

5-2018

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Consumers' Willingness to Pay for Specialty Table Eggs

by

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An Honors Thesis is partial fulfillment of the requirements for the degree Bachelor of Science in Business Administration in Supply Chain Management.

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May 11, 2018

Abstract

The purpose of this research is to define the relationship between two constructs and the purchasing behavior of consumers. These two constructs are composed of zoocentric and anthropocentric ideologies, which are established according to one's attitudes towards an animal's purpose on earth in relation to humans. This study investigates the effect that these two viewpoints have on a consumer's willingness to pay for specialty table eggs and conventional table eggs. Using a survey questionnaire, we sampled 327 college students to test these relationships. Using confirmatory factor analysis to establish construct validity and hierarchical linear regression to test the hypotheses, we hypothesized that zoocentric and anthropocentric viewpoints would drive consumers' willingness to pay for specialty table eggs and conventional eggs, respectively. We found that anthropocentric ideology negatively influenced a consumer's willingness to pay for specialty table eggs, and positively influenced willingness to pay for conventional table eggs. Zoocentric ideology only positively influenced a consumer's willingness to pay for specialty table eggs. However inconsistent with our hypothesis, a zoocentric ideology did not rule out the purchase of conventional table eggs.

1. Introduction

Millennials, characterized as those individuals born between 1982 and 2002, have increased expectations for animal welfare conditions (Appelbaum, 2015). Does this mean that the millennial population is more willing to purchase food items that claim to originate from improved animal welfare conditions? The purpose of this research is to determine the relationship between millennials' attitudes toward animal welfare practices and their purchasing behavior of table eggs.

There is an increasing number of consumers who are willing to pay a premium price for products and food that are derived from ethical practices, in relation to the treatment of animals and environmentally-conscious attributes (Anastasia, 2015). Nearly two-thirds of consumers are willing to pay more for products or food items that originate from companies that market themselves as having a positive social or environmental impact (Will, 2015). Furthermore, there has been an increasing number of households that have focused on healthier alternatives in their food selection (Gustafson, 2017). This is partially due to the millennial population adopting a more healthy-oriented lifestyle (Gustafson, 2017). In addition, in recent years, there has been amplified exposure, interest, and awareness about organic and natural products throughout the media (Frewer, Miles, Marsh, 2002). This in effect may influence a consumer's table egg purchase to prefer conventional table eggs.

Table eggs are generally categorized into two broad classifications according to their marketing attributes: conventional and specialty. Conventional table eggs consist of brown and white caged eggs. Caged eggs are defined as those eggs delivered by hens not living in cages (Torrise, 2017). Specialty table eggs possess multiple marketing attributes including organic, cage-free, free-range, and pasture-raised and generally sell for a price premium over conventional eggs. Many consumers, until recently, were relatively price inelastic with respect to their purchase of specialty table eggs (Sumner, Gow, Hayes, Matthews, Norwood, Rosen-Molina, Thurman, 2011). Therefore, if the price of their preferred specialty table egg selection increased, they were still loyal to their routine purchasing habits of the non-caged option of table eggs. However, there may be price differentials so drastic that previous specialty table egg

consumers would switch their regular buying habits to purchase conventional table eggs (Sumner et al., 2011). Is this influenced by their attitudes toward animal welfare conditions?

We propose that two views exist regarding individuals' beliefs on animals' existence and purpose in the world. In this study, we seek to differentiate these by developing two constructs: anthropocentric and zoocentric. Anthropocentric stems from the Greek prefix, anthropo, which signifies human with regard to sentience ('Anthropocentric', def. 2). Whereas, zoocentric is derived from the Greek prefix, zoo, which translates to mean, of or relating to animals ('Zoo', def. 1). The survey we administered will determine if the reason why millennials are more likely to purchase specialty table eggs than past generations is due to their orientation with a zoocentric viewpoint.

Demographic influences on consumers' choices have been assessed in previous conducted studies. Past research shows that gender, age, annual household income level, and household size all have a correlation with table egg consumption (Bajaei, Wiseman, Cheng, 2011). Active church affiliation, geographic upbringing, and pet ownership have all been shown to have an association with the public's level of concern for farm animal welfare in food production (Cornish, Raubenheimer, McGreevy, 2016). This study will either confirm or reject a demographic link, as well as assess the separation of the two common personal beliefs: anthropocentric and zoocentric. Demographic variables will be used as controls to confirm or deny the study's authenticity.

The purpose of this research is to explore how consumers' personal beliefs affect their purchase preferences for table egg consumption. The results gathered will be advantageous to the marketing segment of the egg industry and assist marketers in the development of effective and appropriate marketing plans for the differentiated egg market.

Now that the topic has been thoroughly introduced, we will develop the literature and theory in the next section. Then, we will develop the research framework and hypotheses. Following the hypotheses, we present the study methodology. We will conclude the research with the results, analysis, discussion, and conclusion.

2. Literature and Theory

2.1. Conventional Table Eggs

Conventional table eggs are the least expensive table egg option on the market (Henderson, 2017). Depending on the breed of the hen, the eggs can possess a brown or white color (Jones, 2017). The feed is not regulated and antibiotics are supplied for the hens. The hens are confined in a battery cage with no outdoor access so they are protected from the elements and predators (Brey, Patmos, Truex, Satrum, Krouse, Kreher, Hickman, Herbruck, Esbenshade, 2018). The cages in which the hens live have a mesh floor which allows for the bird's waste to fall and keep both the hens and eggs clean (Akpobome, 1992).

2.2. Specialty Table Eggs

There are a variety of different forms of specialty table eggs. Organic, cage-free, free-range, and pasture-raised are all comprised of different variations in attributes that make them unique. Many consumers prefer specialty table eggs due to their values influencing their purchasing decisions, and specialty table eggs typically have better animal welfare conditions (Bejaei et al., 2011). Chart I lists the attributes for the four types of specialty table eggs upon which this study focuses (e.g., Thomson (2016), Burnbrae (2018), Fergusson (2016)).

Chart I: Characteristics of Specialty Table Eggs

	Organic	Cage-Free	Free-Range	Pasture-Raised
Feed	Organic feed with no genetically modified organisms	No regulation of feed	Prohibits use of animal byproducts in feed	Prohibits use of animal byproducts in feed
Beak cutting/ Molting	Beak cutting and molting allowed	Beak cutting and molting allowed	Beak cutting allowed, forced molting prohibited	Beak cutting allowed, forced molting prohibited
Environment	Required access to the outdoors and prohibits cages	Prohibits cages but does not require access to the outdoors	Requires access to the outdoors (21.8 sq. ft. per bird) and prohibits cages	Requires access to the outdoors for six hours a day (108 sq. ft. per bird) and prohibits cages
Drug Enhancers	Prohibits use of antibiotics	No regulation of antibiotic use	Prohibits use of growth promoters	Prohibits use of growth promoters

2.3. Perceived Nutritional Value

Prior studies have shown a linkage between a consumer's perceived nutritional value of eggs and their specialty table egg consumption. Some consumers associate yolk color, shell color, price, and hens' access to the outdoors with health benefits (Guyonnet, 2013). There are important deciding factors affecting consumer preferences that must be taken into consideration. Price is the leading contributing factor when consumers purchase conventional table eggs rather than the non-caged alternatives (Bejaei et al., 2011). In addition, informed knowledge about animal welfare practices and awareness of the animal's living conditions, not only physically but also psychologically, affect the buyer's decision when purchasing table eggs (Cornish et al., 2016). In effect, consumers of specialty table eggs are more influenced by hen welfare practices than price (Bejaei et al., 2011).

2.4. Transparency in Specialty Attributes

Food items that contain special attributes, such as being all-natural or hormone-free, experienced an improvement in earnings of nearly five percent and a volume growth of more than five percent in 2017, while conventional food items experienced a plateau in growth for 2017 (Roerink, 2018). Transparency is meaningful to the millennial population when it comes to brand loyalty (Fromm, 2017). Consumers are taking notice of products that are labeled as organic, grass-fed, and antibiotic-free. In fact, products that claim to possess these attributes have the highest likelihood of being taken into consideration with purchasing decisions (Roerink, 2018). The more transparent the label is about sourcing, raising, and welfare practices, the more willing the consumer is to purchase the specialty product (Roerink, 2018).

2.5. Industry's Transition to Cage-Free Table Eggs

An array of grocery chains, restaurants, and distributors have committed to make the switch from conventional table eggs to cage-free table eggs in the next decade (Morris, 2016). Together, these businesses represent an estimated 70 percent of the United States' table egg demand (Wong, 2017). While the industry is preparing for this transformation, a majority of consumers are still choosing to purchase conventional table eggs and are reluctant to switch to the more expensive alternatives (Wong, 2017). Today, only six percent of table eggs produced are cage-free (Wong, 2017). While animal rights movements and campaigns have convinced businesses to make the switch to cage-free table eggs, it may not be what consumers want.

Walmart Stores Incorporated announced in 2016 that it was preparing to eliminate their supply of conventional table eggs by 2025 in both their Walmart stores and Sam's Club locations (Walmart, 2018). They plan to provide transparency in how their food is raised, while offering an affordable and quality product (Walmart, 2018). Walmart is the largest grocery chain in the United States and controls a quarter of the egg industry market. The switch to sourcing from cage-free production systems will adhere to Walmart's aim of attaining the five domains of animal welfare compromise in their supply chain (Walmart, 2018).

There are start-up implementation costs associated with the transition from battery-caged production systems to cage-free facilities. A supplier can expect to spend \$40 per hen in order to have them unrestricted from cages (Beitsch, 2018). In addition to monetary costs, suppliers should anticipate an increase in required labor (O'Keefe, 2018). Depending on the cage-free housing system utilized, suppliers should expect three to five times more labor to adequately operate (O'Keefe, 2018).

2.6. Concept of Welfare

Previous studies have analyzed consumers' level of concern for farm animal welfare in modern food production systems (Cornish et al., 2016). The concept of welfare can be subdivided into five domains. Each domain encompasses a fundamental principle of animal welfare. Nutrition, environment, health, behavior, and experience of the animal are each freedoms of the concept of animal welfare (Mellor, 2016). There are four domains that relate to the physical and functional aspect of the treatment of animals. One value is associated with the mental state of the animal. Natural living, affective state, and biological function are three scientific approaches to assessing the status of an animal's welfare condition (Cornish et al., 2016). While animal sentience cannot be reliably measured, consumers have indicated that it is an important attribute to consider when it comes to modern production systems (Cornish et al., 2016). If an individual views the five domains of animal compromise as important, then their views align with zoocentric ideology that will be discussed in the following section.

2.7. Zoocentric View

The zoocentric view which emphasizes the importance of humane treatment of farm animals. Zoocentrism is a theory that views animals as an equivalent entity to humans. The term zoocentric is coined from two axiomatic words: natural and humane (Blokhuys, Jones, Geers, Miele, Veissier, 2003). Natural is a term used to describe the type of feed with which the animals are provided, as well as conditions pertaining to behavior (Blokhuys et al., 2003). In zoocentrism, individuals support practices that resemble the natural environment as closely as possible. Zoocentric practice teaches that animals experience a range of emotions, including pain (Hanlon, Magalhaes, 2016). Many people who believe in zoocentric ideology view welfare issues from an animal's perspective and often experience feelings of guilt when exposed to intensive production systems (Clark et al., 2016). These individuals perceive that animals possess more than a utilitarian value to humans and believe the quality of an animal's life to be important.

2.8. Anthropocentric View

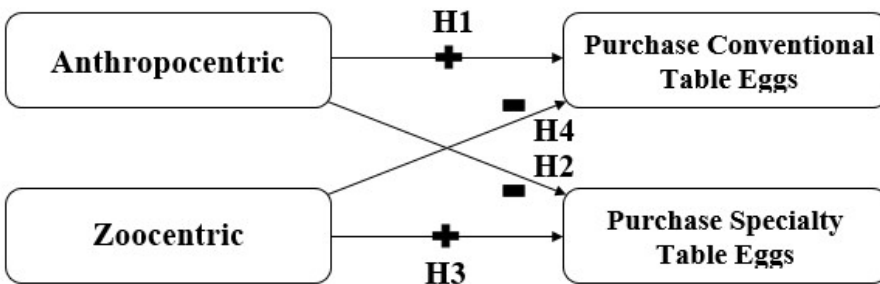
An anthropocentric view is traditionally motivated by human health, such as the minimization of disease transfer and veterinary residue risks (Clark, Stewart, Panzone, Kyriazakis, Frewer, 2016). According to Merriam Webster Dictionary, anthropocentrism considers "human beings as the most significant entity of the universe" ('Anthropocentric,' def.

1). Anthropocentric ideals originated from the Cartesian view during the seventeenth century (Hosford, 2010). The Cartesians believed that farm animals were meant to be used solely as machines. Since the late seventeenth century, Rene Descartes advocated his belief that animals do not have the ability to reason or experience pain (Isacat, 2008). Although animals are living creatures, they are like mechanical robots. However, since humans are conscious beings that have minds and souls, can learn, and have language, they are worthy of compassion (Isacat, 2008). These individuals naturally view farm animals as inferior to humankind. Many view animals as objects, rather than beings with sentient capabilities. It is common for one with anthropocentric views to believe that it “is a (human) right to eat animals” (Harper and Henson, 2001, p. 465).

3. Hypotheses

Dependent upon attributes that were developed to compose the two constructs, anthropocentric and zoocentric, one can hypothesize the influence that these factors have upon a consumer’s purchasing decision. Diagram I describes the relationships that we hypothesized in this study in the following sections.

Diagram I. Theoretical Model and Hypotheses



3.1. Anthropocentric Influence

An anthropocentric consumer’s perception of acceptable animal welfare practices should be in favor of the benefit to humans. Therefore, if there are no health benefits associated with conventional table eggs versus specialty eggs, then the consumer will choose the carton that is the least costly. The treatment of animals does not influence the purchasing decision of an individual with an anthropocentric orientation, and the consumer is typically most concerned with providing their family the egg with the most health advantages or saves them the most money. Despite exposure to and knowledge about animal welfare conditions, an individual with an anthropocentric mindset should not deviate from their preference for conventional table eggs. This is in part due to an anthropocentric perception that the human race is the most significant entity in this universe. Therefore, the amplitude of knowledge an individual possesses about animal welfare conditions should not affect their purchasing decision of table eggs.

H1. Anthropocentric orientation will drive a consumer’s willingness to pay for conventional table eggs.

H2. Anthropocentric orientation will be negatively associated with willingness to pay for specialty table eggs.

3.2. *Zoocentric Influence*

If a human has increased concern for animal welfare practices, then they should be more willing to pay a higher price for a carton of eggs that have attributes that support an animal's natural environment. Zoocentrism is the belief that both animals and humans are equal elements in this universe. Therefore, if a human supports this belief, then the element of freedom for animals should influence the individual's willingness to take additional monetary measures to support the ethical practice of raising and treating animals. Consequently, an individual with a zoocentric mindset is more likely to increase their preference for specialty table eggs if they have amplified knowledge about animal welfare conditions. Conventional table eggs have many characteristics that are not consistent with individuals that share zoocentric views. Hens that produce conventional eggs do not have living conditions that mirror the natural environment of a hen in the wild. Hens producing conventional table eggs have tighter living conditions and lack access to the outdoors, and they are fed antibiotics to increase egg production. Since these living circumstances do not support a zoocentric individual's belief, then an individual's exposure to the living elements for these hens should weigh negatively in their mind.

H3. Zoocentric orientation will drive a consumer's willingness to pay for specialty table eggs.

H4. Zoocentric orientation will be negatively associated with willingness to pay for conventional table eggs.

4. Methodology

4.1. *Questionnaire Design*

The purpose of this section is to describe how we developed our study to test our hypotheses. Questions were developed to test the relationship among two constructs of attitudes toward animal treatment and a consumer's purchasing habits. Previous studies have used survey instruments to study and measure willingness to pay (e.g., Loureiro and Hine (2002), Lusk (2003), Batte, Hooker, Haab, and Beaverson (2007), and Boccaletti (2000)). The questionnaire was subsequently arranged according to the independent and dependent variables. However, in the survey itself, we alternated the questions between the constructs.

Independent Variables: Includes questions to test a respondent's association with zoocentric and anthropocentric viewpoints. Nine statements for each construct were initially developed and arranged in the questionnaire by alternating between the two constructs. Respondents were instructed to indicate their level of agreement with each statement, using the Likert scale (where 1 = disagree, 2 = partially disagree, 3 = neutral, 4 = partially agree, 5 = agree).

Dependent Variables: Statements were structured with resemblance to the same Likert scale as the independent variables in order to be able to test the relationship among the consumer's willingness to pay for a certain egg type and their association with their stance on animal welfare practices (where 1 = disagree, 5 = agree). The questionnaire included four statements for specialty eggs and four statements for conventional table eggs that were alternated to randomize the statements.

4.2. *Measures*

We determined that a Likert scale would be the most viable survey format to test the independent variable effects on the dependent variable (where 1 = disagree, 5 = agree). The five-point Likert scale has enough variation to improve reliability and allow for variability among responses (where 1 = disagree, 5 = agree).

The primary data collection method we used in this research was a survey conducted online (referenced in the Appendix). We conducted a pretest with five university students to refine the protocol. The students were mainly concerned with the phrasing of certain statements.

4.3. Sampling

We used two methods of non-probability sample to survey students. The respondents were part of a voluntary, convenience sample in a university source we estimated to contain mainly millennial students. Specifically, 466 students enrolled in an Introduction to Supply Chain Management class were offered an opportunity to complete the survey as extra credit. We offered an alternate extra credit opportunity to students who requested another form of assignment. Every student was assured confidentiality if they chose to complete the survey, and the research was conducted according to the guidelines of the University of Arkansas Institutional Review Board.

4.4. Data Collection

We launched the survey on March 19, 2018, and it remained open for twelve days. Data collection was completed on March 28, 2018, in order to begin analysis. An additional ten respondents completed the survey before it was closed on March 30, 2018. Although no statistical analysis was done for the ten additional participants, there was no expected change in the results.

We collected a total of 327 survey responses, which represented a response rate of 70 percent. We implemented data cleansing to identify and remove inadequate records. First, we removed the responders who were not recent purchasers of table eggs from analysis. This reduced our data set to include 187 usable respondents. Then, we removed record numbers 5, 32, 46, 108, 137, 142, 153, and 158 due to straight-lining (when a respondent selected the same response repeatedly throughout the survey), indicated that they were not giving truthful answers (Cole, McCormick, Bowers, Brummet-Carter, 2012). We removed record number 165 because it had more than 10 percent of missing values in the data set. We deleted record number 177 in response to missing a critical value. We established a rule for records missing less than 10 percent of data. Record numbers 4, 18, 37, 42, 52, 58, 95, 97, 119, 129, 138, 143, 148, and 174 all had at least one missing entry in their survey responses but less than 10 percent of missing data. We statistically created the values of the missing entries by calculating the median of nearby points in SPSS for the entries missing less than ten percent of data records. The number of final responses that were suitable to be thoroughly evaluated and used for hierarchical regression analysis totaled 176. Table I contains an overview of the respondents in the final sample.

Table I. Demographic Characteristics

Demographic Variable	Category	Percentage Distribution
Gender	Male	58%
	Female	42%
Age	18 years old	1%
	19 years old	24%
	20 years old	45%
	21 years old	19%
	> 21 years old	10%
Household Size	< 3 members	20%
	3 members	12%
	4 members	40%
	5 members	18%
	6 members	7%
	7 members	1%
Household Income Range	≥ 8 members	2%
	< \$25,000	30%
	\$25,000 - \$49,999	8%
	\$50,000 - \$74,999	6%
	\$75,000 - \$99,999	5%
	\$100,000 – \$124,999	10%
	\$125,000 - \$149,999	10%
> \$150,000	31%	
Upbringing Landscape	Rural area/village	2%
	Town	24%
	Large town	37%
	City/metropolitan area	38%
Active Church Affiliation	Yes	68%
	No	32%
Pet Ownership	Yes	73%
	No	27%

5. Data Analysis

5.1. Skewness and Kurtosis

We analyzed the normality of the data set by computing skewness standard error and kurtosis standard error on questions that used the Likert scale in order to determine which questions would be removed from analysis. By standard rule, the skewness standard error and kurtosis standard error must be in the ± 2 range to be considered acceptable (Trochim & Donnelly, 2006). We evaluated skewness for symmetry and assessed kurtosis to determine if respondents tended to be heavy-tailed to a normal distribution. Some variables exhibited excessive skew or kurtosis and were not included in the factor analysis. We also performed post hoc calculations that computed the composite factors with the items reflected in the factor loading table. These are included in Table II.

Table II:

	1 ^a	2	3	4
Skewness	-1.018	-0.583	-0.478	-0.067
Skewness Standard Error	0.183	0.183	0.183	0.183
Kurtosis	0.963	-0.219	-0.884	-0.958
Kurtosis Standard Error	0.364	0.364	0.364	0.364

^aFactor names: (1) Zoocentric; (2) Anthropocentric; (3) Conventional Eggs; (4) Specialty Eggs

5.2. Exploratory Factor Analysis

We used factor analysis to reveal the variability among correlated variables present in this research, using Principle Axis Factor extraction with oblique rotation in SPSS. Exploratory factor analysis techniques allowed us to examine and measure the relationships among the variables and the factors. A value closer to one indicated a stronger relationship between the variable and factor. With the exploration of empirical data, we were able to observe the correlation among features in order to later develop a model of the data. Items were removed from our theoretical constructs because of low communality, low factor loadings (below 0.4), and cross loading (above 0.3). Table III presents the factor loading table with the items remaining after the confirmatory factor analysis.

5.3. Confirmatory Factor Analysis

Following the checking of the assumptions, we utilized confirmatory factor analysis in AMOS to confirm the factor structure and to establish discriminant and convergent validity. After removing two additional items because of low squared multiple correlations, the factor structure was confirmed (CMIN = 79.4, DM = 47, P = 0.002, SMR = 0.0493). Table IV includes values for Cronbach's alpha, construct reliability, and average variance extracted. Table IV concludes that construct reliability and average variance extracted are greater than the recommended values of 0.7 for construct reliability and 0.5 for average variance extracted (Huang, Wang, Wu, Wang, 2013). Therefore, we confirmed that the constructs that compose the theoretical framework retain convergent validity. The absolute value of the square root of average variance extracted entries is greater than the average variance extracted values. This proposes that the constructs used in the study share discriminant validity.

Table III: Factor Loading Table

Item	Pattern Matrix ^a					Structure Matrix			
	1 ^c	2	3	4	h ²	1	2	3	4
Q11_4	0.845	0.077	-0.014	-0.012	0.780	0.880	0.324	-0.321	-0.585
Q11_6	0.818	-0.065	-0.032	-0.104	0.786	0.880	0.180	-0.308	-0.661
Q11_8	0.825	0.053	-0.014	-0.029	0.749	0.864	0.293	-0.310	-0.588
Q10_7	-0.109	0.858	-0.034	-0.048	0.710	0.180	0.839	-0.282	0.000
Q10_8	0.190	0.754	-0.038	0.129	0.688	0.331	0.817	-0.305	-0.022
Q10_14	0.031	0.668	0.026	-0.049	0.453	0.247	0.670	-0.208	-0.076
Q10_1	-0.079	0.075	0.790	-0.054	0.611	-0.282	-0.195	0.778	0.201
Q10_3	0.079	-0.155	0.661	-0.004	0.489	-0.181	-0.341	0.682	0.116
Q10_13	-0.018	0.041	0.620	0.074	0.408	-0.260	-0.161	0.632	0.245
Q11_3	-0.246	0.006	0.011	0.611	0.641	-0.659	-0.079	0.248	0.780
Q11_5	0.025	-0.009	0.031	0.818	0.656	-0.538	-0.027	0.236	0.809
Q11_7	-0.009	-0.008	-0.011	0.859	0.743	-0.585	-0.022	0.216	0.862

^a Factor method was Principal Axis Factor and rotation was oblique (Direct Oblimin)

^b Factors derived based on eigen values, scree, and theory.

^c Factor names: (1) Specialty Eggs; (2) Zoocentric; (3) Anthropocentric; (4) Conventional Eggs

Table IV: Constructs and Reliability Indicators

	1 ^a	2	3	4
Anthropocentric	0.52	0.11	0.08	0.14
Specialty Egg	-0.33	0.74	0.63	0.09
Conventional Egg	0.28	-0.79	0.66	0.00
Zoocentric	-0.37	0.31	-0.07	0.60
Number of Items	3	3	3	3
Range of Scale	1-5	1-5	1-5	1-5
Mean	3.64	2.88	3.48	3.88
Standard Deviation	1.00	1.26	1.24	0.92
Coefficient alpha (α)	0.73	0.90	0.86	0.81
Construct Reliability	0.76	0.90	0.86	0.82

Note: Values below the diagonal are the correlation estimates among the constructs, diagonal elements are AVE values, and values about the diagonal are squared.

All correlations are significant at 0.001.

^aFactor names: (1) Anthropocentric; (2) Specialty Eggs; (3) Conventional Eggs; (4) Zoocentric

6. Results

6.1. Hypotheses Tests

After testing for validity in AMOS, we used its features to create composite variables. We tested the hypotheses using hierarchical linear regression. According to the results in Tables V and VI, three of the four hypotheses were supported. The fourth hypothesis was not supported due to no significant relationship among anthropocentric ideology and the purchase decision for conventional table eggs. The incremental variance explained by the two independent variables for the decision to purchase specialty table eggs was statistically significant ($R^2 = 0.18$, $p < 0.01$).

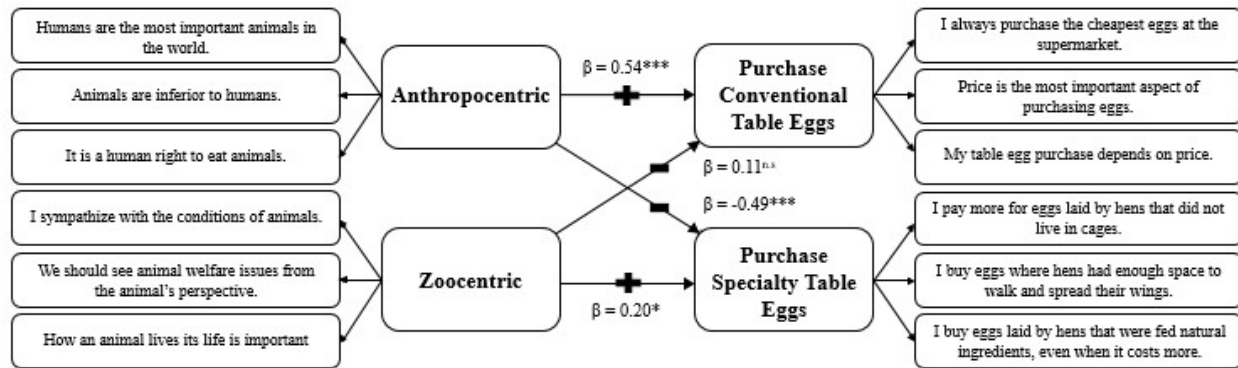
H1. There was strong evidence supporting the hypothesis that individuals who shared anthropocentric ideals were more likely to purchase conventional table eggs ($\beta = 0.54$, $p < 0.001$).

H2. The results confirmed that anthropocentric views negatively affect a consumer’s purchasing decision for specialty table eggs ($\beta = -0.49, p < 0.001$).

H3. An individual who maintains predominately zoocentric perspectives is positively related to the purchasing habits of specialty table eggs ($\beta = 0.20, p < 0.1$).

H4. There was no significant relationship between zoocentric ideology and the disfavor for conventional table eggs.

Diagram II. Hypotheses Linkage



The standardized betas represented in Diagram II resemble the strength of the effect the independent variables have on the dependent variables. A high absolute value beta coefficient indicates a strong effect the independent variable has on the dependent variable. Since Hypothesis 1 has a beta coefficient of 0.54, it can be interpreted that the relationship between anthropocentrism and the preference for conventional table eggs is relatively high. Whereas, Hypothesis 2 has a strong negative beta coefficient, so an individual with anthropocentric-orientation is not likely to purchase specialty table eggs. Hypothesis 3 shows that a one-unit increase in the predictor factor for zoocentrism, there is consequently a 0.20 increase in the preference for specialty table eggs. Since Hypothesis 4 is not statistically significant with reference to the p-value, the beta coefficient does not significantly forecast the outcome.

6.2. Control Variables

We controlled the effects of seven variables in this study. We selected the control variables based on previous literature that suggested they would have an influence on the purchasing decisions of consumers. Three of the seven controls were able to be analyzed due to a high degree of statistical significance.

Annual Household Income level. An increase in family income correlated negatively with the preference for conventional table eggs ($\beta = -0.07, p < 0.05$). No significant relationship existed for a household’s income and their desire for table eggs with more humane animal practices.

Upbringing. The greater the population size of the town in which one grew up negatively correlates to their decision to purchase conventional table eggs ($\beta = -0.17, p < 0.1$). There is no significant relationship that exists between the landscape of an individual’s upbringing and their purchasing habits for specialty table eggs.

Gender, Age, Household Size, and Church Affiliation. Neither gender, age, household size, nor church affiliation represented a significant relationship between the preference of specialty or conventional table eggs.

Pet Ownership. There is a positive correlation among individuals who do not own a pet and their purchase inclination for conventional eggs ($\beta = 0.36, p < 0.05$) and, consequently, a negative relationship among non-owners of a pet and their preference for specialty table eggs ($\beta = -0.40, p < 0.05$).

Table V: Results of Hierarchical Linear Regression for Conventional Table Eggs

	Conventional Egg Beta	Hypothesis Support/Reject
Gender	-0.05	
Age	0.01	
Household Size	0.03	
Household Income	-0.07**	
Upbringing	-0.17*	
Church Affiliation	0.04	
Pet Ownership	0.32*	
Zoocentric	0.11	H4 not supported
Anthropocentric	0.54***	H1 supported
Adjusted R ²	0.14	
R ²	0.18	
F-statistic	4.11	
VIF	1.79	
Durbin-Watson	2.00	
Number of Observations	176	

Table VI: Results of Hierarchical Linear Regression for Specialty Table Eggs

	Specialty Egg Beta	Hypothesis Support/Reject
Gender	0.29	
Age	0.03	
Household Size	-0.01	
Household Income	0.05	
Upbringing	0.16	
Church Affiliation	0.01	
Pet Ownership	-0.34*	
Zoocentric	0.20*	H3 supported
Anthropocentric	-0.49***	H2 supported
Adjusted R ²	0.19	
R ²	0.23	
F-statistic	5.57	
VIF	1.79	
Durbin-Watson	2.00	
Number of Observations	176	

Notes: *p-value < 0.1; **p-value < 0.05; ***p-value < 0.01

Table VII: Variables Descriptive Statistics

	Mean	Standard Deviation	Scale
Gender	1.42	0.50	1-2
Age	3.14	0.93	1-5
Household Size	2.92	1.35	1-7
Household Income	4.11	2.54	1-7
Upbringing	3.11	0.82	1-4
Church Affiliation	1.32	0.47	1-2
Pet Ownership	1.27	0.44	1-2
Zoocentric	3.73	0.92	1-5
Anthropocentric	2.37	0.75	1-5
Conventional Eggs	2.19	1.04	1-5
Specialty Eggs	1.95	1.23	1-5

Table VIII: Correlation Matrix

	Gender	Age	HH_ Size	HH_ Income	Upbringing	Religion	Pet	Zoo- centric	Anthropo- centric	Con_ Eggs	Spec_ Eggs
Gender	1										
Age	-0.30**	1									
HH_Size	-0.01	-0.40**	1								
HH_Income	0.11	-0.25**	0.53**	1							
Upbringing	-0.06	0.00	0.27**	0.20**	1						
Religion	0.05	0.16**	-0.23**	-0.23**	-0.08	1					
Pet	-0.10	-0.03	-0.02	-0.15*	0.05	-0.01	1				
Zoocentric	0.42**	-0.06	-0.11	0.01	0.04	0.16*	-0.03	1			
Anthropo	-0.26**	-0.03	0.29**	0.11	0.09	-0.27**	-0.05	-0.43**	1		
Con_Eggs	-0.11	0.02	-0.01	-0.17*	-0.12	-0.03	0.14	-0.09	0.32**	1	
Spec_Eggs	0.27**	-0.03	-0.05	0.10	0.09	0.09	-0.14	0.34**	-0.38**	-0.86**	1

Notes: *p-value < 0.1; **p-value < 0.05; ***p-value < 0.01

7. Discussion

7.1. Hypotheses

Other studies have reached the conclusion that price was the leading deciding factor when consumers purchased conventional table eggs (Bejaei, Wiseman, Cheng, 2015). Similarly, the probability of consumers purchasing table eggs that came from hens that were not caged was greater for the respondents who indicated their rating of “care and feeding of hens” as important (Bejaei et al., 2015, p. 431). We extend this by indicating why people make these decisions. Consumers who were aligned most closely with zoocentric ideals were positively associated with the purchase of specialty table eggs. Survey participants were asked to indicate the last price they paid for a carton of eggs. As seen in Table IX, individuals who associate most closely with zoocentric ideology on average pay \$1.36 more for a carton of table eggs than anthropocentric-oriented consumers. This held to be consistent with the results in this study that individuals who associate with zoocentrism are more willing to pay a higher price for table eggs.

Table IX: Most Recent Price Paid
Descriptive Statistics

	Mean	Standard Deviation
Zoocentric	\$3.73	0.92
Anthropocentric	\$2.37	0.75

We then ran a test to determine the association between consumers’ viewpoints on animal welfare and their willingness to pay for specialty table eggs. Table X explains the relationships that were revealed. We found that the more anthropocentric-minded an individual is, the less willing they are to pay the purchase price of specialty table eggs. Whereas, there is no significant relationship that exists among individuals with zoocentric views and the price they are willing to pay for eggs that contain specialty attributes. This contradicts what was tested earlier in the study. In the first part of our analysis, we found that the more zoocentric-minded a consumer was, the more apt they would be to purchase table eggs that resemble specialty traits. However, when we asked the participants the price they last paid for a carton of specialty eggs, their responses did not statistically align with what was previously found. This may be due to zoocentric consumers supporting the improvement of animal welfare conditions, but ultimately viewing price to be the leading deciding factor in their table egg purchase. Therefore, some zoocentric consumers are price elastic when it comes to the purchase of specialty table eggs.

Table X: Purchase Price Correlation Matrix

	Zoocentric	Anthropocentric	Purchase Price
Zoocentric	1		
Anthropocentric	-0.43**	1	
Purchase Price	0.02	-0.17*	1

Notes: *p-value < 0.05; **p-value < 0.01

Contrary to the expectation that consumers who share zoocentric viewpoints would be less apt to purchase conventional table eggs, there was no significant relationship evident that confirmed this belief. This suggests that individuals are willing to sacrifice their personal beliefs for price.

7.2. Purchase Price

We performed a post hoc analysis to determine if consumers were willing to pay the price of a variation of specialty table eggs currently out on the market. This helped determine if consumers were ultimately influenced by price rather than ethical animal production systems. We listed the attributes that encompass each egg type prior to asking the survey participants the price they would be willing to pay. Therefore, allowing respondents to knowledgeably indicate the price they would be willing to pay for each type of specialty table egg. A rule was established for respondents that indicated a range that they would be willing to pay for particular egg types. We took the average for the range in which they specified they were willing to spend. Table XI summarizes the average price the survey participants were willing to pay for each egg type, as well as the average price for a carton of specialty table eggs in Arkansas. The average price was recorded from local grocery stores such as Harps, Walmart, and Ozark Natural Foods.

The average respondent in the survey indicated that they would be willing to spend \$2.29 on organic table eggs. According to the average price for a carton of eggs in Arkansas, the majority of respondents are not willing to pay the actual price for a carton of organic eggs. In fact, we determined that only two percent of respondents were willing to pay the price for organic eggs.

The same conclusion held to be true for other forms of specialty table eggs. The egg type that most consumers were willing to pay for were cage-free, which represented 27 percent of survey participants. 18 percent of respondents were willing to pay the price of \$3.39 for free-range eggs, and only one percent of sampled consumers indicated that pasture-raised eggs were worth the price. Accordingly, consistent with our earlier analysis, these findings suggest that the power of zoocentrism is only relevant up to a point where price becomes more important.

Table XI: Purchase Price Consumers are willing to pay vs. Actual Price

	Organic	Cage-Free	Free-Range	Pasture-Raised
Respondent's Mean	\$2.29	\$1.98	\$2.33	\$2.49
Respondent's Standard Deviation	1.00	1.00	1.14	1.26
Number of Observations	138	141	138	139
Store Price Mean	\$4.31	\$2.98	\$3.39	\$5.59
Δ^a	\$2.02	\$1.00	\$1.03	\$3.10

^a Difference in respondent's mean and actual store price mean

7.3. Control Variables

Upbringing. An individual's upbringing is an indicator of their purchasing decision of conventional table eggs. Individuals who reside in a rural area are likely to be less concerned with the different production systems, possibly due to exposure to the environment at a young age (Cornish et al., 2016). Individuals raised in a city or metropolitan area may have never been aware of the level of intensity of production systems. Therefore, when they witness the treatment of farm animals for the first time, their concern is likely amplified, and they are consequently more likely influenced to change their future purchasing decisions or become more willing to pay a premium price for products with improved welfare conditions (Cornish et al., 2016).

Church Affiliation. Religiosity has been determined to affect a consumer's preferences and behavior in their shopping habits. Religiosity has also shown to be one of the most key influences in buying behavior, often due to a family's cultural beliefs (Sood, Nasu, 1995). The degree to which a person follows their religious beliefs in daily life and is committed to their faith affects their consumer behavior (Johnson, Jang, Larson, Li, 2001).

Although this study revealed no significance on the influence religion has on one's purchasing decision, prior studies have shown a relationship (Cornish et al., 2016). Attending a church of any denomination has been previously recognized to be associated with a diminished concern for animal welfare conditions. This may be due to the belief that in the Christian faith, God is the most important entity. The Bible verse from Genesis 9:3 states, "Every moving thing that lives shall be food for you" (Genesis 9:3 The Holy Bible). With knowledge of Genesis 8:20, "Then Noah built an altar to the Lord and, taking some of all the clean animals and clean birds, he sacrificed burnt offerings on it," and Exodus 12:8 when the Lord allowed His people to use the flesh from these clean sacrifices as food, it can be concluded that the reference of 'moving things' in Genesis 9:3 is referencing clean animals (e.g., Genesis 8:20 and Exodus 12:8).

7.4. Marketing Segment

A study has indicated that labeling on egg cartons can be unclear to consumers (Daley, 2014). Less than one in four consumers actually search for the term, pasture-raised, when wanting to purchase the synonymous egg type (Daley, 2014). Even if a consumer intends to purchase pasture-raised eggs, they confuse the qualities of pasture-raised table eggs with characteristics that compose cage-free table eggs and free-range table eggs (Daley, 2014). Consumers have difficulty understanding the differentiation between the specialty egg types. The assortment of brands, claims, prices, and variation in egg types can be overwhelming and confusing to the consumer. This is why the promotion aspect in marketing is imperative for specialty table egg producers.

For many consumers, how the hen was raised and where the egg came from is equally as important as the end-product. This information can be communicated to the consumer through marketing and advertising. To provide validity of marketing claims, some producers find it essential to receive a United States Department of Agriculture (USDA) certification on their cartons (Morris, 2016). Egg cartons that obtain the USDA Grade Shield must maintain stringent quality standards with bi-annually farm inspections (Morris, 2016). The Agriculture Marketing Service ensures that the quality and marketing claims of table eggs are verified (Morris, 2016).

In addition to certifications being present on packaging, companies believe that other packaging attributes help the eggs to sell itself. Companies such as Happy Egg, Eggs for Soldiers, and Claytons believe that colorful, bold, and bright packaging will help draw positive attention to their product (e.g., Clarke (2013) and Casey (2011)). A package that stands out to the

consumer often stimulates the consumer's five senses (Byrne, 2017). Therefore, the intensity of colors in packaging can have an effect on a consumer's shopping behavior (Lane, 2017).

The results gathered in this study can benefit the marketing segment of the egg industry. This study had revealed that there is a relationship between anthropocentric-minded individuals and their preference for table eggs that enlist specialty attributes. Anthropocentric consumers are more willing to pay a premium price for these attributes. Therefore, it is important that suppliers clearly communicate and provide transparency in the characteristics that differentiate their table eggs from conventional alternative.

8. Conclusion

This study analyzed the relationship among two constructs that compose humans' beliefs and consumers' purchasing decision for table eggs. The variation in willingness for consumers to purchase specialty table eggs was dependent on two influential factors: zoocentric ideology and anthropocentric ideology. According to the results, anthropocentric views have a positive influence on a consumer's preference for conventional table eggs and a negative impact on a consumer's favoring specialty table eggs. We determined that an individual who is zoocentric is more willing to pay a premium to purchase specialty table eggs. On the contrary, there is not enough statistical significance to be able to adequately evaluate the relationship among zoocentric-focused individuals and their opposition towards the purchase of conventional table eggs. We found that consumers with high anthropocentric values are more motivated in their purchasing decisions than consumers with zoocentric values. That is, consumers with zoocentric values are not willing to discount purchasing conventional table eggs if the price is right.

8.1. Contributions

Previously, no study has identified the characteristics that create the constructs of zoocentrism and anthropocentrism. A model was developed to determine the most conceptually valid predictors of each ideology. This study established validity of three main attributes that encompass zoocentrism and three traits that make up anthropocentrism. Scales were developed to analyze the relationship with which each consumer associated the two constructs.

While other studies have focused solely on the different physical attributes of an egg or demographic linkage between the different types of eggs, none have tried to link consumers' attitudes toward animal welfare conditions to their purchasing decision of table eggs. We used the two constructs established in this study in a model to estimate the likelihood of purchasing conventional table eggs versus specialty table eggs. We then determined if the two constructs had an effect on a consumers' purchasing decision. Students recorded the price they would be willing to pay for each egg type and indicated the price they most recently paid for a carton of eggs. We then analyzed the consumers' purchasing decision. With this study, we developed the attributes of the two constructs, anthropocentrism and zoocentrism.

8.2. Limitations and Further Research

Restricting the sample to only students enrolled in Introduction to Supply Chain Management class (business students), we likely limited the generalizability of the results. This study used a voluntary and convenience sampling technique from individuals enrolled at the University of Arkansas. Therefore, it is assumed that it does not represent all millennials comprehensively, but rather, predominately business majors and minors that are required to enroll in this course. By understanding the restrictions of the proposed study, we suggest further

research taking into account other geographic areas. In addition, a study representing all age groups remains to be explored.

Social desirability bias must be taken into consideration when asking participants about the price they are willing to pay for products that have distinguished animal welfare conditions. In order to prevent biases, an experimental research design would be applicable for further studies. An experimental research design is more suitable to accurately measure the true price consumers are willing to pay for a carton of table eggs. By using a natural observation method of a consumer in a grocery store, a researcher eliminates the social desirability bias because the consumer is unaware that they are being observed. Therefore, one can investigate in further studies the behavioral purchasing behavior of consumers to determine the actual type of egg purchase consumers prefer, rather than what they claim they purchase. Considering the following limitations, this study awaits further research.

9. Appendix. Survey Questionnaire

Control Variables

1. Indicate your gender. (Gender)
2. Select the category that includes your age. (Age)
3. Indicate your household size. (HH_Size)
4. Indicate your household income range. (HH_Inc)
5. How would you describe the landscape of your upbringing? (Upbringing)
6. Do you have an active religious affiliation? (Religion)
7. Do you own a household pet? (Pet)

Independent Variables

(1 = disagree to 5 = agree)

- 1_1. Humans are the most important animals in the world.
- 1_2. Animals feel the same range of emotions as humans, such as happiness and sadness.
- 1_3. Animals are inferior to humans.
- 1_4. Animals enjoy activities like drinking, eating, and running.
- 1_5. I feel close to animals.
- 1_6. Animals should enjoy their life on Earth.
- 1_7. I sympathize with the conditions of animals.
- 1_8. We should see animal welfare issues from the animal's perspective.
- 1_9. Animals do not feel and sense things the same way as humans.
- 1_10. I sometimes feel guilty about the way animals are treated.
- 1_11. While production systems may not be ideal for animals, it is acceptable because of the benefit to humans.
- 1_12. Animals are important for their own sake.
- 1_13. It is a human right to eat animals.
- 1_14. How an animal lives its life is important.
- 1_15. Animals do not know any difference between production systems, such as animal density.
- 1_16. It is okay to eat animals if they are treated humanely.
- 1_17. Animals should be fed in a way that maximizes food production.
- 1_18. Animal feed should not differ greatly from what they would eat in their natural environment.

Dependent Variables

(1 = disagree to 5 = agree)

- 1_1. I pay more for eggs if they provide higher benefit to me.
- 1_2. I pay a higher price for eggs laid by hens that do not live in cages.
- 1_3. I always purchase the cheapest eggs at the supermarket.
- 1_4. I purchase eggs laid by hens that have enough space to walk and spread their wings.
- 1_5. Price is the most important aspect of purchasing eggs.
- 1_6. I buy eggs laid by hens that were fed natural ingredients, even when it costs more.
- 1_7. My egg purchase depends on price.
- 1_8. I pay more for eggs with high standards for animal welfare and feed.

Willingness to Pay

- 1. If conventional table eggs are priced at \$1.00, how much are you willing to pay for organic eggs?
- 2. If conventional table eggs are priced at \$1.00, how much are you willing to pay for cage-free eggs?
- 3. If conventional table eggs are priced at \$1.00, how much are you willing to pay for free-range eggs?
- 4. If conventional table eggs are priced at \$1.00, how much are you willing to pay for pasture-raised eggs?

Table Provided for Questions 1-4

Conventional	Organic	Cage-Free	Free-Range	Pasture-Raised
Feed is not regulated	Organic feed with no genetically modified organisms	No regulation of feed	Prohibits use of animal byproducts in feed	Prohibits use of animal byproducts in feed
Beak cutting and molting allowed	Beak cutting and molting allowed	Beak cutting and molting allowed	Beak cutting allowed, forced molting prohibited	Beak cutting allowed, forced molting prohibited
Caged with no outdoor access	Required access to the outdoors and prohibits cages	Prohibits cages but does not require access to the outdoors	Requires access to the outdoors (21.8 sq. ft. per bird) and prohibits cages	Requires access to the outdoors for six hours a day (108 sq. ft. per bird) and prohibits cages
Antibiotics supplied	Prohibits use of antibiotics	No regulation of antibiotic use	Prohibits use of growth promoters	Prohibits use of growth promoters

Purchase Price

- 1. About how much did you pay for your last carton of eggs you purchased?
 - Less than \$1.00
 - \$1.00 - \$1.99
 - \$2.00 - \$2.99
 - More than \$3.00

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