Research

College Students' Perceptions regarding Sensory Aspects of Conventionally Produced and Unconventionally Produced Foods: Implications for Marketing to the Millennial Generation

Christina M. Crowder, Catherine W. Shoulders and K. Jill Rucker

Abstract

Every day consumers vote which products line the shelves of grocery stores, co-ops, and niche markets by use of their dollars. Public unrest with regard to the environment, animal welfare, food purity, and human health impacts of agricultural production practices have led to the rise of alternatively produced food products. While the sales of alternatively produced foods are increasing, studies regarding the qualities of such products impact consumer purchases have yielded inconsistent results. This study examined students' perceptions of sensory aspects of conventionally produced and alternatively produced foods to better understand how sensory aspects impact decisions to purchase. Students reported consistent perceptions regarding the favorability of each sensory aspect of chicken and apples; the alternatively produced versions of the products yielded higher mean scores on every sensory aspect. However, students' perceptions of the sensory qualities of chocolate, milk, and beef were not consistent; for example, they reported more favorable perceptions of the appearance and smell of conventionally produced milk, but perceived a more favorable texture and flavor from the alternatively produced milk. The results of this study imply when making purchasing decisions, consumers may value specific sensory attributes over others. An alternative approach to marketing alternatively produced products is to focus on valued extrinsic aspects designed to attract consumers to purchase products in spite of their perhaps less valued perceptions of sensory aspects.

Key Words

Marketing, organic foods, sustainability, sensory aspects, millennial generation

Introduction

Consumers vote every day on which products line the shelves of grocery stores by use of their dollar. Previously, consumer preferences spurred the creation of convenient and health-conscious food products (Drache, 1996). However, as agricultural technologies enable more people to work in areas outside of agricultural production, public concern regarding production practices has increased (Dimitri, Effland, & Conklin, 2005). Public unrest with regard to the environmental, animal welfare, food purity, and health impacts of agricultural practices have led to the rise of niche food products, which boast the use of unconventional production practices on the label (Laux, 2013; GRACE Communications Foundation, 2013). These alternatively produced (AP) products are labeled with messages such as organic, grass fed, locally grown, antibiotic free, hormone free, pasture raised, free range, and cage free (GRACE Communications Foundation, 2013), but they are delivered to the consumer in retail products comparable to conventionally produced (CP) products. For example, consumers can purchase both CP and AP whole apples, chicken breasts, cartons of milk, and bars of chocolate.

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The power of consumers' choices regarding CP and AP food products has had a direct impact on agricultural production. Since 1997, sales of organic food have risen from $3.6 billion to $31.5 billion, suggesting heightened consumer awareness about their foods' sources and production methods (Organic Trade Association, 2012). From 2009 to 2010, the production of organic foods rose 7.7%. Currently, organic food constitutes 4% of all food sold in the United States, with organic fruits and vegetables making AP 11% of all fruit and vegetable sales (Organic Trade Association, 2011). The availability of AP foods in mainstream retail locations also has increased, enabling consumers to make their purchasing decisions without sacrificing convenience (Dimitri & Richman, 2000; Jargon, 2013; Organic Trade Association, 2011).

In spite of the growth within the AP food industry, marketers lack a solid plan for advertising AP foods to potential consumers, partially because individuals' interpretation of the terms associated with AP foods varies (Hughner, McDonagh, Prothero, Schults II, & Stanton, 2007; Yiridoe, Bonti-Ankomah, & Martin, 2005). Through a review of research, Hughner, et al. (2007) found consumers could not distinguish organic from conventional food and recommended marketers work to "better convey relevant information to consumers" (p. 106). With consumers making purchasing decisions based on their subjective experiences and perceptions of specific AP and CP foods, a better understanding of how consumers perceive these foods can help marketers advertise products accordingly (Hughner, et al., 2007).

While the current market for AP products appears to be made of older individuals (Roddy et al., 1996; Schifferstein & Ophius, 1998; Cicia, Del Guidice, & Scarpa, 2002), studies have shown the millennial generation to be more health and environmentally conscious while paying special attention to the ethical standards of food production (Pelletier, Laska, Nuermark- Sztainer, & Story, 2013). Within higher education, students in the millennial generation are exposed to frames of universalism through green movements, sustainability degree programs and consortiums, building construction and sustainability-based retrofits, and student sustainability awareness groups (Office for Sustainability, n.d.). Surveys have shown the completion of a postsecondary degree is a consistent attribute among all consumers of unconventional products, but there is little data on the likelihood of those pursuing postsecondary education to purchase AP foods before the expected associated increase in income (Byrne, Toensmeyer, German & Muller, 1991). What data is available suggests the increased price of AP foods may prevent those otherwise willing to purchase from doing so until they reach higher income brackets following graduation (Hughner, et al., 2007; Magnusson, Arvola, Hursti, Aberg, & Sjoden, 2001). The trends within the millennial generation to invest in aspects of sustainability, partnered with their rise in post-graduation employment in the upcoming years suggest marketing CP and AP products according to the subjective perceptions of this population can impact CP and AP sales in the future.

Theorectical Framework

This study was guided by the Total Food Quality Model (Grunert, Larsen, Madsen, & Baadsgaard, 1996), which depicts the combination of factors that influence a consumer's perceptions regarding food quality and, in turn, intentions to purchase. While the overall theory is a holistic approach to addressing the time and inference-making aspects that influence future purchases (Grunert, et al., 1996), this study focused strictly on the sensory aspects that influence perceived quality. The Total Food Quality Model incorporates a means-end approach to explain how the perceptions of food quality influence consumers' intention to purchase the product (Grunert, 2005). Intrinsic cues, which refer to the physical properties of the product like smell, appearance, taste, and flavor (Olson

& Jacoby, 1972), are evaluated both before a purchase and after a purchase. Before a purchase, experienced intrinsic quality cues are limited to appearance and smell, while the remaining sensory-based intrinsic cues of taste, texture, and the like are expected. These cues are experienced after a purchase, during the eating experience. Partnered with extrinsic quality cues, cost cues, and aspects of meal preparation and the eating situation, intrinsic cues influence future purchasing decisions. Research has shown intrinsic cues can be utilized by marketers to influence consumers' perceptions of product quality (Grunert, Bredahl, & Brunso, 2004). However, the intrinsic cues marketers use must be those in which consumers feel confident (Cox, 1967). For example:

> When asking consumers which information about a piece of meat they believe to be predictive of taste and tenderness, many consumers believe information about breed, age of animal, and slaughtering date are predictive of these qualities, but few consumers feel confident in using them, i.e., making the right inferences based on this type of information. Thus, consumers end up making inferences based on cues with which they feel confident, such as colour of meat and visible fat content, even though they may be aware of the fact these characteristics are not always highly predictive of taste and tenderness (Grunert, 2005, p. 376).

Therefore, the intrinsic cues used by marketers to influence consumer perceptions regarding product quality can focus on sensory characteristics, as these are intrinsic cues about which the consumer feels confident using to evaluate quality. Cox (1967) stated consumers prefer intrinsic cues to align with the product quality they want to evaluate, suggesting an examination of the intrinsic cues millennials value when considering the consumption of CP and AP products can aid marketers in determining appropriate cues to use in their marketing.

The use of sensory aspects to better understand the intrinsic cues valued by consumers is not new; however, the role sensory aspects play in consumers' decisions to purchase CP or AP products is inconsistent (Bourn & Prescott, 2002). In 1989, Jolly, Schutz, Diaz-Knauf, and Johal reported flavor was less important to consumers than the extrinsic cues of safety, freshness, general health benefits, nutritional value, and effect on environment when purchasing organic foods. Further, studies have shown dissatisfaction with the appearance of organic foods has led consumers to perceive it to be of poor quality (Hack, 1993; Jolly & Norris, 1991; Roddy, Cowan, & Hutchinson, 1994). With regard to specific foods, consumers did not perceive differences in organic and conventional oranges, grapefruits, bananas, mangos, white grapes, tomatoes, spinach, carrots, or sweet corn (Basker, 1992). However, trained panelists were able to consistently report CP carrots had better taste than ecologically grown carrots, which had a bitter flavor (Haglund, Johansson, Berglund, & Dahlstedt, 1999). Organic apples have been previously found to be sweeter and less tart than CP apples, but they did not differ in overall acceptance (Reganold, Glover, Andrews, & Hinman, 2001). Zhao, Chapbers IV, Matta, Loughin, & Carey (2007) did not find significant differences in consumers' overall liking and intensity of overall flavor between a variety of organic and CP vegetables, but they did find a significant difference in consumers' perceptions of flavor intensity between organic and CP tomatoes. Further, they noted age was a significant covariate in consumers' perceptions of organic and CP cucumbers. They recommended "further studies … confirm and investigate the extent to which consumer segments have higher preference for organic products" (para. 22).

Purpose and Objectives

The purpose of this study was to evaluate millennial generation members', as accessed through a

university setting, perceptions regarding the sensory characteristics of selected CP and AP foods. To achieve this purpose, the following objectives were developed:

1. To describe students' preferences regarding CP and AP foods.
2. To describe students' perceptions regarding specific CP and AP foods.
3. To determine whether significant differences exist in how those who prefer a CP product perceive qualities of that product versus its AP alternative.
4. To determine whether significant differences exist in how those who prefer an AP product perceive qualities of that product versus its CP alternative.

Methods

This study utilized a nonexperimental comparative design. A convenience sample of undergraduate students at the University of Arkansas (N = 20,350) was recruited to participate via face-to-face methods at a central location on the campus from 5 p.m. to 7 p.m. during a publicized "food tasting" event. Sample size was calculated according to Israel (1992) and was determined to be 100 for a 10% precision level and confidence level of 95%. Students were offered samples of conventional and nonconventional foods, as was indicated on the food labels (see Table 1).

Table 1
CP and AP Foods Offered

	Conventionally Produced	Alternatively Produced
Milk	2%	Organic 2%
Chocolate	Milk	Organic Milk
Beef	Conventionally raised	Grass-fed
Chicken	Conventionally raised	GMO-Free, Pasture-raised
Apple	Pink Lady	Organic Pink Lady

Upon completion of the food sampling, participants were offered a paper-based, researcher-developed questionnaire. The questionnaire included 23 Likert-type items asking participants to indicate their level of agreement with statements that expressed favorability with regard to food appearance, smell, texture, and flavor. Participants then were asked to select whether they preferred the CP or AP produced variety of each food. The survey was reviewed by a panel of experts in survey construction for face and content validity. Because responses were dependent upon the food tasted, the calculation of test-retest reliability was not deemed appropriate. Data were analyzed using SPSS. Frequency, means, and standard deviations were calculated for the first and second objective, which are descriptive in nature. The third and fourth objectives were carried out through the use of dependent samples t-tests. The following null hypotheses were tested:

$H0^{1}$: There is no significant difference in perceptions of CP and AP milk, chocolate, beef, chicken, and apple appearance, smell, texture, or flavor among students who prefer CP products.

$H0^2$: There is no significant difference in perceptions of CP and AP milk, chocolate, beef, chicken, and apple appearance, smell, texture, or flavor among students who prefer AP products.

Effect sizes were calculated and interpreted using Cohen's (1988) recommendations.

Findings

Objective 1 was to describe students' preferences regarding specific CP and AP milk, chocolate, beef, chicken, and apples. Results are displayed in Figure 1. Sixty-four percent (f = 64) of students favored AP apples over CP apples, while only 7% of students (f = 7) preferred CP apples. Twenty-eight percent (f = 28) were neutral in their preference. With regard to chocolate, the largest number of students (39%, f = 39) preferred AP, while 27% (f = 27) preferred CP. One-third of students (f = 33) were neutral in their preference. In comparing CP and AP chicken, almost one-half of students (46%, f = 46) preferred the AP chicken (f = 46), while 28% (f = 28) preferred CP chicken. Approximately one-fourth (f = 25) indicated they had no preference. Preferences with regard to beef were even between CP (33%, f = 33) and AP (33%, f = 33), with an equal number of students indicating they had no preference (33%, f = 33). With regard to milk, more students preferred CP milk (24%, f = 24). Twenty-one percent (f = 21) students preferred AP milk, while more than one-half (f = 53) indicated they had no preference.

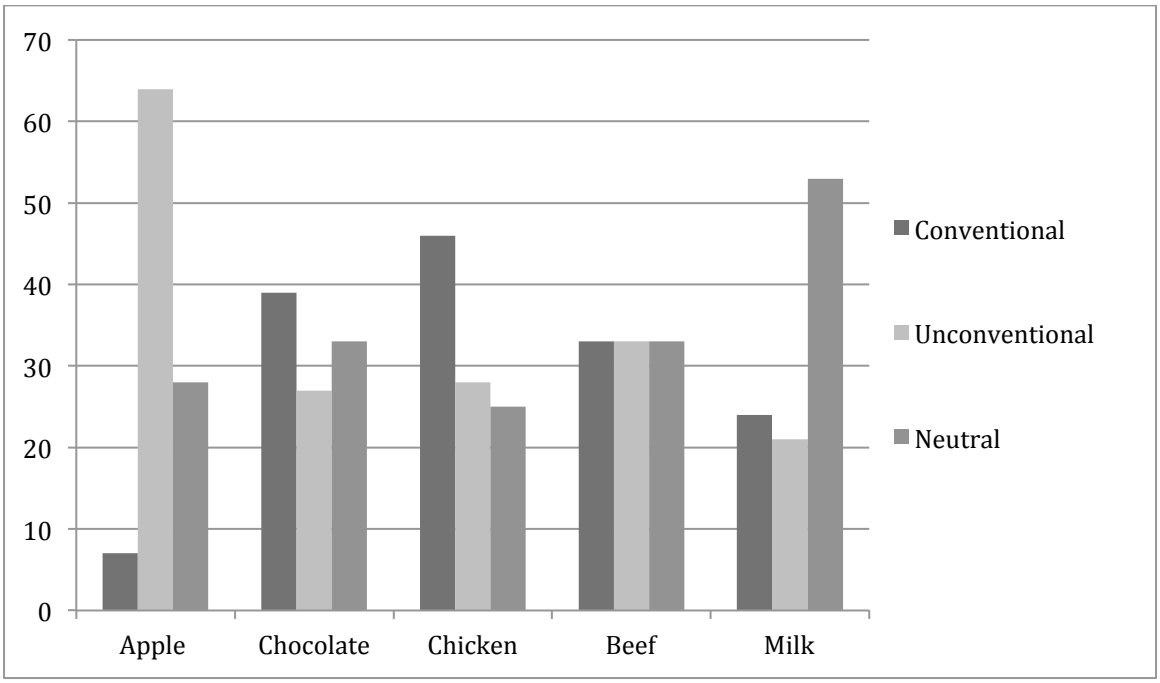

Figure 1. Respondents' preferences with regard to conventionally and AP milk, chocolate, beef, chicken, and apples

Objective 2 was to describe students' perceptions regarding specific qualities of CP and AP foods (see Table 2).

Table 2
Mean Perceptions Scores Regarding Specific Qualities of CP and UP Foods

	Conventionally Produced		Unconventionally Produced	
Item	*M*	*SD*	*M*	*SD*
Milk				
Appearance	3.90	0.83	3.77	1.01
Smell	3.73	0.79	3.70	0.93
Texture	3.79	0.81	4.01	0.85
Flavor	3.68	0.87	3.90	0.87
Chocolate				
Appearance	3.76	0.96	4.18	0.93
Smell	3.83	0.97	4.13	1.00
Texture	3.63	1.08	4.24	0.93
Flavor	3.79	1.13	4.35	0.92
Beef				
Appearance	3.48	1.05	3.04	1.13
Smell	3.49	0.97	3.39	1.05
Texture	3.31	1.04	3.58	1.02
Flavor	3.38	0.98	3.35	1.12
Chicken				
Appearance	3.76	0.96	4.18	0.93
Smell	3.83	0.97	4.13	1.00
Texture	3.63	1.08	4.24	0.93
Flavor	3.79	1.13	4.35	0.92
Apple				
Appearance	3.29	1.20	4.27	0.74
Smell	3.65	0.99	4.27	0.71
Texture	3.67	1.04	4.37	0.68
Flavor	3.88	1.05	4.46	0.73

Students had higher mean perceptions of the CP milk's appearance (M = 3.90, SD = 0.83) and smell (M = 3.73, SD = 0.79) than the AP milk's appearance (M = 3.77, SD = 1.01) and smell (M = 3.70, SD = 0.93). However, students perceived a more favorable texture (M = 4.01, SD = 0.85) and flavor (M = 3.90, SD = 0.87) from the AP milk over the CP milk (M = 3.79, SD = 0.81, M = 3.68, SD = 0.87, respectively). When tasting CP and AP chocolate, respondents held more favorable views of the CP chocolate's appearance (M = 4.33, SD = 0.84) and texture (M = 4.32, SD = .086) over the AP chocolate's appearance (M = 4.28, SD = 0.83) and texture (M = 4.30, SD = 0.86). However, respondents held more favorable views of the AP chocolate's smell (M = 4.31, SD = 0.84) and flavor (M = 4.19, SD = 0.98) when compared to their views of the CP chocolate's smell (M = 4.15, SD = 0.88) and flavor (M = 4.04, SD = 0.97). With regard to beef, respondents held more favorable views toward the CP beef's appearance (M = 3.48, SD = 1.05), smell (M = 3.49, SD = 0.97), and flavor (M = 3.38, SD = 0.98) when compared with their views of the appearance (M = 3.04, SD = 1.13), smell (M = 3.39, SD = 1.05), and flavor (M = 3.35, SD = 1.12) of AP beef.

However, they rated the texture of the AP beef (M = 3.58, SD = 1.02) higher than the texture of the CP beef (M = 3.31, SD = 1.04). When indicating favorability toward the qualities of CP and AP chicken, respondents displayed higher mean scores on the AP chicken's appearance (M = 4.18, SD = 0.93), smell (M = 4.13, SD = 1.00), texture (M = 4.24, SD = 0.93), and flavor (M = 4.35, SD = 0.92) than on the CP chicken's appearance (M = 3.76, SD = 0.96), smell (M = 3.83, SD = 0.97), texture (M = 3.63, SD = 1.08), and flavor (M = 3.79, SD = 1.13).

With regard to CP and AP apples, mean scores indicated respondents held more favorable views toward the AP apple's appearance (M = 4.27, SD = 0.74), smell (M = 4.27, SD = 0.71), texture (M = 4.37, SD = 0.68), and flavor (M = 4.46, SD = 0.73) when compared to the CP apple's appearance (M = 3.29, SD = 1.20), smell (M = 3.65, SD = 0.99), texture (M = 3.67, SD = 1.04), and flavor (M = 3.88, SD = 1.05).

Objective 3 sought to determine whether significant differences exist in how those who prefer a CP product perceive qualities of that product versus its AP alternative. Students who preferred CP milk (f = 24) reported higher mean scores on CP milk's appearance, smell, texture, and flavor than AP milk's appearance, smell, texture and flavor (see Table 3). The difference in their mean scores of the milks' appearance was statistically significant, $t(23) = 2.22$, $p = 0.36$, $d = .45$. The effect size was found to be medium (Cohen, 1988).

Table 3
Perceptions of Qualities of CP and AP Milk among Students who Prefer CP Milk

	CP Milk		AP Milk				
	M	*SD*	*M*	*SD*	*t*	*p*	*d*
Appearance	4.13	0.90	3.50	1.32	2.22	.036	.45
Smell	4.04	0.69	3.63	1.10	2.00	.057	
Texture	3.79	0.72	3.75	1.03	0.189	.852	
Flavor	3.79	0.72	3.29	1.12	1.86	.076	

Students who preferred CP chocolate (f = 28) reported higher mean scores on CP chocolate's appearance, smell, texture, and flavor (see Table 4). The difference in their mean scores of the chocolate's flavor was statistically significant, $t(26) = 3.79$, $p = .001$, $d = .73$. The effect size was found to be medium to large (Cohen, 1988).

Table 4

Perceptions of Qualities of CP and AP Chocolate among Students who Prefer CP Chocolate

	CP Chocolate		AP Chocolate				
	M	*SD*	*M*	*SD*	*t*	*p*	*d*
Appearance	4.41	0.84	4.15	.91	1.27	.215	
Smell	4.37	0.93	4.19	1.00	.795	.434	
Texture	4.48	0.70	3.67	1.70	1.99	.057	
Flavor	4.52	0.75	3.67	1.07	3.79	.001	.73

Students who preferred CP beef (f = 33) reported higher mean scores on CP beef's appearance, smell, texture, and flavor (see Table 5). The difference in their mean scores of the beef's appearance, $t(32) = 3.60$, $p = .001$, $d = .63$, and flavor, $t(32) = 3.23$, $p = .003$, $d = .56$, were statistically significant. Effect sizes were found to be medium (Cohen, 1988).

Table 5

Perceptions of Qualities of CP and AP Beef among Students who Prefer CP Beef

	CP Beef		AP Beef				
	M	*SD*	*M*	*SD*	*t*	*p*	*d*
Appearance	3.67	0.92	2.73	1.13	3.60	.001	.63
Smell	3.64	0.93	3.24	1.17	1.58	.125	
Texture	3.67	0.96	3.30	1.13	1.53	.136	
Flavor	3.76	0.75	3.00	1.09	3.23	.003	.56

Students who preferred CP chicken (f = 28) reported higher mean scores on CP chicken's smell, texture, and flavor (see Table 6). However, they reported higher mean scores on the AP chicken's appearance. Differences in mean scores were not statistically significant.

Table 6

Perceptions of Qualities of CP and AP Chicken among Students who Prefer CP Chicken

	CP Chicken		AP Chicken				
	M	*SD*	*M*	*SD*	*t*	*p*	*d*
Appearance	4.14	0.93	4.21	1.07	0.26	.795	
Smell	4.07	1.02	3.82	1.12	1.02	.316	
Texture	4.32	0.82	4.11	0.99	0.86	.396	
Flavor	4.32	0.98	4.00	0.98	1.20	.240	

Students who preferred CP apples (*f*= 7) reported higher mean scores on the CP apple's texture and flavor (see Table 7). However, they reported higher mean scores on the AP apple's appearance and smell. Differences in mean scores were not statistically significant.

Table 7

Perceptions of Qualities of CP and AP Apples among Students who Prefer CP Apples

	CP Apples		AP Apples				
	M	*SD*	*M*	*SD*	*t*	*p*	*d*
Appearance	3.71	1.13	4.14	0.69	.891	.407	
Smell	3.71	1.13	4.14	0.69	1.16	.289	
Texture	4.57	0.79	3.86	1.07	1.51	.182	
Flavor	4.71	0.49	3.86	0.90	2.21	.078	

Objective 4 sought to determine whether significant differences exist in how those who prefer an AP product perceive qualities of that product versus its CP alternative. Students who preferred AP milk (*f* = 22) reported a higher mean score on AP milk's appearance, smell, texture, and flavor (see Table 8). Differences in mean scores of the milk's smell, $t(21) = 3.309$, $p = .003$, $d = .71$, texture, $t(21) = 3.521$, $p = .002$, $d = .75$, and flavor, $t(21) = 4.482$, $p < .001$, $d = .96$, were statistically significant. Effect sizes were found to be medium and large (Cohen, 1988).

Table 8
Perceptions of Qualities of CP and AP Milk among Students who Prefer AP Milk

	CP Milk		AP Milk				
	M	*SD*	*M*	*SD*	*t*	*p*	*d*
Appearance	3.82	0.80	4.18	0.85	1.63	.119	
Smell	3.45	0.86	4.09	0.92	3.31	.003	.71
Texture	3.59	0.91	4.23	0.69	3.52	.002	.75
Flavor	3.32	1.00	4.27	0.77	4.48	.000	.96

Students who preferred AP chocolate (f = 38) reported higher mean scores on all four of the AP chocolate's qualities (see Table 9). Differences in mean scores of the chocolate's appearance $t(37) = 3.33$, $p = .002$, $d = .54$, smell $t(37) = 2.66$, $p = .012$, $d = .43$, texture $t(37) = 2.90$, $p = .006$, $d = .47$, and appearance $t(37) = 4.74$, $p < .001$, $d = .77$, were statistically significant. Effect sizes were found to be medium for appearance, smell, and texture and large for flavor (Cohen, 1988).

Table 9
Perceptions of Qualities of CP and AP Chocolate among Students who Prefer AP Chocolate

	CP Chocolate		AP Chocolate				
	M	*SD*	*M*	*SD*	*t*	*p*	*d*
Appearance	4.26	0.86	4.71	0.52	3.33	.002	.54
Smell	4.18	0.83	4.61	0.64	2.66	.012	.43
Texture	4.18	0.83	4.63	0.68	2.90	.006	.47
Flavor	3.89	0.86	4.71	0.65	4.74	.000	.77

Students who preferred AP beef (f = 33) reported higher mean scores on all four of the AP beef's qualities (see Table 10). Differences in mean scores were statistically significant for the beef's appearance $t(32) = 2.20$, $p = .035$, $d = .38$, smell $t(32) = 3.11$, $p = .004$, $d = .54$, texture $t(32) = .65$, $p < .001$, $d = .81$, and flavor $t(32) = 6.20$, $p < .001$, $d = 1.08$. Effect sizes were found to be small to medium for appearance, medium for smell, and large for texture and flavor.

Table 10

Perceptions of Qualities of CP and AP Beef among Students who Prefer AP Beef

	CP Beef		AP Beef				
	M	*SD*	*M*	*SD*	*t*	*p*	*d*
Appearance	2.97	1.13	3.55	1.06	2.20	.035	.38
Smell	3.00	1.00	3.70	0.98	3.11	.004	.54
Texture	2.73	1.04	3.85	0.91	4.65	.000	.81
Flavor	2.82	0.95	4.09	1.04	6.20	.000	1.08

Students who preferred AP chicken (f = 45) reported higher mean scores on all four of the AP chicken's qualities (see Table 11). Mean scores for AP chicken were significantly higher than mean scores for CP chicken with regard to appearance $t(44) = 5.55$, $p < .001$, $d = .83$, smell $t(44) = 3.73$, $p = .001$, $d = .56$, texture $t(44) = 5.56$, $p < .001$, $d = .83$, and flavor $t(44) = 5.73$, $p < .001$, $d = .85$. Effect sizes were found to be large for all qualities with the exception of smell, which was found to have a medium effect size (Cohen, 1988).

Table 11

Perceptions of Qualities of CP and AP Chicken among Students who Prefer AP Chicken

	CP Chicken		AP Chicken				
	M	*SD*	*M*	*SD*	*t*	*p*	*d*
Appearance	3.69	.095	4.53	0.73	5.55	.000	.83
Smell	3.71	0.99	4.40	0.94	3.73	.001	.56
Texture	3.38	1.05	4.44	0.87	5.56	.000	.83
Flavor	3.49	1.20	4.60	0.78	5.73	.000	.85

Students who preferred the AP apple (f = 63) reported a higher mean score for it on all four of the apples' aspects (see Table 12). Mean scores for the AP apple were significantly higher than mean scores for the CP apple with regard to appearance $t(62) = 6.43$, $p < .001$, $d = .80$, smell $t(62) = 5.72$, $p < .001$, $d = .72$, texture $t(62) = 7.18$, $p < .001$, $d = .90$, and flavor $t(62) = 6.05$, $p < .001$, $d = .76$. Effect sizes were found to be medium to large for smell and flavor and large for appearance and texture.

Table 12

Perceptions of Qualities of CP and AP Apples among Students who Prefer AP Apples

	CP Apples		AP Apples				
	M	*SD*	*M*	*SD*	*t*	*p*	*d*
Appearance	3.25	1.23	4.35	0.79	6.43	.000	.80
Smell	3.52	1.08	4.40	0.71	5.72	.000	.72
Texture	3.43	1.08	4.49	0.62	7.18	.000	.90
Flavor	3.65	1.14	4.60	0.64	6.05	.000	.76

Conclusions

With regard to Objective 1, results showed more students preferred AP chicken, chocolate, and apples, while more students preferred the CP milk. Students did not indicate an overall preference between CP and AP beef. These findings are reported by previous positions reporting the millennial generation values AP products (Hughner, et al, 2007).

Objective 2 results demonstrated how students perceived CP and AP foods based on sensory aspects. Students reported consistent perceptions regarding the favorability of each sensory aspect of chicken and apples; the AP versions of the products yielded higher mean scores on every sensory aspect. These findings support those found by Reganold, et al. (2001), who reported panelists described organic apples as sweeter and less tart. However, students' perceptions of the sensory qualities of chocolate, milk, and chicken were not consistent for each product; they reported more favorable perceptions of the appearance and smell of CP milk, but they perceived a more favorable texture and flavor from the AP milk. Students' perceptions of CP chocolate were more favorable with regard to appearance and texture, but less favorable than the AP chocolate with regard to smell and flavor. CP beef yielded greater mean perception scores regarding appearance, smell, and flavor, but the texture of AP beef was perceived as more favorable. These findings are confirmed by the inconsistency found in previous research regarding sensory aspects of CP and AP foods (Bourn & Prescott, 2002) and suggest while sensory-based intrinsic cues may influence a consumer's intentions regarding future purchases (Grunert, et al., 1996), they may create mixed feelings about a product. The conflicting perceptions regarding the sensory aspects of a product imply when making purchasing decisions, consumers may value specific sensory attributes over others, which contributes to the various subjective experiences in which consumers engage with their foods (Hughner, et al., 2007).

Results of Objective 3 indicated students who preferred CP milk displayed significantly higher scores on the CP milk's appearance when compared to their scores on the AP milk's appearance. However, results from Objective 4 indicated students who preferred AP milk reported significantly higher scores on the AP milk's smell, texture, and flavor.

Differences in the perceptions of sensory aspects between those who prefer different products is expected according to the Total Food Quality Model (Grunert, et al., 1996). Further, the notion numerous sensory aspects of a product can yield different results with regard to favorability, i.e., smell of a product may be perceived as favorable but appearance or flavor may be perceived as unfavorable,

is also well researched (Haglund, et al., 1999; Reganold, et al., 2001; Zhao, et al., 2007). However, the notion consumers' priorities among the various sensory aspects, partnered with their perceptions of those aspects, influences decisions to purchase was not found in previous literature. Results showing those preferring CP milk and those preferring AP milk perceived significant differences in sensory aspects of the milk samples imply that while their perceptions of the sensory aspects of the two products differ, those who in turn impacted their preferences may differ, as well.

Students who preferred CP chocolate scored it as significantly more favorable than the AP chocolate in flavor. However, those who preferred AP chocolate reported significantly higher scores on its appearance, smell, texture, and flavor when compared to scores on CP chocolate. As was observed with student preferences regarding milk, the sensory aspects valued by those who preferred CP and AP chocolate differed. Findings suggest while flavor was a factor in determining a preference for CP chocolate, all four aspects were valued by those who preferred AP chocolate. Similar conclusions can be drawn with regard to CP and AP beef. Students who preferred CP beef displayed significantly higher scores on its appearance and flavor while those who preferred AP beef displayed significantly higher scores on all four aspects.

While no statistically significant differences were found among the perceptions of CP and AP chicken among students who preferred CP chicken, these students indicted the AP chicken had a more favorable appearance. This conflicts findings reported in previous studies that consumers were persuaded not to buy organic versions of food based on appearance (Hack, 1993; Jolly & Norris, 1991; Roddy, et al., 1994). Results suggest students preferring AP chicken value the sensory aspects of smell, texture, and flavor of the chicken products differently than those who preferred the CP chicken, as those students reported significantly higher scores on those aspects of the AP chicken, in addition to appearance.

While no significant differences were found between scores of sensory aspects among students who preferred CP apples, these students reported more favorable perceptions of the CP apple's texture and flavor, but less favorable perceptions of the CP apple's appearance and smell when compared to the AP apple. These findings are in conflict with those of Hack (1993), Jolly and Norris (1991), and Roddy, et al. (1994), who each reported the appearance of organic foods was negatively perceived. Those who preferred the AP apple reported significantly higher scores on all four of the AP apple's sensory aspects. These results imply students who prefer CP apples may do so based on the sensory qualities of texture and flavor, but if their value of appearance and smell aspects increase, they may alter their preference to favor the AP apple.

Findings led the researchers to partially retain Null Hypothesis 1; significant differences were found in perceptions of CP and AP milk, chocolate, and beef sensory aspects, but were not found in perceptions of chicken and apple sensory aspects among students who prefer CP products. Researchers rejected Null Hypothesis 2; significant differences were found in perceptions of CP and AP milk, chocolate, beef, chicken, and apply sensory aspects among students who prefer AP products.

Recommendations

The results and conclusions of this study yield recommendations for both future research and those marketing CP and AP products. This study was conducted at one institution and should be replicated with other members of the millennial generation, both within and outside of the postsecondary educational environment. A main limitation of the study is the lack of a blind sensory panel, which

was not feasible within the event in where the panel took place; participants were aware of the production method of each food as they were assessing sensory aspects, which could have impacted their perceptions and, therefore, presented a threat to the internal validity of the study. The researchers recommend future research be conducted using a blind sensory panel to enhance validity. Further research also should be conducted using qualitative and quantitative methods to more fully understand how individuals value different sensory aspects and how those values influence consumer decisions. Finally, the Total Food Quality Model incorporates sensory aspects as one form of intrinsic cue combined with extrinsic cues and the food preparation and eating experiences. Researchers should design studies to evaluate more holistically the influence of combinations of these factors to determine how marketing can most effectively influence consumer purchasing decisions.

Those marketing CP and AP products should focus on the millennial generation as an audience from which increased concern in food production practices will be seen. Agricultural communicators should focus on enhancing consumer awareness of the sensory aspects valued by those who prefer that product. For example, when marketing AP chicken, communicators should highlight the appearance of the product to attract consumers typically purchasing CP chicken, as this group reported higher scores regarding AP chicken over their preferred CP chicken. An alternative approach when marketing AP products is to focus on valued extrinsic aspects, such as environmental improvement, in communications designed to attract consumers to purchase products in spite of their perceptions of sensory aspects, which may be valued less than extrinsic aspects (Jolly, et al., 1989).

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About the Author

Christina Crowder is a senior honors student majoring in Food, Human Nutrition, and Hospitality with a Dietetics Concentration. Catherine W. Shoulders is faculty mentor and assistant professor in the Department of Agricultural Education, Communication, and Technology. K. Jill Rucker is a faculty mentor and assistant professor in the Department of Agricultural Education, Communication, and Technology.