

Framing Sustainability: Exploring the Impact of Frames on Generation Z's Perception of Beef Sustainability Messages on Instagram

Introduction & Literature Review

Discussion surrounding climate change and sustainable production practices are emerging in agriculture, and the beef industry, specifically, has come under public scrutiny for its perceived unfavorable environmental impacts such as animal welfare issues, increased greenhouse gas emissions, water consumption, and fossil fuel use (Center for Food Integrity, 2018; Midan Marketing, 2023; Rotz et al., 2019; Schickler et al., 2023). The increased environmental concern tied to beef production has led consumers to believe the beef industry is one of the largest polluters of greenhouse gas emissions in terms of food production (Vetter, 2020) and lean toward purchasing more chicken and pork because they perceive them to have fewer land consumption and emission impacts (Carroll, 2019). Environmentally conscious consumers have also begun to pay closer attention to beef industry communications and question the integrity of their climate-friendly claims (Fassler, 2023). Organizations in the industry are taking action by putting forth aspirations centered around the idea of beef sustainability (Cargill, 2023; National Cattlemen's Beef Association [NCBA], 2023; U.S. Environmental Protection Agency, 2023; U.S. Roundtable for Sustainable Beef [USRSB], 2023) as consumers are beginning to seek out products that align with environmentally proactive values (Su et al., 2019).

Beef organizations have set goals in terms of production practices in an effort to be transparent about their long-term commitments to be environmentally friendly (Cargill, 2023). Certified Angus Beef, a branded beef program, has introduced the idea of sustainability to their consumer facing platforms by integrating ranching culture and its connection to the everyday consumer (Certified Angus Beef, 2023). On the producer front, beef and cattlemen's organizations are advocating sustainable production practices to the farming and ranching audiences to mitigate negative environmental impacts (NCBA, 2023; USRSB, 2023). However, for communicators promoting sustainability in the industry, messages must be strategic. Ruth and Rumble (2017) found an important role in changing attitudes is to target messages to specific audiences over education alone (Schickler et al., 2023). Thus, the purpose of this paper is to examine the public's attitude toward messaging about sustainable endeavors of the beef industry.

Cattle production efforts have evolved in recent years by more producers implementing practices that strive to achieve sustainable outcomes like protecting the overall welfare of cattle, engaging genetic technologies, optimizing feed efficiency, and improving the reproductive management practices on their operations (DelCurto et al., 2005; Gosnell et al., 2021; Menozzi et al., 2015; Mishra et al., 2020; White et al., 2015). Moreover, [Authors, 2024] found cattle producers are most inclined to adopt practices that promote being 'stewards of the land' such as protecting water quality, protecting cattle welfare, and preserving ranching culture. However, there is a disconnect between production practices and consumer perceptions when it comes to the environment and cattle production (Gibson et al., 2020; VanBoxtel et al., 2022; Telg et al., 2018). These findings have suggested the producer story should be told to consumers as agricultural sustainability is important to producers on social, economic, and environmental fronts. Social media is a major factor in how today's information is spread and processed, and the wide availability of these online platforms present communication professionals with a unique opportunity to bridge the gap between producers and consumers (Dobbins et al., 2021).

For those in agricultural communications, it is important to utilize social platforms as users are consistently seeking information that aids in the formation of opinions with effects toward the beef industry (Howard, 2015). Moreover, social media's ability to add imagery to environmental communication has been found to further engage viewers (O'Neill et al., 2013), and consumer research has shown products with production claims are more favorable than those that do not have such claims (Abrams, 2010; Jeong & Lundy, 2016; Schickler et al., 2023; Spain et al., 2018). For example, agricultural products that promote an organic claim are more favored by consumers due to their association with practices that protect the environment, despite the lack of scientific understanding (Lim & Page, 2022; Jeong & Lundy, 2016; Schickler et al., 2023). Effective communication strategies should be utilized effectively to foster favorable attitudes toward the beef industry through the promotion of the industry's values in environmental communication online (Swenson & Olsen, 2018).

With the rise of social media platforms, Generation Z has been coined 'digital natives' (Parker & Igielnik, 2020), and 65% of adults within this generation have stated the social media presence of a brand or industry has an impact on their fresh meat purchasing decisions (Midan Marketing, 2023). Defined as individuals born between the years of 1997 and 2012 (Dimmock, 2019), Generation Z is the most diverse and environmentally conscious generation to date (Parker & Igielnik, 2020) and are next up to be the largest share of the consumer market by 2030 (Bump, 2020). Previous market research has shown 75% of Generation Z consumers think about sustainability when it comes to purchasing fresh meat and many of these consumers would be willing to pay a premium for a product that supports their values (Midan Marketing, 2023; Su et al., 2019). As products with sustainable claims emerge to meet demand, it is essential to understand this cohort's attitudes toward these claims.

Theoretical Framework

The theory of framing and heuristic processing theory guided this study to explore the impact of message framing on Generation Z's thoughts toward the industry's sustainable goals and statements. Scheufele and Tewksbery (2007) described framing as the way in which a message is presented from a particular perspective to influence how the message is evaluated by a viewer. This study utilized three frames to understand what types of beef sustainability messages viewers in Generation Z found to be most favorable through included fact-based, emotional, and aspirational approaches. Furthermore, to explore viewer processing of the messages, the Heuristic Processing Theory was used. This theory suggests when one views a persuasive message, they process it heuristically, through cues such as language or symbols, or systematically, through careful consideration of their involvement in the issue (Chaiken, 1980).

Theory of Framing

Research in message testing within the agricultural industry has found the utilization of frames is valuable to issue-based advertising and communication (Fischer et al., 2020; Ruth & Rumble, 2017; VanBoxtel et al., 2022). Framing allows communicators to highlight certain aspects of an issue and ignore superfluous details (Goffman, 1974; Entman, 1993; Scheufele & Tewksbery, 2007), which can be accomplished through the inclusion or exclusion of certain words, images, and organization (Goodwin et al., 2011; Entman, 1993). Prior research has shown consumers' credibility preferences to an environmentally friendly labeled advertisement over

other frames promoting the same products (Sustainable Brand Index, 2022), which suggested an environmentally conscious audience has the potential to be impacted by message frames.

To better utilize framing in marketing agricultural products, important factors such as mental images, examples and explanations, brevity, and trustworthiness must be considered when designing a narrative to supplement a message frame (Abrams & Soukup, 2017; Cho, 2015; Goodwin et al., 2011; Schickler et al., 2023; Van Boxtel et al., 2022). Additionally, narratives are a crucial message aspect in communicating agricultural science issues (Fischer et al., 2020); therefore, a message frame can gain the consumer's attention and influence their perception on the topic (Abrams & Meyers, 2012; Fischer, 2017; Schechinger, 2023). Framed messages should be created through careful consideration of message features such as content, structure, and style to inform the overall message design (Shen & Bigsby, 2013).

Fact-Based Messages. The addition of factual information adds reasoning to a persuasive message (Shen & Bigsby, 2013) through pulling proven facts about an organization or product (Sustainable Brand Index, 2022). To create a message that has evidence as a foundation, it must be formal and impersonal to decrease the connection to people and relationships (Chambers et al., 2023). Previous research has found those who have higher involvement in an issue may present more interest or attention to a message in contrast to those who may have distance from scientific information, specifically pertaining to agriculture (Fischer et al., 2020).

Emotional Messages. An emotional frame is one that evokes the personal values of a viewer which can lead to an increase in attention to the message (Fischer et al., 2020) and should include viewer values and personal risk (Sustainable Brand Index, 2022). Ruth and Rumble (2017) suggested minimizing consumers' personal risk in a subject can be a crucial aspect in the decision-making process and can be achieved by tailoring the message to the target audience. Emotional narratives should have informal language, pronouns, and a personable tone to connect with the viewer on a more personal level (Chambers et al., 2023).

Aspirational Messages. An aspirational message should focus on the future of the industry and provide examples of what is being done to reach a specific goal (Sustainable Brand Index, 2022). Several aspirational goals have been set forth by organizations within the beef industry (e.g., demonstrate climate neutrality of U.S. cattle production by 2040; NCBA, 2023; USRSB 2023) as environmental communication is a large factor in a consumer's environmental consciousness (Su et al., 2019). Research has revealed Generation Z consumers have higher environmental values than the generations before them (Center for Food Integrity, 2023; Su et al., 2019); therefore, communicators should prioritize these values of Generation Z by promoting positive environmental attributes of a product (Su et al., 2019).

Heuristic Processing Theory

Understanding how viewers process a persuasive message can influence social change and increase public acceptance (Chaiken & Ledgerwood, 2011). Prior research using the Heuristic Processing Theory has examined message cues and their effects on consumer attitudes (Ruth & Rumble, 2017; Townsend & Kahn, 2014). This theory advocates that an individual can view a message one of two ways, heuristically or systematically (Chaiken, 1980). A heuristic view requires less effort on the viewer's end by relying on more accessible information such as

language, symbols, or colors, which can be explained by low involvement or time constraints (Chaiken, 1980). In contrast, a systematic viewer will evaluate the arguments and assess their personal involvement to reach the conclusion of their attitude formation (Chaiken, 1980).

Marketing a product with perceived unfavorable environmental impacts, such as sustainable beef, requires an investigation into the consumer's perspective to find what elements might cause a viewer to process messages heuristically or systematically. A previous study using the Heuristic Processing Theory to study how Generation Z processed social media messages found that posts including an animated infographic elicited a higher level of cognitive processing than a static post (Martinez, 2021), giving insight to the different pathways of processing when consumers view agricultural information on social media.

Thought Listing Technique to Measure Processing. To inform attitudes toward a subject, understanding viewers' cognitive processing is important (Ruth et al., 2016; Vyvlecka, 2023), and thought listing is a helpful method that can act as an indicator of valence and degree of processing when exploring the thoughts of individuals' perceptions of agricultural-based issues (Brown & Gold, 2014; Hill, 2020). This technique can be conducted by asking participants to openly record their feelings after being exposed to stimuli then categorize their thoughts into categories such as positive, negative, or neutral (Brown & Gold, 2014; Ruth et al., 2016; Vyvlecka, 2023). The descriptive data gathered from this procedure such as timing, number of thoughts, and number of words recorded can provide insight into cognitive measures through data comparisons taken from the free responses of the participants (Cacioppo et al., 1997; Ruth & Rumble, 2017). This method allows researchers to make inferences from viewer thoughts to the research context (Wimmer & Dominick, 2014).

Purpose & Research Questions

As a new generation is beginning to infiltrate the market and production practices are being questioned, practitioners need to understand the complex relationship between consumers and their attitude toward the environmental impacts of the beef industry. This study focused on applying a fact-based, emotional, and aspirational framed approach to communication messages to examine what type of message frame resonated best with Generation Z when forming attitudes toward the beef industry. This study aimed to answer the following research questions:

RQ1: What is the viewers' attitude and trust toward the beef industry based upon the message frame presented?

RQ2: How does viewer processing vary upon the shown message frame?

RQ3: What are the viewers' thoughts toward the messages?

Methods

A quantitative experimental research design was used for this study to determine the effects of message framing on viewer attitudes, trust, cognitive processing path, and thoughts of social media messages regarding beef sustainability. A Qualtrics survey questionnaire was distributed to 213 students at [university name] through an online study registration system. Participants consisted of college students between the ages of 18 and 26, making them adults in Generation Z. The data reported in this manuscript were part of a larger study, and data for this manuscript were independently analyzed from other variables collected through the instrument.

As shown in Table 1, the majority of participants were female ($n = 170, 79.8\%$). Most participants reported to not be of Hispanic or Latino origin ($n = 168, 78.9\%$) and identified their race as white ($n = 177, 83.1\%$). For academic classification, 85 students were seniors (39.9%), 65 were juniors (30%), 32 were sophomores (15%), and 32 were freshmen (15%). When asked their college, the majority of participants reported to be from the College of Human Sciences ($n = 78, 36.6\%$) and College of Media and Communication ($n = 69, 32.4\%$).

Table 1
Summary of Participants' Demographic Characteristics (N = 213)

Demographic	<i>f</i>	%
Gender		
Female	170	79.8
Male	42	19.7
Prefer not to say	1	0.5
Race ^a		
White	184	86.4
Black or African American	14	6.6
American Indian or Alaska Native	3	1.4
Asian	11	5.2
Native Hawaiian or Pacific Islander	1	0.5
Other	4	1.9
Ethnicity		
Hispanic	45	21.1
Non-Hispanic	168	78.9
Academic Classification		
Freshman	32	15.0
Sophomore	32	15.0
Junior	64	30.0
Senior	85	39.9
Academic College ^a		
College of Agricultural Sciences and Natural Resources	37	17.4
College of Arts & Sciences	21	9.8
College of Education	1	0.5
College of Engineering	3	1.4
College of Human Sciences	78	36.6
College of Media and Communication	69	32.4

^a Select all that apply; therefore, percentages do not add up to 100%

Instrumentation and Variables

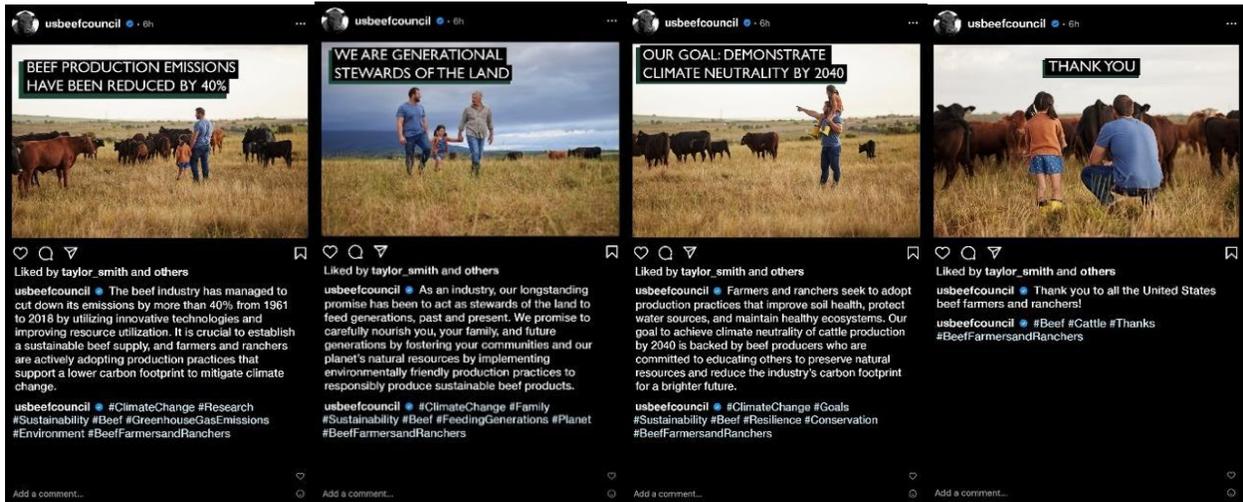
A cross-sectional survey was utilized to collect data from a predetermined population at one point in time (Fraenkel et al., 2019). This was a between subjects experiment as participants randomly viewed only one of four conditions (fact-based, emotional, aspirational, or control)

pertaining to beef sustainability. After viewing the message, participants were directed to a post-test questionnaire to gather demographic information, participant attitudes, trust, and thoughts toward the beef industry and its sustainability efforts based on the condition viewed. A thought listing procedure was utilized to supplement the quantitative survey questions.

Stimuli: Mock Instagram Posts

Stimuli for this study consisted of four mock Instagram posts: fact-based, emotional, aspirational frames, and a control that were randomly assigned to participants. The messages were researcher created based on industry examples (Cargill, 2023; Certified Angus Beef, 2023; NCBA, 2023; Tyson Foods, 2023) and literature regarding message framing and communication (Abrams & Soukup, 2017; Chambers 2023; Fischer et al., 2020; Goodwin et al., 2011; Shen & Bigsby, 2013; VanBoxtel et al., 2022). With the exception of the control message, the messages were created to be consistent in format, word count, and imagery with the greatest manipulation occurring in the text of the posts. A debriefing statement was included at the end of the survey claiming that deception was used within the messages viewed - although the information was science-based and factual. All four messages are shown in Figure 1.

Figure 1
Mock Instagram Posts for the Three Message Frames and Control



Fact-Based Condition. The fact-based message in this study presented the statistical fact from NCBA (2023), “the beef industry has managed to cut down its emissions by more than 40% from 1961 to 2018 by utilizing innovative technologies and improving resource utilization,” which has been confirmed through previous research (Capper, 2011; Rotz, 2023). Numerical statistics were used to provide evidence to the claim and pronouns were not used to keep the message formal (Chambers et al., 2023; Shen & Bigsby, 2013).

Emotional Condition. The emotional message was created to center its visual and narrative around the future of the planet and generations in order to resonate with the personal risks of Generation Z. Fischer et al. (2020) found that this can increase viewer attention and make the frame more motivating to the target audience. The message emphasized farmers’ and

ranchers' personal responsibility to take care of the environment as it has been found that consumers trust farmers when seeking information regarding the food supply (Goodwin et al., 2011; Schickler et al., 2023). Additionally, pronouns were emphasized, and the language was informal as supported by Chambers et al. (2023).

Aspirational Condition. An aspirational message was created and used to promote the beef industry's sustainability initiatives and did so by emphasizing the work of farmers and ranchers and an industry goal using vivid production practice examples (NCBA, 2023; USRSB, 2023). The aspirational message emphasized the futuristic work of the beef industry with the inclusion of a timeline (Sustainable Brand Index, 2022) that aspires to achieve certain industry benchmarks in relation to climate neutrality and cattle production.

Control. A control message was also created without mentioning beef sustainability or stating any facts. The purpose of this message was to collect demographic data from participants and ensure that the data collected were not random events.

Dependent Variables

Attitude Toward the Beef Industry. After viewing their assigned message, participants were asked to indicate their attitude toward the beef industry to five Likert scale (1 = *Strongly disagree*, 5 = *Strongly agree*) statements. The statements were as follows, "I believe the beef industry is...": *Raising animals responsibly; Good for the environment; A proactive industry; Preserving natural resources; A sustainable choice.* Reliability for this construct was determined by Cronbach's alpha = 0.93, exceeding Wimmer and Dominick's (2014) recommendation.

Trust. Participants' trust in the message was measured by rating their level of agreement to five Likert scale (1 = *Strongly disagree*, 5 = *Strongly agree*) statements. The statements included: *It is safe to trust the information conveyed in the post; I have confidence in the information conveyed in the post; I trust the information conveyed in the post; I am willing to share the information I have seen in the post with my friends or family; I am willing to purchase more beef based on the information conveyed in the post.* Cronbach's alpha = 0.92 was achieved for this construct; therefore, it was deemed reliable as a reliability of 0.70 or greater is recommended in social sciences (Ary et al., 2021; Wimmer & Dominick, 2014).

Timing and Thought Listing. To measure cognitive processing, participants were timed for how long they spent viewing the stimuli by adding a Qualtrics timing question to the instrument when the stimuli was on the participants' screen. Participant time on the stimuli was measured in number of seconds. Furthermore, the thought listing technique was utilized to gain a deeper understanding of the viewers' perception toward the topic and measure cognitive processing (Brown & Gold, 2014). This procedure was implemented by asking participants to freely record their thoughts immediately after viewing the stimuli (Brown & Gold, 2014; Vyvlecka, 2023). After recording their thoughts, participants were asked to self-assign their thoughts into one of three categories: *favorable, neutral, or unfavorable.*

Data Collection

Participants were recruited on an online study registration platform at [university name] and were asked to complete an online survey instrument. The survey instrument consisted of one of four mock Instagram posts, thought listing procedure, and a post-test questionnaire. The condition viewed was randomly assigned via Qualtrics for the stimuli to be evenly distributed across the sample. Approval was received from [university IRB] prior to data collection (IRB2023-1050). For participating, students received .25 study credits to be applied to a course of their choosing through the online study registration platform.

Instrument Development and Data Analysis

Validity of the survey instrument was established through an expert panel review of the questionnaire and stimuli pilot testing. The expert panel consisted of four agricultural communications faculty members at three universities and one expert from the College of Media and Communications. The expert panel had expertise in experimental design, visual communications, information processing theories, and social media research and provided feedback on the content and clarity of the survey instrument. A focus group was held to pilot test the Instagram posts to determine if they projected the desired message frames. Finally, another pilot test was distributed through an online survey to graduate students at [university name], and we ensured items met reliability standards (Wimmer & Dominick, 2014). The instrument and stimuli were modified based on the feedback of the measures to ensure the validity of the study.

A statistical analysis of the data was conducted by exporting the data file from Qualtrics and uploading the file into IBM SPSS Statistics 29.0. The data file was then cleaned for missing or invalid data. Before cleaning, there were 339 respondents to the questionnaire; however, 126 responses were removed for not meeting specified criteria: failure to pass the attention check ($n = 87$), less than 80% completion ($n = 34$), or exceeded maximum age requirement ($n = 5$). The resulting sample size of this study was 213. Statistical tests such as frequencies, descriptive means, standard deviations, and one-way ANOVAs were run to obtain the results. To categorize the responses of the variables of interest (attitude and trust), real limit structures were set for each of the items as follows: 1 – 1.49; 1.5 – 2.49; 2.5 – 3.49; 3.5 – 4.49; and 4.5 – 5. To analyze the thought listing data, a codebook was created by the researcher to reveal common themes related to the message content and attributes. Two coders were trained on the codebook to ensure accuracy and intercoder reliability. Intercoder reliability was met by coding a portion of the data set and comparing the results of the two researchers. All variables reached a reliability of Krippendorff's $\alpha > .80$, reaching Wimmer and Dominick's (2014) recommendation.

Limitations

The stimuli used were intended to mimic a real social media post as close as possible; however, there were uncontrollable factors that could have impacted the study's results. The profile used in the stimuli was fake and researcher created. In an attempt to eliminate any skepticism, a verified badge was included by the fictitious username. Despite this, participants may have still questioned the profile's credentials and credibility. Furthermore, the quantitative analysis did not reveal any significant effects, however, the thought-listing procedure provided important cognitive insights. These results could be due to the limitation of a single-exposure design as repeated exposure to a particular message frame could yield stronger effects over time.

Results

RQ1: What is the viewers' attitude and trust toward the beef industry based upon the message frame presented?

The first research question sought to identify participants' attitude and trust toward the beef industry based on the message frame presented to them. Attitude and trust data were analyzed through one-way ANOVAs that tested the effects of condition presented on attitude and trust. It was found that the main effect of condition on attitude was not significant, $F(3,209) = 1.00, p = .39, \text{partial } \eta^2 = .014$. It was also found that the main effect of condition on trust was also not significant, $F(3,209) = 1.58, p = .20, \text{partial } \eta^2 = .022$. The Bonferonni post hoc analyses revealed no significant differences of attitude or trust between the four conditions shown. These analyses provide evidence that participants' attitude or trust level was not influenced by frame.

RQ2: How does viewer processing vary upon the shown message frame?

Processing was measured by viewing time and total amount of words and thoughts recorded in the thought listing procedure as presented in Table 2. These measures were analyzed through one-way ANOVAs that tested the effect of condition on viewing time, number of words, and number of thoughts. It was found that the main effect of condition on viewing time was not significant, $F(3,209) = 1.28, p = .28, \text{partial } \eta^2 = .018$. It was also found that the main effect of condition on number of thoughts was not significant $F(3,209) = .42, p = .74, \text{partial } \eta^2 = .006$. Finally, it was found that the main effect of condition on word count was also not significant, $F(3,209) = 1.19, p = .31, \text{partial } \eta^2 = .017$. The Bonferonni post hoc analyses revealed no significant differences between viewing time, word or thought counts across the four conditions. This analysis provides evidence that thought processing was not impacted by message frame.

Table 2

Total Viewing Time and Number of Thoughts and Words by Condition (N = 213)

Condition	<i>n</i>	Total Viewing Time (s)	Total Number of Thoughts	Total Number of Words
Fact-Based	51	1477.82	155	1030
Emotional	54	2112.06	171	957
Aspirational	50	1213.46	153	855
Control	58	1151.02	187	849

RQ3: What are the viewer thoughts toward the messages?

The responses from the thought listing procedure were coded into categories for further analysis. The topics were then coded into items focused on message content and attributes. Items in message content were focused on the information portrayed in the posts; whereas message attributes were more visual items such as post organization, length, and imagery.

Happiness/hope was found to be the most prevalent theme among participant thoughts for content ($n = 65$) and the majority of these thoughts were considered to be favorable ($n = 59$). Thoughts in this category included "I was glad the industry has concern for climate change," "hopeful that people see this." It was also revealed that participants *wanted to seek more information* on the topic ($n = 63$) and the majority found this to be favorable ($n = 34$). One

participant thought, “I felt interested in what the post was talking about and wanted to learn more.” Another participant noted, “I want more information on beef sustainability.” Also, when a thought had an *aspirational/goals* theme, participants categorized it as favorable each time ($n = 11$), making the aspirational coded thoughts the only theme consistently reported as favorable among participants. This theme included sentiments such as “forward thinking” and “goal oriented.” For message attributes, the *photo* was mentioned most frequently ($n = 68$) as participants indicated, “I thought that the photo was visually satisfying” and “the picture drew my attention more than the post.” Table 3 presents the researcher coded themes and whether participants categorized their thoughts into the *favorable*, *neutral*, or *unfavorable* categories.

Table 3
Frequencies of Participants’ Thought Topic and Perceptions

Topic	Number of Mentions	Favorable	Neutral	Unfavorable
Message Content				
Want to seek more information	63	34	23	4
Lack of current knowledge	9	2	4	3
Disinterest	20	3	5	12
Animal welfare/slaughter	16	7	5	4
Cattle as animals	25	17	7	1
Beef producers/farmers	15	14	0	1
Family/generations	47	38	8	1
Informative content	19	13	5	1
Aspirations/goals	11	11	0	0
Beef as food	23	15	6	2
Sustainability/environment	37	32	3	2
Confusion	21	4	8	7
Happiness/hope	65	59	5	1
Agriculture	24	16	8	0
Nostalgia	4	3	1	0
Gratitude	14	13	1	0
Skepticism	31	8	13	10
Other thoughts on content	46	24	15	7
Message Attributes				
Caption length	24	8	7	9
Photo	68	42	11	13
Hashtags	7	3	1	2
Heading	8	2	3	2
Overall post	36	27	5	4
Profile/credibility	17	5	6	6
Other thoughts on attributes	3	1	1	1
Incomprehensible	4	3	1	0

Conclusions, Implications, and Recommendations

The beef industry has come under scrutiny for its perceived unfavorable environmental impacts, and cattle producers and working to mitigate these influences and perceptions. Beef

organizations are also seeking to provide transparency between producers and the public through aspirations to promote positive attitudes and trust among concerned consumers. To communicate these goals, framing has been found to be an effective tool in connecting with certain values of a target audience (Goffman, 1974; Fischer et al., 2020; Sustainable Brand Index, 2020); however, across a fact-based, emotional, and aspirational frame, this study found no significant differences in viewer attitude toward the beef industry, trust in the message, or cognitive processing path. Despite this, data collected from the thought listing exercise provided additional insight that can lead to important implications for agricultural communicators in this area.

When exploring viewer attitude based on the frame shown, an overall neutral to slightly high attitude was reported by participants with the lowest attitude score from the emotional message and the highest being found from those viewing the control. This finding suggests Generation Z prefers more short-form content that is quicker to process, and social media is a more heuristic platform in terms of cognitive processing measures. As for participant trust, an overall neutral trust was reported with the highest level of trust coming from the aspirational message. Perhaps this is due to the aspirational message focusing on detailed impacts that beef producers are implementing to meet industry benchmarks (i.e., improve soil health, protect water sources, and maintain healthy ecosystems) while the other frames did not detail environmentally positive production impacts. By providing vivid examples of positive environmental impacts, consumer confidence can be increased (Fischer, 2017; Schechinger, 2023), promoting more positive attitudes toward the subject among viewers.

Delving into viewers' cognitive processing, measurements of viewing time and total amount of words and thoughts were compared to determine processing pathway. The emotional frame was viewed the longest in comparison to the other three messages at 2,122.06 seconds (35.37 minutes). This finding could indicate the participants' attempt at making a personal connection to the message; however, perhaps this type of appeal was not the correct approach for a population of college students who may not have their own children or families to relate this message to. The control had the least amount of viewing time among participants at 1,151.02 seconds (19.18 minutes) and had the least number of words recorded in the listed participant thoughts. Perhaps it was viewed the most heuristically by participants due to it being the shortest message that did not attempt to promote industry actions, appeal to generational values, or speak to the future of beef production. These findings confirm Martinez et al.'s (2021) results that communicating scientific information to Generation Z through social media is complex when looking through a heuristic versus systematic processing lens. In the case of informing attitudes and promoting trust among a target audience, a systematic view can be more impactful than a heuristic view due to the viewers' careful consideration of their personal involvement in the topic.

While this study did not reveal one message frame resonated best with Generation Z when communicating about beef sustainability on social media, the thought listing procedure uncovered key points viewers found interesting pertaining to the messages' content and attributes. Key themes that emerged from participant thought included *information seeking*, *happiness/hope*, *sustainability/environment*, and the *photos* used to supplement the message information. Each of these themes were found favorable in participant reports, revealing that consumers of Generation Z do value the environment and want to know what is being done to protect it. The happiness/hope theme was deemed favorable among the majority of viewers who listed these kinds of thoughts, indicating that more of these messages should be promoted to the public when communicating about the beef industry on social media. *Information seeking* is an important finding as supplemental information should be added when communicating scientific

information to inform attitudes and promote trust among a topic (Fischer et al., 2020; Goodwin et al., 2020; Swenson & Olsen, 2018). To fulfill this generation's information seeking needs, it is imperative that practitioners gain viewer attention and provide necessary information to promote a more systematic processing path when viewing persuasive messages online. Additionally, the thoughts provided by viewers indicated potential latent framing effects. While a single exposure may not be enough to make an immediate change in one's attitude or trust, continued use of message frames could influence perceptions when considering a long-term sustainability campaign for the beef industry.

To design impactful communications campaigns, several message features should be taken into consideration with the target audience when designing frames. When deciding the appropriate features to use, Shen and Bigsby (2013) found content, structure, and style are important factors to consider. The key themes that emerged in this study (happiness/hope, sustainability/environment, and the photos) were found to be favorable in the reports of the participants and should be referred to when tailoring a message's framing features. This finding reveals that consumers within this generation do value the environment and want to learn more about what is being done to protect it. Perhaps the participants felt the images were relatable by humanizing the situation by including imagery of human and animal subjects with the posts, making photos an important aspect of message framing. Communicators can pique viewer interest when sharing factual information to promote issues that are perceived as unfavorable to the public when under scrutiny by allowing them to process a message more systematically rather than heuristically.

Recommendations for Practice & Future Research

The results of this study provided recommendations that can be used in marketing and agricultural communications when promoting environmental commodities to target audiences like Generation Z. When creating social media messages for this audience, it is important to consider the imagery used to supplement the promoted information. Using high quality content that can be relatable to the target audience is important and confirms O'Neill et al.'s (2013) finding that imagery is important in communicating environmental issues. As the thought listing procedure also revealed, viewers wanted more information about the topic after viewing the message. Therefore, practitioners should provide supplemental information to social media posts so viewers can more systematically consider the message to reach a judgement, potentially informing attitude or enhancing trust in the presented message. To spark information seeking among viewers, practitioners should use hope or aspirational driven messages that highlight long-term sustainability goals in the beef industry with vivid images when designing messages for digital content. By promoting messages that elevate the beef industry's aspirations in consideration of the top message content and attribute topics, communicators can gain viewer attention while also sharing factual information to promote issues that are perceived as unfavorable to the public. For educators, the addition of framing in the curriculum should be utilized to teach agricultural communications students to create impactful campaigns and messages that appeal to the target audience. Teaching students how to effectively conduct strong audience analyses and create personas for their target audience should be emphasized in post-secondary education courses. Furthermore, the creation of easily digestible scientific communication should be included in the campaign toolbox for it to supplement messages when viewers wish to seek further information.

This study provides a foundation for future research opportunities. Research should be conducted with a larger sample size to potentially yield more significant results to this specific population. Additionally, testing the three message frames across other generations that have higher personal risk could provide further insight about beef sustainability frames on social media. For Generation Z, different frames should be tested among this population as there were no significant differences found on viewer attitude, trust, or processing; perhaps more obviously different frames should be tested such as gain versus loss frames or reward framing. One mock Instagram post served as the stimuli for this study but proved to not be enough to allow the viewer to systematically process the topic. Further research should delve into strategies to add supplemental information to social media posts to give the viewer more confidence in the information provided and perhaps allow users to process more systematically in order to inform attitudes and increase trust among audiences. Moreover, eye tracking could be a useful tool in this area to enhance the Heuristic Processing Theory to determine how long viewers are paying attention to the stimuli and where their visual attention allocation is on the post: photo, caption, or headline. This method could provide further insight for future social media practice to promote a more systematic approach to cognitive processing. Finally, this study focused on language regarding 'sustainability' in the beef industry. Future research should focus on different terms such as 'regenerative agriculture' or 'climate friendly' to determine what language resonates with consumer audiences, like Generation Z, best. This type of research would benefit not only the beef industry but others in agriculture promoting products that are under scrutiny for perceived unfavorable environmental impacts.

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