree.

Part II of the instrument contained statements and questions to assess respondents' perceived knowledge of poultry production in Arkansas. First, this section included the statement "I am very knowledgeable about poultry production practices" to assess how respondents perceived their knowledge of poultry production; answers followed the same scale as the previous perception statements. Next, respondents answered the question "Do you or does anyone in your immediate family work in poultry production?" with either a "yes" or "no" response. Finally, an open-response item asked respondents, "Of all 50 states, where does Arkansas rank in the total dollar value of poultry produced?"

Part III of the survey consisted of questions related to demographics of the surveyed participants. Questions about age, ethnicity (Native American, Black/African-American, Hispanic, Caucasian, Asian, other), gender, area of residence (farm, rural, suburb, city), and highest degree or level of school completed (12th grade or less, no diploma; high school graduate or GED; some college, no degree; associate degree; bachelor's degree [e.g. BA, BS, AB]; graduate or professional degree; don't know; refused) were all present on this part of the instrument.

Face and content validity of the instrument were assessed by a panel of five faculty members with expertise in survey research methods (two faculty) and poultry science (three faculty); these experts recommended minor revisions and deemed the revised instrument to be valid. To determine

instrument stability, the survey was administered twice (at a 14 day interval) to a convenience sample of 10 adults in the northwest Arkansas area. The agreement percentage between the first and second administrations was 80%, which was deemed to be acceptable (Gall, Gall, & Borg, 2006).

To collect data for this research, a researcher and a trained assistant directly administered surveys to consumers individually at local grocery stores in northwest Arkansas. After determining specific stores at which to administer the instrument, the researcher contacted the corporate offices of the grocery store chain and received permission to administer surveys to consumers at the chosen stores. Before administering the survey at each store location, the researcher informed the store manager that the researcher would be conducting surveying at a specific time. The researcher and an assistant spent approximately two hours administering surveys in each store during each session. Interviews were conducted near the meats or butcher section of the stores.

Data from the completed surveys were entered into an Excel spreadsheet and then imported into SAS® 9.3 (Cary, NC) for analysis using descriptive and correlational statistics. Open-ended responses were analyzed using open coding methods (Creswell, 2007; Glense, 2006; Strauss & Corbin, 1990).

## Results/Findings

The survey methodology utilized in this study yielded quantitative data that fulfilled the stated objectives of the study. The findings are reported by objective.

### Objective 1: Perceptions of policies, procedures, and standards in the poultry industry

Respondents were first asked about their perceptions of poultry production in Arkansas regarding policies, procedures, and standards in the poultry industry (see Table 1). Consumers moderately agreed that poultry was more affordable than beef or pork ( $M = 4.81$ ,  $SD = 1.09$ ). Consumers generally believed it was healthier to eat organically produced poultry than conventionally produced poultry ( $M = 4.47$ ,  $SD = 1.39$ ). Respondents moderately agreed most Arkansas poultry is grown on factory farms ( $M = 4.15$ ,  $SD = 1.37$ ). Consumers were unsure as to whether conventionally produced poultry contained unsafe levels of hormones or antibiotics ( $M = 3.68$ ,  $SD = 1.45$ ). Respondents disagreed poultry was the cause of most food-borne illness ( $M = 2.21$ ,  $SD = .99$ ). Consumers disagreed hormones and antibiotics were never given to poultry during production ( $M = 1.91$ ,  $SD = 1.05$ ;  $M = 1.84$ ,  $SD = 0.96$ , respectively).

### Objective 2: Perceptions of personal preferences and understanding of the poultry industry

Respondent perceptions were also assessed in regard to consumer preferences and personal understanding of the poultry industry in Arkansas (see Table 2). Overall, consumers agreed that poultry production has a positive effect on Arkansas ( $M = 4.92$ ,  $SD = 1.07$ ). Consumers moderately agreed poultry producers care about the welfare of the poultry they produce ( $M = 4.01$ ,  $SD = 1.41$ ). Consumers were unsure if poultry processing employed a large number of undocumented workers ( $M = 3.93$ ,  $SD = 1.36$ ). Consumers were unsure if farmers use humane production practices ( $M = 3.81$ ,  $SD = 1.42$ ). When asked about poultry production's effect on the environment, respondents moderately disagreed poultry production is harmful to the environment ( $M = 2.90$ ,  $SD = 1.30$ ). Consumers disagreed that if they lived in a rural area, they would like to live near a poultry farm ( $M = 2.20$ ,  $SD = 1.33$ ).

Table 1

*Consumer Perceptions of Policies, Procedures, and Standards in the Poultry Industry and Relationships between Statements and Demographic Characteristics*

Statement	Relationships between Statements and Demographic Characteristics							
	<i>M</i>	<i>SD</i>	Knowledge <sup>a</sup>	Industry Affiliation <sup>b</sup>	Age <sup>a</sup>	Area of Residence <sup>c</sup>	Education <sup>c</sup>	Gender <sup>b</sup>
Poultry is more affordable than beef or pork.	4.81	1.09	-0.01	0.11	0.21**	0.04	0.00	-0.04
It is healthier to eat organically produced poultry than conventionally produced poultry.	4.47	1.39	-0.06	0.05	-0.12	-0.05	-0.09	-0.04
Most Arkansas poultry is grown on factory farms.	4.15	1.37	0.01	-0.10	-0.03	0.06	-0.04	-0.04
Conventionally produced poultry contains unsafe levels of hormones or antibiotics.	3.68	1.45	0.15	-0.02	0.08	0.02	-0.09	0.19**
Eating poultry is the cause of most food-borne illness.	2.21	0.99	0.04	-0.05	-0.12	-0.09	-0.07	0.15*
Hormones are never given to poultry.	1.91	1.05	0.13	0.07	-0.07	0.05	-0.12	-0.15*
Antibiotics are never given to poultry.	1.84	0.96	0.03	0.05	0.08	-0.10	-0.11	-0.12

<sup>a</sup>Pearson Product-Moment Correlation; <sup>b</sup>Point Biserial Correlation; <sup>c</sup>Spearman Rank-Order Rho Correlation.

*Note.* *N* = 198; Responses were coded as 1 = Strongly Disagree, 2 = Disagree, 3 = Moderately Disagree, 4 = Moderately Agree, 5 = Agree, 6 = Strongly Agree; Responses for Industry Affiliation were coded as 1 = No, 2 = Yes; Responses for Area of Residence were coded as 1 = Farm, 2 = Rural, 3 = Suburb, 4 = City; Responses for Education were coded as 1 = at least high school graduate, 2 = some college, no degree or associate degree, 3 = Bachelor's degree or higher; Responses for Gender were coded as 1 = Male, 2 = Female

\**p* < .05; \*\**p* < .01

Table 2

*Consumer Perceptions and Understanding of the Poultry Industry and Relationships with Demographic Characteristics*

Statement	<u>Relationships between Statements and Demographic Characteristics</u>							
	<i>M</i>	<i>SD</i>	Knowledge <sup>a</sup>	Industry Affiliation <sup>b</sup>	Age <sup>a</sup>	Area of Residence <sup>c</sup>	Education <sup>c</sup>	Gender <sup>b</sup>
Overall, the poultry industry has a positive effect on Arkansas.	4.92	1.07	0.04	0.09	0.10	-0.10	-0.05	-0.11
Poultry producers care about the welfare of the poultry they produce.	4.01	1.41	-0.04	0.16*	0.08	-0.03	-0.08	-0.03
Poultry processing employs a large number of illegal immigrant workers.	3.93	1.36	0.08	-0.07	0.003	0.05	-0.21**	0.11
Poultry farmers use humane production practices.	3.81	1.42	0.03	0.17*	0.11	-0.04	-0.09	0.04
Poultry production is harmful to the environment.	2.90	1.30	-0.03	-0.11	-0.03	0.11	0.15*	0.12
If I lived in a rural area, I would like to live near a poultry farm.	2.20	1.33	0.11	0.18	-0.07	-0.17	-0.14	-0.07

<sup>a</sup>Pearson Product-Moment Correlation; <sup>b</sup>Point Biserial Correlation; <sup>c</sup>Spearman Rank-Order Rho

*Note.* *N* = 198; Responses were coded as 1 = Strongly Disagree, 2 = Disagree, 3 = Moderately Disagree, 4 = Moderately Agree, 5 = Agree, 6 = Strongly Agree; Responses for Industry Affiliation were coded as 1 = No, 2 = Yes; Responses for Area of Residence were coded as 1 = Farm, 2 = Rural, 3 = Suburb, 4 = City; Responses for Education were coded as 1 = at least high school graduate, 2 = some college, no degree or associate degree, 3 = Bachelor's degree or higher; Responses for Gender were coded as 1 = Male, 2 = Female

\**p* < .05; \*\**p* < .01

to the section of the survey that assessed their perceived knowledge of the poultry industry. Of the consumers surveyed (32.8%) moderately agreed they were knowledgeable about poultry production processes. The majority of consumers surveyed did not work in the poultry industry, nor did any members of their immediate family (81.7%). Most respondents ranked Arkansas 10th or higher in terms of the total dollar value of poultry produced.

### **Objective 3: Respondent demographics and demographic/perceptions correlations**

The mean age of respondents was 49.5 ( $SD = 16.98$ ) and ranged from 19 to 92 years. Most consumers surveyed lived in an urban area (54.3%). In regard to education level, 12.2% of respondents possessed a high school education or less, 44.4% of respondents had some college but no degree or an associate degree, and 43.4% of respondents possessed a bachelor's degree or higher. The majority of respondents were female (65.2%).

All statistically significant correlations between respondent demographic characteristics and perceptions of the poultry industry were described as low, using the descriptors suggested by Davis (1971). As shown in Table 1, age was positively ( $r = .21$ ) correlated with agreement that poultry is more affordable than beef or pork. Females tended to more strongly agree that conventionally produced poultry contained unsafe levels of hormones or antibiotics ( $r = .19$ ) and that eating poultry is the cause of most food-borne illnesses ( $r = .15$ ). Females more strongly disagreed that hormones are never given to poultry ( $r = -.15$ ). There were no significant correlations between self-perceived knowledge of the poultry industry, poultry industry affiliation, residence, or level of education and respondents' level of agreement with any statement in Table 1.

Poultry industry affiliation had low positive correlations with agreement that producers care about the welfare of their poultry ( $r = .16$ ) and use humane production practices ( $r = .15$ ). Respondents' level of education was negatively correlated with agreement that poultry processing employs a large number of undocumented workers ( $r = -.21$ ) and positively correlated with agreement that poultry production is harmful to the environment ( $r = .15$ ). There were no significant relationships between respondents' self-perceived knowledge of the poultry industry, age, level of education, or gender and level of agreement with any statement in Table 2.

### **Conclusions, Discussion, and Recommendations**

Of the perceptions assessed in Part I of the instrument, Table 1 related to policies, procedures, and standards in the poultry industry. The remaining questions in the perceptions section of the survey were based largely on consumer preferences and personal understanding of the poultry industry (see Table 2). Conclusions are discussed based on these two sections of the survey, and recommendations for agricultural communicators, educators, and poultry industry public relations are made.

#### **Conclusions**

Consumers possessed a higher level of self-reported agricultural literacy regarding the affordability of poultry as compared to other meats, the use of antibiotics in poultry production methods, and poultry as a source of food-borne illness. Consumers reported they were fairly knowledgeable about the price of poultry in comparison to other meats, generally agreeing with the valid statement that poultry is more affordable than beef or pork (American Meat Institute, 2009). Consumers were also knowledgeable about antibiotic use in poultry production. In regard to the use of antibiotics being legal and utilized in the poultry industry, the majority of consumers surveyed were aware of this fact (Jones & Ricke, 2003). Finally, consumers were knowledgeable about poultry serving as a source of

food-borne illness; whereas, they generally disagreed that eating poultry is the cause of most food-borne illness (Bruhn & Schutz, 2007; Painter et al., 2013).

Consumers lacked self-reported agricultural literacy regarding perceptions of the other policies, procedures, and standards addressed in the survey; namely, consumers lacked knowledge about the healthiness of organic poultry in comparison to conventionally produced poultry, the use of hormones in poultry production, the level of antibiotics and hormones present in conventionally produced poultry, and the use of factory farms in the poultry production industry. Consumers generally agreed that organically produced poultry is healthier than conventionally produced poultry, but with the strict mandates and regulations enforced by the government concerning food safety in mind, both organically and conventionally produced poultry should possess the same level of health for the consumer. Consumers disagreed with the statement that hormones are never given to poultry, despite the illegality of the use of hormones in poultry production (Donoghue, 2003). In a similar fashion, consumers moderately agreed that conventionally produced poultry contains unsafe levels of hormones or antibiotics; research that supports the notion that the levels of antibiotics in conventionally produced poultry are safe, and the level of hormones is nonexistent because of the absence of their use (Donoghue, 2003; Verbeke & Viaene, 1999). Consumers agreed most Arkansas poultry is grown on factory farms, which is in contrast to the truth that most Arkansas poultry farms are owned and operated by producers, not integrators (Boehler, 2010). However, this perception is dependent upon consumer understanding of what a factory farm is, and could simply mean that consumers equate modern production practices with factory farming instead of the ownership of farms by integrators as factory farming.

Regarding the remainder of the perceptions assessed as a part of the instrument, consumers varied in their favorability of poultry production and all it entails in Arkansas. Consumers held moderately favorable views of the level of care poultry producers possess about the poultry they raise, yet consumers were slightly less agreeable that poultry farmers use humane production practices. In regard to these two perceptions, there was a significant difference between industry affiliation and if consumers thought producers had an adequate level of care for their flocks and that they used humane production practices. Consumers were unsure as to whether poultry production is harmful to the environment, but most consumers generally disagreed they would like to live near a poultry farm. There was a significant difference in consumers' understanding of the effect of poultry production on the environment and their educational level, indicating that as people become more educated they may realize the effects of poultry production on the environment more. Respondents were in general agreement that poultry processing employs a large number of illegal immigrant workers, but because of the lack of research accounting for illegal immigrant workers it is unsure as to whether this perception matches with reality or not. A significant difference existed between the level of education an individual held and their opinion about whether undocumented workers were involved in poultry production, meaning education could play a role in improving this area of understanding. The results of this study revealed a lack of correlations between self-reported perceptions of poultry production and education, which points toward a need for improved understanding of the poultry industry at all levels of education. In a similar fashion to research conducted by Frick and colleagues (1995), despite the limited knowledge consumers held of some aspects of poultry production in Arkansas, the majority agreed that poultry production had a positive effect on the state.

### **Recommendations and Implications**

It is particularly troubling that consumers in Arkansas show deficiencies in self-reported levels

of poultry production agricultural literacy, but perhaps it is more troubling that agricultural communicators and educators have not worked to keep consumers better informed about the practices of an industry that is so important to the state. To remedy the lack of understanding of the poultry industry revealed through this study, consumers need to be educated about the health benefits of conventionally produced poultry, the absence of hormones in poultry production methods, the effects of the use of antibiotics in poultry production, and the business model of poultry production in Arkansas. These proposed educational topics should be addressed through industry marketing efforts aimed at improving consumer knowledge, which will ultimately improve and ensure the importance of poultry production in Arkansas (McGraw et al., 2012). As noted, these educational efforts should be focused at all levels of formal education; whereas, there was a lack of correlation between self-reported perceptions and education. As recommended by Specht and Buck (2014), these marketing efforts should depict the reality of production processes in the industry instead of merely trying to draw in consumers through entertainment.

Consumer education should become a higher priority for the poultry production integrators in Arkansas, such as Tyson Foods, Inc.; OK Foods, Inc.; Simmons Foods, Inc.; Cobb-Vantress, Inc.; and George's, Inc. Communicators in agricultural based organizations should be careful to depict reality while engaging in marketing efforts, as well as work to create convincing arguments to combat other campaigns that may misrepresent agriculture to the public (Goodwin & Rhoades, 2011; Specht & Buck, 2014). Marketing efforts should be directed at women; whereas, previous research noted they are the primary consumers for groceries (Dholakia, 1999). Female consumers should especially be advised of the healthiness of conventionally produced poultry, particularly in regard to the use of antibiotics and the absence of hormones in poultry. Agricultural communicators should also work to bridge the gap of media coverage of agriculture issues through improving relations with media (Lundy et al., 2006). The availability of this information concerning poultry production practices in media coverage would aid in improving agricultural literacy (Lundy et al., 2006). Additionally, improving agricultural literacy in this way could have positive effects on poultry consumption and legislation (Holloway, 2004).

In one way or another, perceptions weigh heavily on the mind of the consumer because of the implications or consequences associated with the actions driven by perceptions. Improved consumer education efforts must adequately address the topics on which consumers lacked agricultural literacy. As consumers become more knowledgeable about these topics they will better understand the consequences associated with their perceptions, thus making more informed purchasing decisions (Ajzen & Fishbein, 1980; Belleau et al., 2007). The theory of reasoned action explains that consumers make decisions based on the consequences associated with a purchase (Ajzen & Fishbein, 1980). As consumers become more aware of the absence of negative consequences associated with purchasing poultry through educational and marketing efforts they will be more likely to purchase poultry (McEachern & Schroder, 2002). The increase in marketing and educational materials to improve agricultural literacy about healthiness of conventionally produced poultry, the effects of the use of antibiotics, and the absence of hormone use in poultry production, and the business model of poultry production in Arkansas is a direct implication of this research that falls under priority area one of the National Research Agenda (Doerfert, 2011).

This study revealed consumer perceptions in regard to a variety of parts of the poultry production industry. One limitation of this study was the lack of generalizability, which would have strengthened the findings and conclusions. Despite this limitation, consumer perceptions identified in this study should be used to more effectively tailor marketing and education efforts to maintain the importance

of poultry production in Arkansas through improving agricultural literacy. Lessons learned in this research may add value to consumer messaging, specifically to poultry purchasers. This study should be repeated on a national level or in other states. For any commodity that is of importance to the national or a state economy this study could be replicated to better understand consumer perception of the commodity which could lead to improved communications efforts about the commodity. Additionally, qualitative research could be conducted to gain a deeper understanding of how consumers develop and maintain perceptions of commodity production and how that affects their purchasing behavior.

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