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# Focus groups exploring American consumer perspectives on contemporary poultry production reveal critical insights to educate sustainable practices for producers

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Ensuring sustainability in poultry production is complex and requires a multifaceted approach that considers human health and food security, bird health, the environment, and society. Consumers are critical stakeholders, yet their growing disconnection from agriculture production practices complicates efforts to achieve more sustainable systems. This study aims to gain insights into consumers' attitudes toward poultry and perceptions of contemporary production methods. Exploration of consumer perspectives would offer valuable insights that could educate producers on the priorities of the target market and make informed decisions about embracing practices to increase the sustainability of their operations. In this context, eight focus group discussions (FGDs) were conducted with 54 multicultural participants who consume chicken and reside in Minnesota, USA. The major themes that emerged from the FGDs include (1) purchasing and consumption habits, (2) concerns regarding production methods, (3) the impact of social, religious, and cultural factors, (4) familiarity with poultry production practices, and (5) the importance of educating consumers. The study revealed that convenience, affordability, and health benefits are positive drivers of poultry consumption. While participants exhibited a greater preference for the flavor of dark (leg and thigh) meat, they often chose breast meat for its ease of preparation and perceived health benefits. Concern for human health tended to take precedence over ethical claims associated with animal welfare. Furthermore, misconceptions emerging from skepticism and unfamiliarity with regulations and the labeling of poultry products may deter the acceptability of higher costs. Many participants identified knowledge gaps and sought science-based information from reliable sources. They conveyed the necessity of outreach and education for consumers in more engaging and accessible forms of communication. The well-established reputation of poultry as a healthy, convenient, and affordable source of protein is the main driver for its consumption. Learning the attributes they believe are significant and underlying motivations or obstacles to consumption can

be beneficial in developing effective strategies to promote the adoption of sustainable practices. Enhancing consumer understanding of sustainable poultry production could influence their acceptance and readiness to absorb the additional costs associated with it.

#### KEYWORDS

consumer attitudes, sustainability, stakeholder engagement, focus group discussions, purchasing decisions, poultry

## 1 Introduction

The poultry industry has experienced remarkable growth in the past few decades and has given rise to increasingly efficient and productive birds. The Food and Agricultural Organization (FAO) reports that an increased preference for white meat will lead to long-term and escalating global trends in poultry consumption. Poultry meat will be the most significant contributor to global animal protein consumption, accounting for 47% within this category (OECD and FAO, 2023b). It is also estimated that the increasing share of poultry in meat production will mitigate greenhouse gas emissions in the meat sector by 2031, lowering the projected increase from 15% to 9% (OECD and FAO, 2023a). In contrast to the birds produced in 1957, a 400% increase in growth has been observed in modern-day broilers, which simultaneously have a 50% lower feed conversion ratio, meaning more chicken meat per pound of feed consumed (Zuidhof et al., 2014). As feed represents the largest expense associated with food-animal production, the favorable meat-to-feed ratio provides substantial savings for consumers and plays a vital role in ensuring food security for a growing global population with an increasing appetite for protein.

The milestones achieved within the poultry industry tend to be overlooked by the general population, which grows increasingly disconnected from food production. Thus, consumer concerns and misconceptions surrounding modern production practices have increased alongside the growing gap between them and the agricultural sector (Sutherland et al., 2020). Contemporary poultry production in the United States includes a variety of production systems that are broadly categorized as either conventional or alternative. For instance, to be eligible for organic certification, poultry farmers must comply with the standards in the United States Department of Agriculture (USDA) organic regulations specified in 7 CFR §205. This includes specifications on the origins and breeds of the birds, their nutrition, healthcare, living conditions, handling and management practices, and the necessary record-keeping to meet labeling regulations (Coffey and Baier, 2012). Organic poultry production in the United States can be further divided into two models: barn- or pasture-raised. Additionally, the terms commonly associated with poultry and egg production include “cage-free,” “free-range,” and “local.”

Despite the profound impact of the intensification of agricultural production systems on food availability and resource utilization, the public perceives that animal production is shifting from a traditional agrarian system to an industrially intense one (Fraser, 2008). This is reflected in the vocabulary incorporating

industrial metaphors, where animals are likened to machines and farms to factories, raising concern for animal welfare in these systems (Fraser, 2014). Considerable ambiguity exists among consumers around the use of antibiotics in food animal production. Although the industry has resolved to use antibiotics only for therapeutic purposes and by veterinarian’s prescription, a large segment of consumers had limited knowledge about the issue (Adam and Bruce, 2023). These perceptions of conventional agriculture has also led to misconceptions among consumers, such as the inherent safety of organic foods compared to those conventionally produced. Crandall et al. (2009) argue that it may negatively impact organic poultry systems as it may undermine consumer adherence to recommended precautions related to food handling. Furthermore, the added premium associated with organic meats compared to conventional products continues to be a barrier to their purchase among consumers (Van Loo et al., 2010). This is because the prices of organic feed are typically double or triple the price of their conventional counterpart (Coffey and Baier, 2012).

“Sustainable agriculture” is an integrated production system with site-specific applications that meets human food needs, enhances environmental quality, optimizes resource use, ensures farm economic viability, and improves the quality of life for farmers and society (7 U.S. Code § 3103). World hunger notably increased in 2021, with 2.3 billion people lacking access to adequate food, a widening inequality heightened by the pandemic (FAO, 2022). According to the Food and Agriculture Organization of the United Nations (FAO), livestock production supports the livelihood of at least 1.3 billion people globally and supplies 34% of global food protein demands (FAO, 2023). The nutrients provided by eggs, milk, and meat are an asset to communities vulnerable to malnutrition and micronutrient deficiencies. Exemplifying this fact, Dammann and Smith (2010) found among low-income American women that Black women spent most of their food dollars on chicken/turkey. Poultry is among the most efficient converters of feed to meat or eggs, enables the cycling of nutrients to the soil through manure, and generally has a lower environmental footprint than other animal production systems.

However, determining which production system is most sustainable would be difficult as both have advantages and disadvantages. A study of broiler production systems in the United Kingdom found that organic and free-range systems typically utilize less gas, oil, and electricity than birds raised indoors. However, these alternative production systems have longer production cycles than their conventional counterparts, leading to greater feed consumption and manure production per bird

(Leinonen et al., 2012). Favorability for alternative production systems is driven by the positive perception of animal welfare, such as the birds' access to fresh air and sunlight, freedom to express natural behaviors, and decreased stocking density. However, their susceptibility to weather conditions and increased mortality due to predation and exposure should also be considered (Pedersen et al., 2003). Fanatico and coworkers also report that the genotype of slow- and fast-growing birds have a more significant influence than housing systems (Fanatico et al., 2005).

Consumers may overlook these factors, such as those in Australia, whose purchase of free-range or cage-free eggs was mainly driven by perceptions of improved quality instead of animal welfare considerations (Bray and Ankeny, 2017). Thus, for the industry to become more sustainable, it would require a better understanding of consumer demands. Collaboration among stakeholders and consumers' choices is critical to sustainable development. Individual consumers' lifestyle choices and dietary patterns ultimately play a crucial role in achieving sustainability (Aschemann-Witzel et al., 2019). In this regard, the objective of this study was to investigate consumer attitudes toward chicken consumption and perceptions of modern poultry production methods through focus group discussions (FGDs), which allow the collection of in-depth insights, real-time feedback, and exploration of diverse opinions on participants' preferences, behaviors, and attitudes (Krueger, 2014). The goal is to use this information to guide poultry producers to understand market priorities better and make informed decisions on adopting practices that benefit poultry, producers, people, and the planet.

## 2 Materials and methods

### 2.1 Focus group recruitment

Eight focus group discussions (FGDs) were conducted in May and June 2022. Six were held at the University of Minnesota's Saint Paul campus ( $n = 38$ ) and two at the Minneapolis American Indian Center ( $n = 16$ ). Participants were consumers of chicken ( $N = 54$ ), aged 18–88 years, and resided within the Minneapolis and Saint Paul area in Minnesota, United States of America (Table 1). They were recruited through flyers posted at community sites such as libraries, grocery stores, restaurants, and cafes and distributed by email. The Institutional Review Board at the University of Minnesota approved the study. The participants gave written informed consent and completed a short questionnaire regarding chicken consumption. Refreshments and food were offered at the start of the session, while participants were asked to complete a brief questionnaire about their basic demographics and preferences. After participating in the focus group, each individual was provided a \$50 gift card to reimburse their time.

### 2.2 FGDs and their analysis

FGDs were conducted using one primary moderator and two co-moderators, with the primary moderator being a trained facilitator with expertise in handling hundreds of focus groups previously. The two co-moderators were experts in their fields of

poultry. The primary moderator ran the group discussions and is an expert in food systems, nutrition, and the use of theoretical frameworks. The co-moderators each had discussion questions they were responsible for. Focus groups collect qualitative data, which is managed differently than quantitative (i.e., measurable) data. Moderators developed open-ended questions framed on a literature review designed to gather information on poultry consumption, knowledge, attitudes, beliefs, and values using the Theory of Planned Behavior as a theoretical framework (Ajzen, 1991). This theory has been utilized previously to investigate decision-making behaviors in both agricultural and health-related issues (Fila and Smith, 2006; Lautenschlager and Smith, 2007). Questions used to obtain information for this study included: "How often do you include chicken meat in your diet; which parts do you like best and why?" "And how do you prepare it?" "What qualities are important to you?" "Why do you eat chicken?" "Is it important to you how chickens are raised?" "What barrier exists to prevent you from eating more chicken?" "Where do you buy chicken, and what factors are you looking for in your chicken?" "Do you believe it is important for you to eat antibiotic-free chicken?" "How important is it to you that chicken production is sustainable?" and "Would you pay more for sustainably produced chicken, why and how much more?"

Each group started with introductions of moderators, and then group members said their first name and answered an "ice-breaker" question, "What is your favorite chicken dish and why?". The primary moderator then told all members their interests to learn their opinions and ideas, that no responses were "right" or "wrong," to respect all comments, and if they disagreed with a comment, that would be fine, but to do so politely. Furthermore, they do not need to say anything if they do not want to respond to a question. Then, the primary moderator started by asking the first question, pausing to allow all to think. And when someone wanted to talk, they did so, and others joined the discussion by raising a hand, and they were called on. A name card was placed in front of each participant. The groups were kept small with six–eight participants for smooth facilitation and that all members were comfortable to talk during the time. If the conversation stopped, the moderator would ask for any comments and continue with the following question. The primary moderator kept the discussion moving forward. When it was time for a co-moderator to start, the primary moderator would identify, and the secondary moderator would start the conversation. A participatory approach was employed to avoid imposing the moderators' values on the participants. Participants were allowed to attend only one FGD so that responses were not researched or rehearsed. Main thoughts were briefly summarized at the end, and participants were asked if they had anything to add. New focus groups were added until the moderators heard no new thoughts or information from the groups. When that occurred, it was concluded that a saturation point had been reached, and no further groups were conducted. We reached that point with eight focus groups with 54 different people for this topic.

All sessions lasted ~120 min, were audio recorded, transcribed verbatim, and double-coded independently using open-coding methods (Corbin and Strauss, 1990; Wiig and Smith, 2009). Because data were qualitative, each focus group was systematically coded for, line by line, by two coding researchers. Each transcript was first independently coded, and once that was completed, coding researchers went through the coded transcript

together. Any differences in coding were discussed and resolved before moving to the following line and next thought. This process took time, as expected, and was systematically done to ensure that coding moderators made the same conclusion, completing the verification process. The codes were subsequently organized into themes and subthemes (Krueger, 2014). They met through ZOOM meetings and discussed thoughts, main codes, themes, and subthemes with the other researchers. The coding researchers then found supporting representative quotes selected from the discussions and took them back to the other researchers who agreed after the discussions. The draft of the manuscript was then prepared and reviewed by all researchers.

## 2.3 Questionnaire data

All subjects completed demographic information and a questionnaire. Data collected through the questionnaire were analyzed using R (version 4.3.0, R CoreTeam) for descriptive statistics. For Table 2, the data are presented as frequency distribution with counts and percentages across each row. Contingency analysis was performed on the data using Chi-squared and Fisher's Exact test ( $P < 0.05$ ).

## 3 Results

### 3.1 Focus group participants' characteristics and questionnaire responses

The sociodemographic characteristics of the 54 participants in the eight FGDs are summarized in Table 1. The average age was 41 years old, with the majority identifying as White (31%), followed by Asian (30%), Native American (24%), Hispanic (7%), and Black (7%) (Figure 1A). Most participants reported their health and diet as "good" and "fair," respectively (Figure 1B). Table 2 illustrates the distribution of food expenditures by sex and the rating of their diets. Among participants who rated their health as "excellent," 67% categorized chicken or turkey as their primary grocery expenditure. By contrast, the individual who reported "poor" health spent most of their money on red meat.

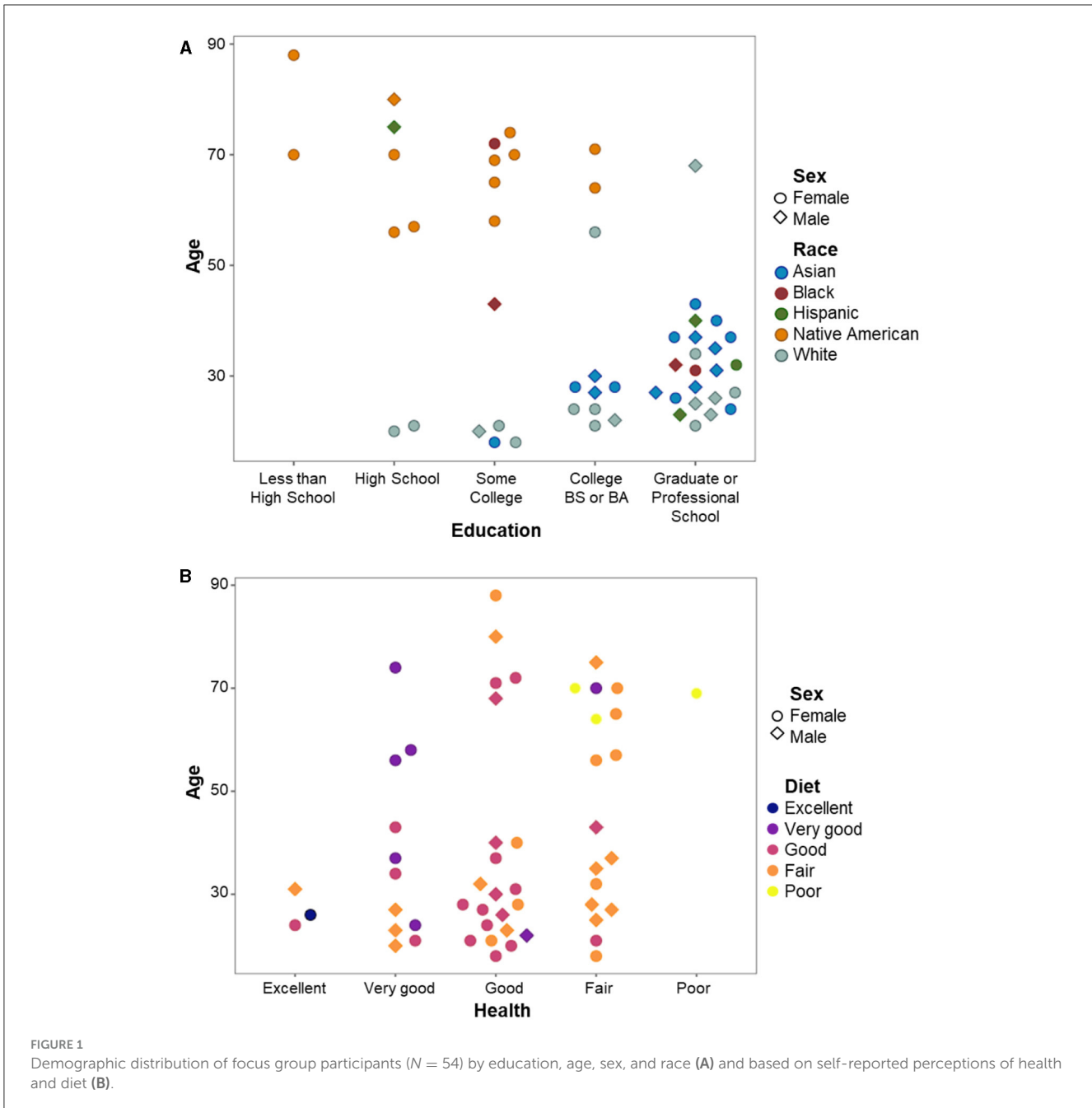
Based on the questionnaire responses, perceived health benefits (70%), personal preference (67%), and cost (54%) were the primary determinants for food purchases (Figure 2). Most participants purchased their chicken from grocery stores (76%) and big box stores (57%), and their preferred method of preparation was frying, while barbecuing was the least common choice. Participants were evenly distributed when reporting the food categories to which they allocated the most money. However, chicken and turkey were slightly more popular than red meat. Most participants preferred buying more fresh vegetables, followed by red meat and fish, if their budget permitted.

TABLE 1 Sociodemographic characteristics of focus group participants (N = 54).

Characteristic		Count (%)
Age range (years)	18–28	23 (43%)
	29–38	10 (19%)
	39–48	4 (7%)
	49–58	4 (7%)
	59–68	3 (6%)
	69–78	8 (15%)
	79–88	2 (4%)
Race	Asian	16 (30%)
	Black	4 (7%)
	Hispanic	4 (7%)
	Native American	13 (24%)
	White	17 (31%)
Annual household income	Unemployed	3 (6%)
	Less than \$10,000	10 (19%)
	\$10,000–\$19,999	12 (22%)
	\$20,000–\$29,000	10 (19%)
	\$30,000–\$45,000	6 (11%)
	\$40,000–\$65,000	4 (7%)
	\$65,000–\$90,000	5 (9%)
	More than \$90,000	4 (7%)
Education	Less than high school	2 (4%)
	High School	7 (13%)
	Some College	11 (20%)
	College BS or B.A.	11 (20%)
	Graduate/Professional School	23 (43%)
Sex	Female	35 (65%)
	Male	19 (35%)
Number of people in household	One	23 (43%)
	Two	13 (24%)
	Three	8 (15%)
	Four	8 (15%)
	Five or more	2 (4%)
Number of children in household	Zero	43 (80%)
	One	6 (11%)
	Two	5 (9%)

### 3.2 FGD analysis

Five major themes emerged from the focus group analysis. They were (1) shopping and consumption habits, (2) concerns for poultry production systems, (3) the influence of their social, religious, and cultural factors, (4) familiarity with poultry



production, and (5) potential avenues for consumer education (Figure 3). Representative quotes for each theme are listed in Table 3.

### 3.2.1 Shopping and consumption habits

Price was a significant determinant of chicken purchases, with cost being the most frequently cited concern for many participants. Several participants purchased what was most affordable, and many hesitated to allocate more budget toward this purchase. However, several participants indicated they would prefer to buy “what [they] think is more ethical” in the future. Twenty-four participants mentioned their willingness to pay an average of 37% more per pound of chicken, with the majority

saying they would accept a 20% increase. Among the 14 that specified a dollar amount, the average acceptable increase was 80 cents per pound, with most participants setting their limit at 50 cents. Several participants indicated they would only accept the higher cost if it benefited individual farmers instead of corporations.

Convenience was also a factor in purchasing and consuming chicken, with ease of preparation occasionally taking precedence over an individual’s taste preference. Despite liking dark meat, several participants indicated purchasing breast meat or chicken tenders for home cooking. Considerations for the potential impact on a person’s health were a greater priority over concerns for animal wellbeing in many cases. Many participants reported relying on sensory cues, such as sight and smell, as indicators of product



TABLE 2 Primary expenditure category by participants' sex, self-reported health, and diet ratings.

Money spent mostly on	Chicken or Turkey	Dairy	Fruits	Grains	Red meat	Vegetables
Total (N = 54)	12 (22%)	4 (7%)	9 (17%)	10 (19%)	11 (20%)	8 (15%)
<b>Sex</b>						
Female (n = 35)	6 (17%)	3 (9%)	8 (23%)	6 (17%)	6 (17%)	6 (17%)
Male (n = 19)	6 (32%)	1 (5%)	1 (5%)	4 (21%)	5 (26%)	2 (11%)
<b>Health rating</b>						
Excellent (n = 3)	2 (67%)	0	0	0	0	1 (33%)
Very good (n = 11)	2 (18%)	1 (9%)	3 (27%)	2 (18%)	2 (18%)	1 (9%)
Good (n = 22)	5 (23%)	3 (14%)	2 (9%)	5 (23%)	3 (14%)	4 (18%)
Fair (n = 17)	3 (18%)	0	4 (24%)	3 (18%)	5 (29%)	2 (12%)
Poor (n = 1)	0	0	0	0	1 (100%)	0
<b>Diet rating</b>						
Excellent (n = 1)	1 (100%)	0	0	0	0	0
Very good (n = 7)	0	1 (14%)	1 (14%)	1 (14%)	3 (43%)	1 (14%)
Good (n = 20)	2 (10%)	3 (15%)	4 (20%)	4 (20%)	3 (15%)	4 (20%)
Fair (n = 23)	8 (35%)	0	4 (17%)	4 (17%)	4 (17%)	3 (13%)
Poor (n = 3)	1 (33%)	0	0	1 (33%)	1 (33%)	0

quality. The smell was a crucial factor associated with the perceived freshness and desirability of cuts, particularly for those who prioritize cheap cuts and trust their capability to ensure their safety through cooking and preparation.

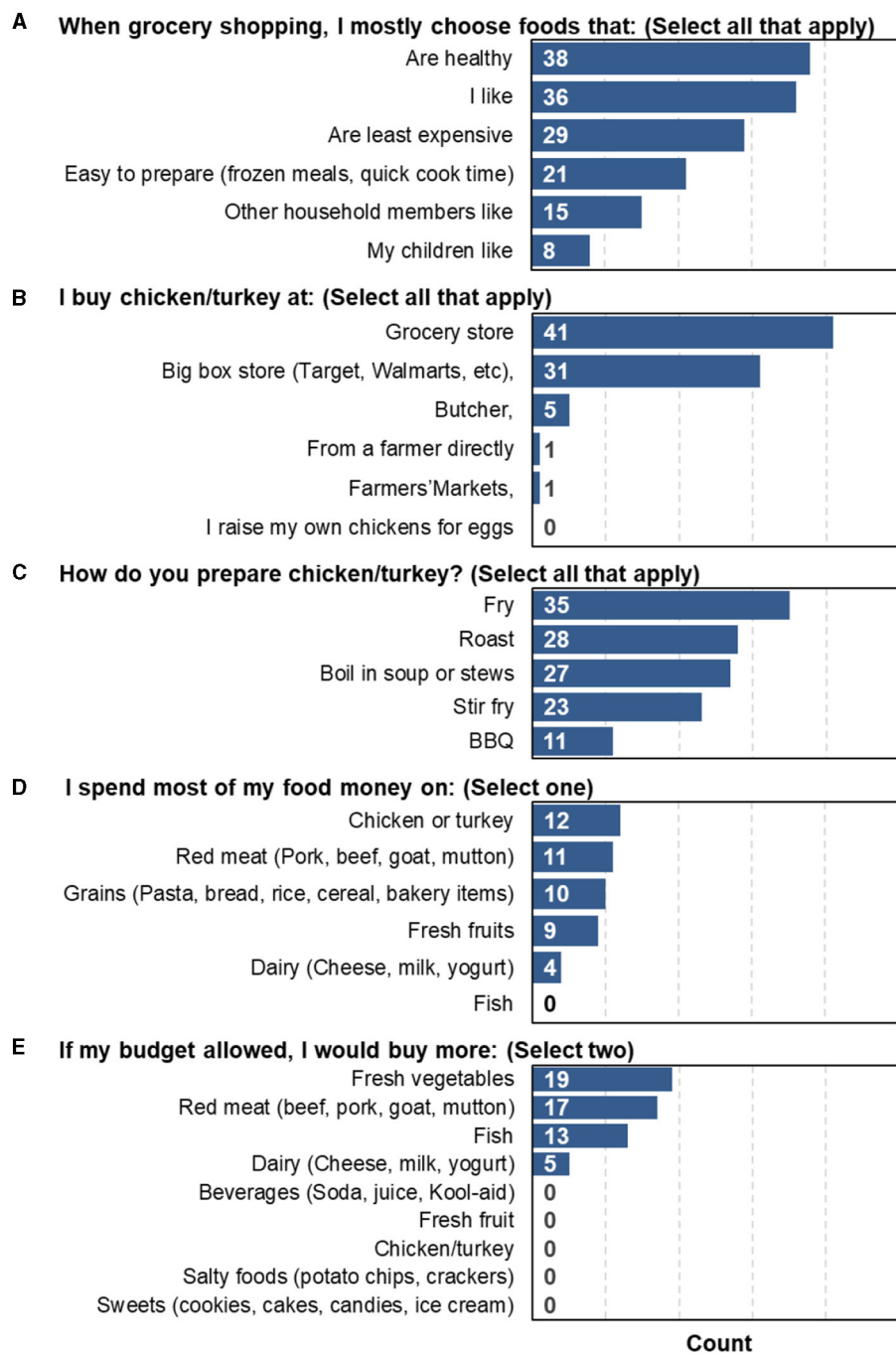
Additionally, the availability of products and the participants' access to them were common factors influencing their purchasing habits. This was particularly true regarding the store location, packaging size, and available parts. These were in part influenced by convenience, transportation, and household size. Product labels played a significant role, and opinions varied widely, especially concerning the validity of claims and the associated product quality of certain brands. Several participants also cited several large brands they perceived as less trustworthy and actively avoided. Accessibility played a particularly key role as participants noted that they would ultimately purchase products available to them despite their concerns about industrial-scale production and its compromising impact on animal welfare. Overall, their responses demonstrated the multifaceted aspects influencing their purchasing decisions.

### 3.2.2 Concerns for poultry production systems

Participants expressed a variety of concerns about poultry production. These include the perceived prioritization of the industry for profit over the welfare of both people and poultry. The confinement and housing of birds were the primary concerns concerning animal welfare, with only one participant citing concerns for transportation, which they have heard can lead to injuries. Participant responses demonstrated their concerns centered on the health implications of production methods on humans, particularly surrounding the use of antibiotics and

hormones. Several participants across sociodemographic statuses, particularly those with children, expressed concern over the impact of perceived hormone use in chicken production on puberty and adolescent development. Similarly, concerns were also raised about the possibility of disease transmission from the consumption of chicken products derived from ill birds. However, their limited consideration of chicken welfare may be due to lapses in their knowledge of modern broiler rearing, which was evident based on their responses surrounding hormone and antibiotic use in chickens. This was also made apparent by paradoxical perceptions of what constitutes the ideal production method. Several participants seemingly projected what they believed to be better for the poultry without considering its implications. For instance, the use of antibiotics in chicken production was a particular point for contention, though most participants citing this concern were primarily wary of the deleterious impacts it would have on human health. Fewer participants recognized the therapeutic use of antibiotics for chickens, with only one participant citing concerns for animal welfare should antibiotics not be administered.

However, greater familiarity with animal production does not always guarantee a preference for products with welfare indicators. Several participants expressed doubts about production systems such as cage-free or organics and the associated product requirements. Opinions on product labeling and marketing were equally varied, with several participants skeptical of the authenticity of claims while others trusted the regulating bodies overseeing it. Amidst their concerns, participants expressed a desire to consume products they perceived as more natural and ethically sourced, such as wild game among Native Americans, village chickens for Asians, or small farm production or neighborhood chickens in rural Minnesota. They associate these

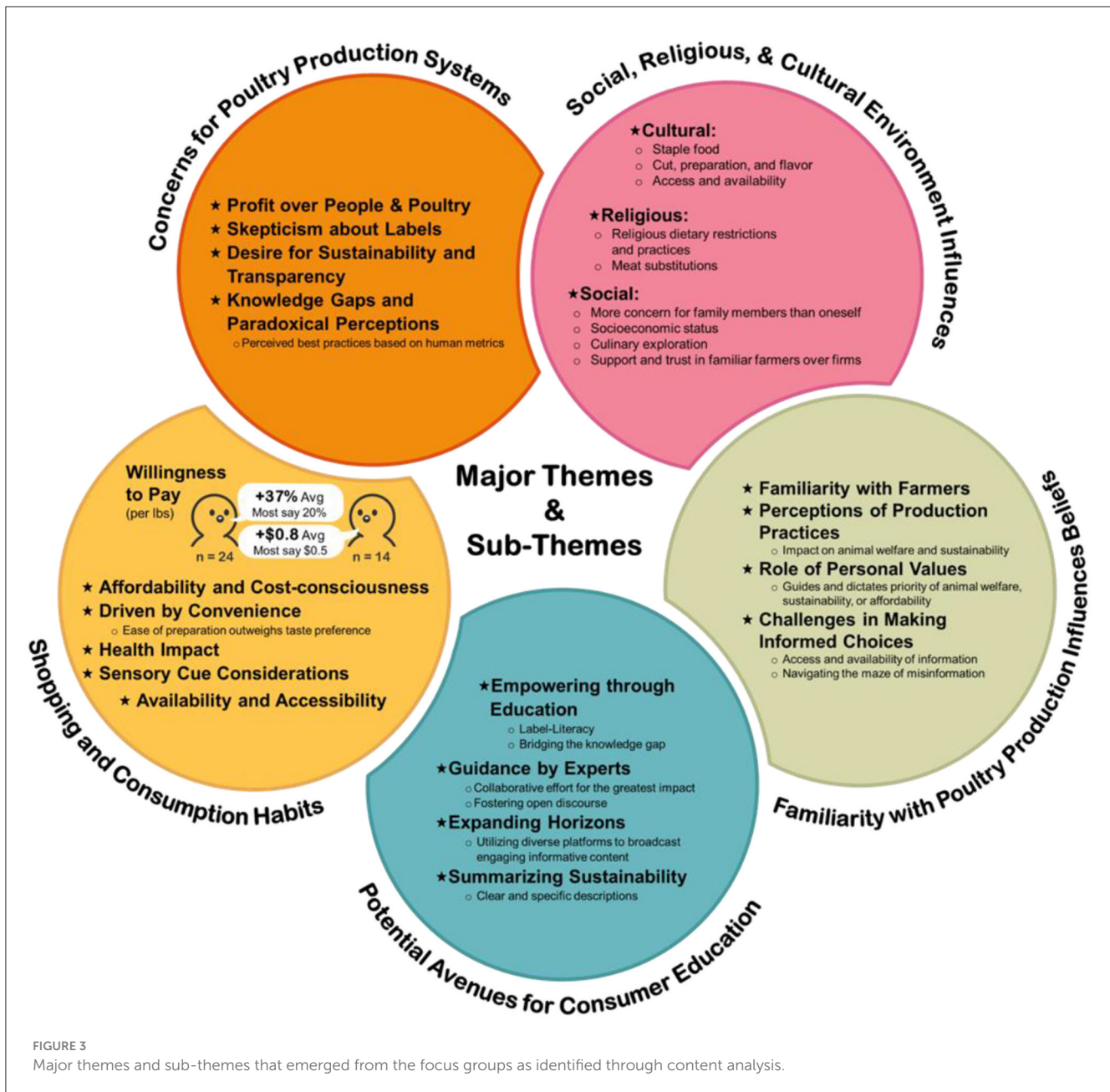


**FIGURE 2** Focus group participants' responses to questions regarding shopping activity, chicken purchasing and preparation habits, food expenditures, and desired food categories with increased budget. Each bar represents the number of participants chose to select the option out of 54 total participants in the study.

rearing methods with fewer harmful substances or synthetic additives that could affect their wellbeing, although they were not directly involved in raising the animals. As a result of their firsthand exposure to these practices, they have greater trust in the system. This suggests that greater transparency within the industry could address some of their concerns and provide assurance that the products align with their values and expectations.

### 3.2.3 Social, religious, and cultural environment influences

Social, religious, and cultural factors seemed to shape people's views on poultry consumption significantly. Trust in familiar farmers often preceded large corporations, reflecting the preference for locally sourced products. The geographical area where the consumers resided also affected the accessibility and availability of poultry. For instance, participants from areas where poultry



is less readily available than other protein sources said it was treated as a meal for special occasions. Conversely, its affordability, low-fat content, and versatility in meeting cultural and religious constraints have made it a staple food for many. Culture influences the methods by which the chicken is prepared and flavored, which transcend geographical boundaries as participants reported culinary exploration through their communities and online resources.

Furthermore, most participants who identified as Muslim reported that they adhered to Halal requirements, which limited the products they would purchase and consume. As adherence levels varied among the participants, not everyone who adhered to this understood the requirements to produce Halal chicken meat in the United States. Yet, several individuals expressed their association of this label with higher standards in production and quality.

The social environment surrounding a participant also affected their beliefs and consumption patterns. Upbringing played a significant role in many of the participants and shaped their preferences for flavors and methods of preparation. For example, a family member's health is often prioritized over the participants themselves, with several noting greater willingness to purchase higher quality products for their children or parents. This was also evident in discussions of sustainability, where a participant voiced the nuances of sustainability but ultimately considered the environmental impact on future generations. Socioeconomic factors also influenced poultry consumption among lower-income communities whose preferred preparation methods alternated according to weather. Methods of preparation that required more heat tended to be avoided in the summer to limit the cost associated with cooling their homes. These social, religious,



TABLE 3 Select quotes illustrating the major themes associated with the perspectives of chicken consumers in Minnesota, USA.

Major theme	Representative quotes	Participant
Shopping and consumption habits	"I go to Target because it's by the bus line"	F, 69, FG4
	"I buy chicken breasts because that's easiest one to cook for me but I definitely prefer dark meat, and I really like drumsticks"	F, 24, FG1
	"I really just buy what's affordable to me now, but in the future I would... like to be able to buy what I think is more ethical"	M, 22, FG1
	"I probably wouldn't pay anything extra. I have been very lucky back on wood with not getting sick or having anything happen to me from eating anything in my life... so I trust the food and how I cook it"	F, 56, FG1
	"I will never pay more... if there is chicken that's on sale about to go bad, I will buy that. If it has a smell too bad... they probably pulled off the shelf by then. I trust it"	M, 23, FG6
	"... there's some brands that you avoid because you see it and you think it wasn't good"	F, 43, FG2
	"For me it's important that is like, the most. I know it's hard to get sometimes, but the most natural way of growing, you know, the chicken was grass feed or seaweeds. It's, it's hard sometimes to get that because, you know, the, the labels sometimes don't tell you that much information"	F, 32, FG7
	"I go to the label organic. For me, that would mean it has a better life... than the conventional one"	F, 32, FG7
Concerns for poultry production systems	"They don't realize that it's not good for our girls to be starting their cycles at 8 or 9, 10 years old. It should be around 12, 13 years old and that's not the case today, you know. And that should be the alarm. It is an alarm that we need to take a look at our food, the food cycle, the food chain and what's being pumped into it... what bothers me most is that it's profits over human life. I'm always about trying to eat more fish, more wild game... because I know that those animals, especially if they're being raised in indigenous communities, are not being pumped up with all these things"	F, 58, FG3
	"But is it true that, like, If boys eat too much chicken or even guys, they can have grown the breast"	F, 43, FG2
	"But in developing country. It is a very sad news that, they are using hormones to grow the chicken, and sell the chicken within 21 days, and to 28 days. I have a bad experience, when I was an graduate student. I go to my, went to my village home. We have a very short farm, we never used these types of hormones and vaccines, but so the, at least 10 or 12 small farms are growing, and I have not visited but I learned that they're using the hormones through injecting it, and I don't know with, with the eye drops they can use it, I don't know"	F, 37, FG7
	"What we are seeing with chickens, you know, the bird flu and all of these different ingredients that are made to promote the growth... which makes me wonder as a mother and a grandmother and a great grandmother, how much those things are affecting our children"	F, 70, FG3
	"I think we just need to do due diligence... understand the constraints that the growers have and try to work together and compromise. The animal rights need to be about the same as ours from my point of view... it just seems more natural. That's kind of a goofy thing to say"	M, 68, FG1
	"But, you know, maybe just categorize as organic. For me, it's more, I'm more likely to buy that chicken than chicken that is not organic, because I know it's very important our body, you know, it's clean. It doesn't have any hormones and all those stuffs, antibiotics"	F, 32, FG7
	"So, there are a few like layer facilities around where I grew up. I personally don't enjoy seeing how they transport chickens in semis because they're so packed in there and I've heard stories about like their feet can get caught in some other crates"	F, 24, FG7
	"... all the cage free, organics, they are just scams... if they were sick, they should be used antibiotic. I will buy those chickens because I don't want them to suffer"	F, 18, FG2
"When there is somebody label the chicken and it's... from the expert. I can rely on them"	M, 31, FG7	
Social, religious, and cultural environment influences	"In Sri Lanka, it's island, so we have a lot of fish compared to chicken. We would have chicken only if it's a special occasion or something. It's not as frequent, not even as frequent as here because I think it's expensive"	F, 37, FG8
	"So for me again, I don't know what, but eating chicken for me has a strong relationship because my religion and culture because I'm a Muslim"	F, 28, FG8
	"It was just always on the plate itself, never really questioned it. It was chicken for dinner"	M, 20, FG5
	"My dad and my mom like to eat the feet... I didn't appreciate it until I came here, because that has a lot of collagen... And that's so good, you know, for body"	F, 32, FG7
	"... chicken was no different than eating beavers, muskrats or squirrels... I don't ever remember eating fried chicken until I was down here in the cities"	F, 70, FG3
	"If they want to benefit industrial producer then I will not pay anything"	F, 32, FG7

(Continued)

TABLE 3 (Continued)

Major theme	Representative quotes	Participant
	“Sustainability is kind of a big topic. I mean, you can write an essay on paper. And different words strikes to me, like, environmental impact or, like a pollution and also economic sustainability and disparity and many things like, standoff between the developing countries vs. the developed countries. So many different issues are complicated. But I think it all sounds to environment in the end to me, it's like, how to I mean, the way you do business, obviously have, like, consequences to the environment. We don't want to pass on the messy man mess up ecosystem to the next generation”	M, 37, FG2
	“Isn't it just by nature when you think of a mass chicken farm production that... they are just feeding these chickens for the sole reason of killing them a little bit later makes you not wanna eat chicken”	F, 70, FG3
Familiarity with poultry production influences beliefs	“The sustainability to me would be considering all three aspects environment, social and economic... to make sure it's affordable for people to buy chicken, it makes economic sense for our farmers to produce that, as well as the social aspect of animal and worker welfare”	F, 20, FG7
	“I don't really buy into some of the marketing... specifically about hormones and GMO's and things like that, and I choose to not buy things that are labeled excessively because I know that they're taking advantage of other people potentially. And I trust that farmers and veterinarians are providing for care for animals and if animals are sick, or if they're getting sick that is an upholding animal welfare”	M, 25, FG6
	“... if I have to choose, and I know this chicken was conventional, this chicken was not. I would choose the one that did not, but sometimes... that's hard to know”	F, 32, FG7
	“There's a bunch of misinformation because people see something and they then get upset, but then they don't understand that there are certain things reasons as to why that happens”	F, 24, FG1
	“I'm not really thinking about what the life of the chicken is because I am just kind of buying what is there. But I come from a small town that has a local butcher and it's full of farming and I definitely think it's much better to support that than the big box companies”	F, 20, FG1
	“When I find sales [...] I prefer to buy chickens that are like caged free and like grass fed, so I do think that it's very important because I've noticed that there is a huge effect on the meat. In Italy most of the meat that you buy from a butcher that is like family friends and I do see a huge difference between the quality of the meat”	F, 21, FG8
Potential avenues for consumer education	“The public knows pretty much nothing and because of that, it's difficult when people who are uninformed are making decisions that really affect these industries and they affect these farmers. I really do think that there needs to be a lot more education about food production and it just isn't there. It's not being taught in schools anymore. People are farther away from farms”	F, 21, FG1
	“... for me it's like if we follow the nature of the life, then that's kind of sustainability, which means like we raise the chicken in the way more traditional, like how they grow, what they eat is not a chemical like thing, it's like we allow them to go outside. They eat... like grass, seed, whatever then we slaughter them, when they turn to opt out, naturally. So that can offer strict sustainability. But I know that's really hard to achieve here”	M, 30, FG8
	“Well, you've come to the right place to talk about sustainability. We've sustained ourselves for over 500 hundred years. We think that is the big crown right there because we have come through a lot as a native people”	F, 58, FG3
	“Sustainability as, as a term? So, as a term that I think sustainability means, more toward we can continue using the, what can I say, like so that, that process is, something that can be carried over, like it can be continued as a process... can I have some time, I need to <i>process</i> that”	M, 28, FG7
	“For me speaking of sustainability I will always think about an environment actually, I think it's going to be much better to you know take more benefits in every single chicken's organs like for some of the feathers and then I don't know like the limb kind of thing, try to use all of those parts effectively”	F, 28, FG8
	“... education of not only farmers that maybe have practices that could become more sustainable but also people who are consumers and understanding if you want this change, this is going to be the impact. I think it's just not only farmers but also those vets and researchers... have to learn how to communicate all of these kinds of complex, feed efficiency, health issues, all of that to the public”	F, 24, FG1
	“I feel like it should come from professionals. Like even some kind of government organization. So it would have a big impact”	F, 43, FG2
	“You know, for me sustainability I think is the thing that you get your stuff in later times like, there should be a proper supply for that, and I haven't seen any such kind of sustainability labels on the products...”	M, 27, FG8
	“You know, they say our first instructors are our parents and then beyond that, the next instructors are teachers in the school systems. And then beyond that, to our peers, to our families, and friends [...] all of those are good avenues to be able to provide outreach and to inform and educate”	F, 65, FG4
	“If it comes to the word sustainable, I don't know it's a big word. I don't think carries a lot of meaning, just people either would ignore it or they would get confused. You have to be more specific when you say how you're going to be sustainable because like I said, it could be a lot of things. What is your point you have to be specific”	F, 37, FG8

Abbreviations: Sex, Age, Focus Group #, F—female, M—male, FG—focus group

and cultural influences collectively shape the consumers' poultry consumption patterns. It also highlighted the intricate relationship between food choices and cultural heritage, religious practices, and social impacts.

### 3.2.4 Familiarity with poultry production influences beliefs

As previously indicated, exposure to poultry production was a significant factor in shaping their beliefs. Familiarity with the farmers who raised the animals profoundly impacted an individual's perception of the product's quality and the ethics and sustainability associated with their practices. Those with friends, family, or neighbors who reared chickens tended to believe that the products they purchased were better. However, knowing a farmer or butcher did not necessarily translate to the knowledge of the production system, as some participants appeared to inadvertently conflate labels from other animal products, citing their preference for "grass-fed" chickens.

This highlights the point made by many participants: that education about production practices is paramount to influencing purchasing decisions and consumers' understanding of the impact certain production practices have on animal welfare and sustainability. They expressed the challenges of making informed choices because of the maze of misinformation they must navigate and what they believe was false advertising. They seek access to reliable information to help them make informed decisions, particularly when faced with conflicting claims. Irrespective of their understanding of production practices, personal values played a significant role, dictating whether animal welfare, sustainability, or affordability precede their choices. Based on their responses, participants tended to trust farmers and veterinarians more than large firms or companies. This further highlights the importance of the interface with poultry producers as individuals rather than as part of an industry.

### 3.2.5 Potential avenues for consumer education

Although the participants' level of disconnect from the agricultural sector affected their beliefs surrounding poultry production, it was not the sole determinant of their acceptance or knowledge of poultry products. Many acknowledged shortcomings in their understanding of the industry and proposed potential avenues by which consumer education can be enhanced to empower individuals to make informed decisions about their purchases. These included improving label literacy, such that they understood the information presented to them on product labels beyond the more commonly recognizable claims such as "fresh," "all-natural," and "antibiotic-free." Bridging the gap between regulating bodies and consumers would help the latter understand the definition of specific terminologies and the requirements imposed on their use and effectively communicate their merits to the consumers.

Many participants reiterated their desire to interface with experts, such as farmers, veterinarians, researchers, government officials, and other stakeholders. They suggested stakeholders collaborate and foster open discourse with the public, particularly about different production methods and their implications. They

believed that a consistent message from multiple sectors would minimize potential conflicts of interest and act as a checks and balances system, leading to the greater perceived credibility of the information provided, which the consumers could more reliably trust. Ultimately, this could help raise awareness of the producers' efforts to adopt more sustainable practices and help consumers better understand the limitations of their demands, including becoming more informed about how it may affect the chickens and their welfare.

Responses were heterogeneous when asked about the ideal method of dispersing information, yet many conveyed a resounding desire for more engaging content readily available across diverse platforms. Participants felt that the content should captivate their attention and concisely communicate the pertinent information but also provide adequate sources for further exploration into the topic for those interested. Convenience continues to be a predominant theme in this area, as they want the information to be accessible and straightforward.

Finally, when asked about their perspectives on "sustainability," many struggled to communicate their thoughts. They found it confusing and vague or could not define or discuss the idea. Though there was a consensus on its complexity, few participants recalled that it encompassed environmental, economic, and social dimensions. Among those less familiar, the environmental impact was the more prominent sustainability indicator. Several participants requested more time or clarification on the subject before voicing their perspectives, with several commenting on the absence of products labeled "sustainable." Some relayed the subject of effective utilization of the entire bird, whereas others viewed traditional agricultural practices as more natural and sustainable.

## 4 Discussion

Population growth, urbanization, and rising incomes have made chicken meat the preferred choice for its affordability, low-fat content, and versatility in meeting cultural and religious constraints. Residents of high-income countries prefer chicken primarily because of convenience and perceived health benefits. Consumers in lower and middle-income countries are more likely attracted to the relatively lower associated costs than other animal proteins (OECD and FAO, 2023b). Thus, it becomes ever more critical to ensure adequate production that sustainably meets the demands of a growing global population. Achieving sustainable poultry production necessitates the optimization of all three pillars of sustainability: social, economic, and environmental considerations. In this perspective, the consumers play a critical role as their demands often influence the industry. This qualitative analysis provides insight into the consumer's views on poultry production, which may help producers better understand *why* consumers seek specific labels and what they associate with them.

Chicken consumption among the participants was driven by affordability, accessibility, convenience, and perceptions of health benefits, particularly with white meat. However, the participants in this study also made it clear that misconceptions were prevalent, particularly about the use of hormones and their potential impact on human health. Their degree of disconnect from food production influenced their perspectives regarding the industry

and their overall understanding of production practices. Yet, participants reporting more familiarity with chicken production exhibited similar skepticism of product labels and alternative rearing methods. This was similarly observed among consumers in Australia, where knowledge of chicken production was reported as positively correlated to chicken consumption but was not associated with a greater preference for products affiliated with high welfare (Erian and Phillips, 2017).

In contrast, knowledgeable participants exhibited greater skepticism surrounding the accreditation programs of those labels (Erian and Phillips, 2017). Studies of consumers in the United States found that the “no added hormones” label on poultry products contributed to consumers’ perception of hormone use in poultry despite federal regulations that strictly prohibit it (Yang et al., 2020). Currently, this claim can only be used on poultry products when accompanied by a statement explicitly indicating the prohibition of hormone use (USDA FSIS, 2015).

Although comparisons between different production systems are beyond the scope of this study, a larger proportion of the participants exhibited similar perspectives on industrialized agriculture production as those reported in other studies (Saba and Messina, 2003; Bray and Ankeny, 2017). Most participants agreed that organic and traditional agricultural practices are more sustainable and safer than modern ones. This contrasts with the main focus of modern food production, which is primarily concerned with the adequacy of output and economic viability of systems, particularly when adopting alternative practices that may be less productive but more sustainable (Schaller, 1993). However, there seems to be an “attitude-behavior gap” whereby consumers’ intentions toward ethical consumption are not reflected in their purchasing behavior (de Barcellos et al., 2011). They cited cost and access to products as the primary barriers associated with the discrepancy between their attitudes and actions. Robinson and Smith (2002) also observed a lack of confidence among Minnesotan consumers in purchasing sustainably produced foods despite their prevailing inclination to support them. However, their acceptance of higher costs may also be associated with their social connection with those involved in production.

The level of familiarity participants had with a person related to the production system emerged as a significant theme in the FGDs. Many participants held these producers and their products in higher regard, regardless of their actual understanding of their production system. This behavior may be related to prosocial spending, a well-studied phenomenon that suggests humans are inclined to experience rewarding feelings when they utilize their resources to help others, particularly those with whom they are acquainted (Aknin et al., 2011). Several participants’ explicit disdain for large corporations or well-established brands further suggests that the social aspect of this interaction is where they derive satisfaction in contributing to individual farmers. Thus, this is an essential factor for producers to consider when conducting consumer outreach. The provision of information is a significant factor as personal trust in different stakeholders varies. For example, some found reassurance from governmental organizations or researchers and identified them as reliable sources of information. In contrast, others felt more reassured when they received direct communication from farmers or veterinarians.

Discussions surrounding the concept of sustainability brought diverse and ambivalent responses, with participants often placing greater considerations toward factors that impact them directly, such as environmental and human health-associated concerns. Grunert and colleagues also reported limited use of sustainability-related labels among consumers in six European countries, with more specific labels such as “animal welfare,” “rainforest alliance,” and “fair trade” better understood among the consumers (Grunert et al., 2014). Environmental sustainability and health consequences of consumption have been the primary dimensions by which sustainability is measured, despite acknowledgment of the additional facets associated with the food system. The EAT-Lancet Commission’s proposed healthy diets from sustainable food systems projected minimal impact on poultry and egg production from 2010 to 2050 (Willett et al., 2019). They also noted the necessity to intensify food production to meet growth in demand sustainably. Poultry tended to be a preferred product to help ameliorate the environmental impact of food-animal production as it contributes to less greenhouse gas emissions and utilizes less land (Hallström et al., 2015).

Bridging the gap between the farm and table is critical in ensuring that consumers are better aware of agricultural production systems and their limitations. This knowledge would provide them with more realistic expectations of the industry and potentially increase their willingness to contribute their part to help move toward more sustainable poultry production systems. Educating consumers to be more literate about agricultural practices can be a practical approach to help promote their acceptance and appreciation of the improvements producers adopt. For instance, many participants recognize claims such as “cage-free,” “fresh,” and “natural” as indicators of quality, but few brought up USDA grades, and none discuss terms such as “air-chilled.” This showcases that many of these advancements in food production are underappreciated despite extensive research demonstrating the benefits they confer to water conservation, food safety, and certain sensory attributes of the processed cuts (Zhuang et al., 2009; Perumalla et al., 2011). It presents an opportunity to enhance consumer literacy about labels on packaging by communicating production practices that are not readily apparent to them at the point of product selection.

Consumer education is critical in discussions surrounding sustainability, particularly as the wellbeing of animals in these production systems tends to be overlooked. Anthropomorphism, attributing human-like traits to animals, was a common aspect of the participants’ perceptions of welfare, particularly those with limited exposure. Thus, participants prioritize housing and outdoor access more than transportation and antibiotic use. Similarly, a survey of Dutch university students reported that outdoor access and stocking density were more closely associated with animal friendliness than considerations for transportation or breed used (de Jonge and van Trijp, 2013). Outlining the definition of “sustainability” would thus be the first step to more effectively communicating the efforts made by producers and processors toward ensuring the adoption of more sustainable practices. Moreover, the discussions in the focus groups revealed that a vital element in garnering consumer support lies in framing these definitions with the consumers’ interests at heart

and effectively conveying the merits these changes would bring them. Offering a clear and specific description can dispel their confusion, empowering consumers to make informed decisions while gaining their support once they comprehend the direct impact and potential benefits these changes can bring to their lives.

Although several participants' understanding of antibiotic growth promoters seems to be conflated with hormone use, the underlying concern with their application in poultry centered primarily on residues in meat and, to a lesser extent, antimicrobial resistance. While this oversight is most likely unintentional, it underscores the possibility of neglecting the consequences of antibiotic-free production systems on animal health and welfare and sustainability from an efficiency perspective. A study exploring drug-free commercial broiler chicken operations in Canada found that these systems were associated with reduced performance and greater susceptibility to intestinal diseases such as necrotic enteritis (Gaucher et al., 2015). Communicating these lesser-known factors and their potential impact on the production cost may increase consumers' willingness to accept the proportion of the bill passed to them. Beliefs and attitudes toward sustainably produced foods have previously been found to influence consumers' intent to purchase (Robinson and Smith, 2002). Thus, communicating the potential values and benefits associated with sustainably produced chicken may sway their purchasing behavior. However, this may be a challenge as chicken is often cited as the "affordable" protein source, and one that no participants indicated they would allocate additional costs if their budget allowed. Its status as a staple in diets means that even the slightest increase may have a consequential impact on their budgets.

It is worth noting that these focus groups were conducted in 2022 when the avian influenza outbreak further exacerbated disruptions to the food supply chain brought about by the COVID-19 pandemic. This significantly impacted the table egg industry, leading wholesale egg prices to surge throughout the year, potentially increasing rates of food insecurity (Knight et al., 2022). This most likely influenced the participants' food purchasing and consumption behaviors, as several of them echoed similar concerns and perceptions of risk as those observed among consumers in Taiwan (Hsu et al., 2008). Notably, people's reactions to these events were divergent. Wary of the potential transmission of diseases from the food they eat, some participants reinforced their risk minimization behaviors. While others trusted in their ability to properly prepare food to avoid illness and rationalize actions that they recognized were precarious to justify purchasing cheaper meats. They also generally voiced their trust that appropriate authorities regulated the retail products. This was consistent with previous studies on the influence of avian influenza on consumers in Western Europe, who also reported a high level of trust in their food system (de Krom and Mol, 2010). This perception could contribute to the limited decline in documented incidences of salmonellosis despite considerable progress in curtailment of *Salmonella* prevalence on poultry products. Emphasis on affordability may influence the stringency to which consumers adhere to foodborne pathogen mitigation measures, especially considering many were found to disregard USDA recommendations during food preparation (Kosa et al., 2015; Maughan et al., 2016). Although the

rising prices of eggs impacted purchasing habits, the narrowing price margin between conventional and more premium-labeled eggs concomitantly swayed several consumers to purchase the latter.

While the results of this study contribute valuable insights to the existing literature on consumers' attitudes toward poultry production and sustainability, it is essential to acknowledge the limitations. The focus groups took place in the Minneapolis-Saint Paul area during the work week. Its generalizability to the entire population and other regions of the country may be limited—particularly those with different educational and socioeconomic backgrounds. Moreover, the focus groups included younger and older adults, with a smaller representation of middle-aged individuals. However, efforts were made to ensure the inclusion of participants from diverse backgrounds and ethnicities. Although fellow participants could influence an individual's responses in group settings, focus group methodology is suitable for gathering formative insights because it encourages discourse between members that would otherwise not occur during a structured, one-on-one interview.

On November 15, 2022, the U.N. estimated that the world population reached eight billion, an exponential increase from the 2.5 billion people in 1950 (United Nations, 2022). The rapid pace of population growth brings a much greater demand for food, including poultry products. Sustainable poultry production requires thoughtful considerations for the wellbeing of the planet, poultry, producers, and people who rely on them for sustenance. However, these discussions made it evident that "sustainable" is an ambiguous term for many consumers. Thus, future studies should explore avenues by which the complexity of sustainability and its nuances can be made more understandable and relatable to the average person. Moreover, it's essential to expand the focus beyond the sustainability of production alone, as factors like food waste and consumption habits should be considered when striving for a truly sustainable food system (Conrad et al., 2018).

## 5 Conclusion

In conclusion, the present study offers valuable insights into consumers' perceptions of poultry production and practices. It reiterated the well-established reputation of poultry as a healthy, convenient, and affordable source of protein, which is the main driver for its consumption. Furthermore, the findings lay a foundation for producers to enhance their understanding of the consumers' perspectives, priorities, and underlying motivations or obstacles to consumption. This information may be advantageous to developing strategies that help promote adopting sustainable practices. Knowledge of the specific attributes consumers deem significant can assist in decision-making when considering which practices to adopt and how to market the change to garner public appreciation and financial support. It also emphasizes the significance of efforts to educate consumers on the sustainability of poultry production, particularly in swaying consumer acceptance and willingness to offset higher costs.



## Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

## Ethics statement

The Institutional Review Board at the University of Minnesota approved the study. The participants gave written informed consent.

## Author contributions

GD: Investigation, Methodology, Software, Validation, Writing – review & editing, Data curation, Formal analysis, Visualization, Writing – original draft. CS: Investigation, Methodology, Writing – review & editing, Conceptualization, Resources, Supervision. WM: Investigation, Methodology, Resources, Writing – review & editing. KV: Writing – review & editing, Funding acquisition. AK: Funding acquisition, Writing – review & editing, Conceptualization, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation.

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## Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

The author(s) declared that they were an editorial board member of *Frontiers*, at the time of submission. This had no impact on the peer review process and the final decision.

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