

Exploring How Music Influences Hedonic Response to, Elaboration on, and Recall of Scientific Information about Gene-Edited Pigs

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Recommended Citation

Baffour-Awuah, D., Lamm, A. J., Byrd, A. R., Lamm, K. W., Sanders, C., Qu, S., Masambuka-Kanchewa, F., & Retallick, M. (2026). Exploring how music influences hedonic response to, elaboration on, and recall of scientific information about gene-edited pigs. *Journal of Applied Communications*, 110(2), 1–23.

<https://doi.org/10.4148/jac.20877>

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Exploring How Music Influences Hedonic Response to, Elaboration on, and Recall of Scientific Information about Gene-Edited Pigs

Abstract

Public understanding of emerging scientific innovations can be influenced by ethical, emotional, and cultural concerns, which complicate how people interpret the benefits of science. Appealing to the emotional as well as logical side of decision-making may assist when communicating about innovations. The use of gene editing in agriculture is an example of complex science that may be contentious, including the recently developed Porcine Reproductive and Respiratory Syndrome (PRRS)-resistant pig. Music has been shown to garner attention as a form of hedonic stimuli and may assist in emotionally connecting someone to scientific information. The purpose of this study was to explore how background audio could influence hedonic response to, elaboration on, and recall of scientific information about the PRRS-resistant pig on Instagram. Using an experimental design, 1,000 U.S. respondents were randomly assigned to view an Instagram-style reel accompanied by one of five audio treatments: rap music, pop music, country music, AI-generated voiceover, or no sound. Hedonic response, elaboration, and recall were measured using validated scales and analyzed using one-way ANOVAs and Tukey's post hoc tests. Results indicated country and pop music produced the highest hedonic responses, and the AI-generated voiceover and country music resulted in the highest elaboration. Rap music led to the highest recall. The findings imply music has the potential to influence communication in digital settings. Agricultural communicators seeking to improve public engagement with scientific innovations, especially on social media, can include specific background audio with their messages to elicit hedonic response, increase elaboration, and enhance recall.

Keywords

Gene editing, music, PRRS-resistant pigs, hedonics, elaboration

Authors

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Introduction

Science and technology are an integral part of modern life (Betz et al., 2023). For this reason, people increasingly face the need to integrate scientific information with their personal values as they make important life decisions (National Academies of Sciences, Engineering, and Medicine, 2017). The scientific community has a duty to engage with society to disseminate knowledge and provide a return on public investment in the science enterprise (Trench, 2021). However, communicating science effectively takes specific skills, such as knowing how to clearly explain ideas to different audiences (Borowiec, 2023).

A specific area where the scientific community has been publicly challenged, leading to misconceptions regarding its use, is gene editing (GE), an emerging scientific innovation (Qaim, 2020). GE is the modification of specific parts of an organism's genetic material to express favorable traits (Lanigan et al., 2020). GE in agriculture has primarily focused on crop improvement, aiming to enhance traits such as crop yields, stress tolerance in the face of drought or flooding, and disease resistance (Chen et al., 2019). Despite these advantages, skepticism of GE remains a challenge (Khattak et al., 2026; Spreen & Klimmt, 2024; Kato-Nitta et al., 2019), complicating how to effectively communicate about the science behind it. One factor contributing to this challenge is the confusion surrounding terminology, particularly the similarities between the terms GE and genetically modified organisms (GMOs; Wells & Jolly, 2017). Both GMOs and GE involve intentional genetic modifications, but GMOs typically involve inserting foreign DNA, while GE often makes precise changes to existing genes without adding new genetic material (Ahmad et al., 2023). Because public awareness of gene editing remains limited, many people continue to struggle to distinguish GE from genetic modification, which may contribute to uncertainty about its application (Oh & Lee, 2025).

Ethical concerns also play a role, as some believe GE could harm organisms and the environment (Shinwari et al., 2018). Media representations of GE often generate sensationalism, confusion, or fear among the public (Bubela et al., 2009; Ji et al., 2022). Additionally, there are concerns GE is unnatural and scientists are “playing God” (Locke, 2020; Mehta, 2001, p. 207; Stapleton & Torres Yabar, 2023). Nonetheless, the use of GE in agriculture is expanding from crops to livestock with its inherent advantages believed to overcome public scrutiny. Scientists have argued GE has the potential to transform agriculture by allowing precise, efficient, and targeted modifications which enhance crop resilience, nutritional value, and productivity (Zhang et al., 2014) and improve animal health and welfare as well as disease resistance (Van Eenennaam, 2017).

Recent agricultural advancements in GE have taken what scientists have learned from using GE to advance crop resilience and applied the knowledge to livestock. Specifically, GE has been used on pigs to make them resistant to Porcine Reproductive and Respiratory Syndrome (PRRS). PRRS presents a major challenge for global pig production (Whitworth et al., 2016), the result of a positive-stranded RNA Arterivirus (Nesbitt et al., 2024). PRRS adversely impacts pig health and productivity by causing increased abortions, prenatal losses like stillbirths and mummified fetuses, and weaker piglets, which result in higher pre-weaning mortality and lower weaning weights (Magalhães et al., 2025). Additionally, PRRS raises post-weaning mortality, decreases average daily weight gain, and makes pigs more vulnerable to secondary bacterial infections that typically need antibiotic treatment (Machado et al., 2024; Mainquist-Whigham

et al., 2025; Schweer et al., 2016). Holtkamp et al. (2013) estimated PRRS caused \$664 million in annual losses from 2006 to 2010.

Reducing the risk of PRRS through PRRS-resistant pigs will help reduce pig deaths, improve pig growth, and lower the need for antibiotics leading to healthier animals, increased farm productivity, and reductions in economic loss (Fiers et al., 2024). Many consider the GE PRRS-resistant pig a major milestone in agriculture, while others have concerns regarding public emotional reaction and lack of acceptance of the science (Frewer et al., 2013; Ishii, 2017). Therefore, effectively communicating the results of using GE science to make pigs PRRS resistant, which includes a reduction in antibiotic use and improved animal welfare, requires science communication strategies that not only inform but emotionally engage the public.

Logic and reason form the basis of the scientific method and therefore are often the cornerstone of scientific communication messaging (Hall Jamieson & Hardy, 2014). However, successful science communication can benefit from engaging emotions (Skurka et al., 2019; Taddicken & Reif, 2020). Emotional responses such as fear, excitement, hope, and anger triggered by messages can significantly alter thoughts and motivate actions (Dillard & Nabi, 2006; Lazarus, 1991; Tannenbaum et al., 2015). Therefore, science communicators often engage their audiences emotionally by utilizing approaches such as storytelling (Dahlstrom, 2014; Davies et al., 2019; Kaplan & Dahlstrom, 2017), image visualization (Nayak & Iwasa, 2019), and humor (Frank et al., 2025; Hee et al., 2022).

Another approach to emotional appeal is the use of music, which has been found to evoke profound emotional and cognitive reactions, and enhance message retention (Lacher, 1989; Micallef Grimaud & Eerola, 2022). Music can serve as a messaging vehicle by embedding a message in lyrics (acapellascience, 2017; Dixon et al., 2024; Dr. Raven the Science Maven, 2020) or as a hedonic cue, where music accompanies a message to evoke emotional experiences of pleasure or displeasure, while the message is being conveyed (Micallef Grimaud & Eerola, 2022; Reybrouck & Eerola, 2022). In the digital media era, music is often used hedonically as the background to shorts and reels on platforms like YouTube, TikTok, and Instagram to attract engagement (Gu, 2024). Given the demonstrated potential of music to influence emotions and enhance message retention (Micallef Grimaud & Eerola, 2022), a study investigating the effect of using music as a hedonic cue in science communication efforts is warranted when attempting to appeal to both logic and emotion as in the case of the GE PRRS-resistant pig.

Literature Review

Capturing and maintaining public attention in today's digital environment has become increasingly challenging (Shanmugasundaram & Tamilarasu, 2023). Attention is a finite resource (Oberauer, 2019). Science communicators must compete effectively with entertainment, sports, and misinformation to capture an audience's attention (Dai & Wang, 2023). Although the public may not actively pursue scientific information, individuals may be interested in agricultural innovations and likely hold values related to agricultural issues like food safety, animal welfare, and environmental sustainability (Iorfa et al., 2025; Jose et al., 2025; Martin et al., 2024). The literature refers to this as "Latent Readiness" (Jackson, 1990, p. 2). Jackson (1990) first introduced the concept of latent readiness as part of his public relations model, describing it as a critical stage where individuals are not actively contemplating an effect but are forming

predispositions that can be later activated, thereby leading to an effect or action. Triggering latent readiness can encourage profound message processing, even among audiences who are not actively seeking information (Fishbein & Ajzen, 2010).

A potent method to stimulate latent readiness is by eliciting hedonic responses, which are experiences of pleasure and displeasure (Micallef Grimaud & Eerola, 2022). Hedonics represent essential elements of emotional experiences and contribute to core positive and negative reactions to introduced phenomena (Becker et al., 2019). Specifically, pleasure, as the positive valence of feelings, includes enjoyment, happiness, and satisfaction, induced by events perceived as beneficial and can arise from receiving a desired stimulus or from the removal of an aversive event (Cabanac, 2002). Hedonic motivation refers to the desire to engage with media primarily to experience pleasure and positive feelings or to avoid discomfort (Oliver & Raney, 2011). Uses and Gratifications Theory (Katz et al., 1973) suggests audiences actively pursue content that fulfils their emotional or informational needs, with enjoyable stimuli proving especially effective in capturing attention and promoting engagement. The theory has been widely applied in agricultural and science communication research to understand audience motivations for engaging with blogs, social media, and online communication platforms (Byrd et al., 2025; Haller et al., 2019; Meyers et al., 2015).

Eliciting pleasure as a hedonic response has been shown to improve message elaboration and recall (Lang, 2000). Listeners driven by hedonism typically report favorable emotional responses, reinforcing the role of enjoyable stimuli, like music, in enhancing audience engagement (Powell et al., 2023). Research in agricultural and food communication contexts has shown that emotionally engaging communication strategies, including environmentally themed music and affective video messaging, can influence audience perceptions and willingness to engage with sustainable food systems concepts (Locke et al., 2025; Wang & Li, 2023). This is clear in genres like country and pop, where repetitive harmonies, straightforward melodic patterns, and rhythmic structures evoke pleasurable responses (Korczynski, 2014; Ostberg, 2025; Rojek, 2011). Overall, this indicates hedonic characteristics influence both enjoyment and how deeply audiences engage, providing a solid basis for examining genre-specific impacts.

In digital platforms, particularly social media, aside from music serving as a hedonic stimulus that engages users, it is also used to draw their attention to content. A qualitative study by Laplante and Downie (2011) found younger adults derived both utilitarian (goal-oriented) and hedonic satisfaction from finding music-related information on digital platforms. This presents an opportunity for agricultural science communicators to utilize hedonic cues as an effective strategy for capturing audience attention while conveying scientific information or clarifying complex scientific topics. Such seemingly complex subjects include GE.

Studies have indicated the public perceives GE as a complex phenomenon (McCaughey et al., 2019) or confuses it with genetic modification (Shew et al., 2018). In research exploring this issue, McFadden et al. (2024) found negative public perceptions of GE can be corrected by providing substantial safety evidence over time, and that familiarity with GE helps create more positive safety opinions, suggesting evidence can lead to broader acceptance. Given this, agricultural science communicators may create short-form videos or reels enhanced with music as a hedonic cue to evoke enjoyment and curiosity, thereby capturing the attention and fostering

deeper message processing among audiences who are latently ready to engage and learn about scientific innovations such as GE but require the right stimuli (Micallef Grimaud & Eerola, 2022; Rehman et al., 2024). Incorporating emotionally resonant elements, such as short videos and reels set with music, may evoke hedonic responses that act as gateways to learning (Schäfer et al., 2013). These enjoyable stimuli could attract audience attention and enhance their engagement with the content (Valenzuela-Gálvez et al., 2024). According to Petty and Cacioppo (1986), the initial peripheral engagement could pave the way for deeper processing of the central message when the content resonates with the audience's predispositions. Therefore, using music strategically may assist in conveying essential scientific information on GE to audiences, encouraging positive reception and central processing, rather than ignoring the scientific message or reacting negatively.

Purpose and Research Objectives

The purpose of this study was to determine whether elaboration, recall, and hedonic response differed depending on the background music accompanying an Instagram reel about GE PRRS-resistant pigs.

RO1: Determine respondents' levels of hedonic response, elaboration, and recall after viewing an Instagram reel accompanied by rap, pop, country music, an AI-generated voiceover, or no-sound.

RO2: Determine if hedonic response, elaboration, and recall differ based on type of music accompanying an Instagram reel.

H1: Hedonic response, elaboration, and recall will differ based on the sound treatment associated with an Instagram reel a respondent receives (rap music, pop music, country music, AI-generated voiceover, or no-sound).

Methods

A quantitative experimental research design was used to address the research objectives, which sought to determine whether elaboration, recall, and hedonic response differed across types of audio accompanying an Instagram reel about gene-edited pigs. Specifically, data were collected through an online survey instrument. Quantitative methods are well suited for examining such differences between variables and for supporting generalizable conclusions from data (Creswell & Creswell, 2018). An experimental approach was chosen because it enables manipulation of independent variables and assessment of their impact on dependent variables in controlled settings, which enhances causal inference (Campbell & Stanley, 1963; Kämpfe et al., 2011). Quantitative methods, however, have limitations in capturing emotional nuances and contextual factors influencing individuals' reactions to scientific messages. Nevertheless, an experimental design was suitable, as it enabled systematic manipulation of audio treatments and precise measurement of their impact on hedonic response, elaboration, and recall within a controlled setting. Data were collected from residents representative of the U.S. population aged 18 and older, based on age, state of residence, sex, ethnicity, and race. Non-probability opt-in sampling was used to recruit respondents who were geographically representative of the U.S. public (Baker et al., 2013). Non-probability samples are commonly accepted as a sampling

technique in agricultural communication research (Lamm & Lamm, 2019) and are used in public opinion research to overcome issues with non-response bias but can introduce limitations to generalizability (Baker et al., 2013). Respondents were recruited through Qualtrics Panels. Potential exclusion, selection, and non-participation biases were accounted for with post-stratification weighting methods (Baker et al., 2013). The 2020 U.S. Census was used to weight data based on gender, age, race/ethnicity, and geographic location to ensure the results represented the population of interest.

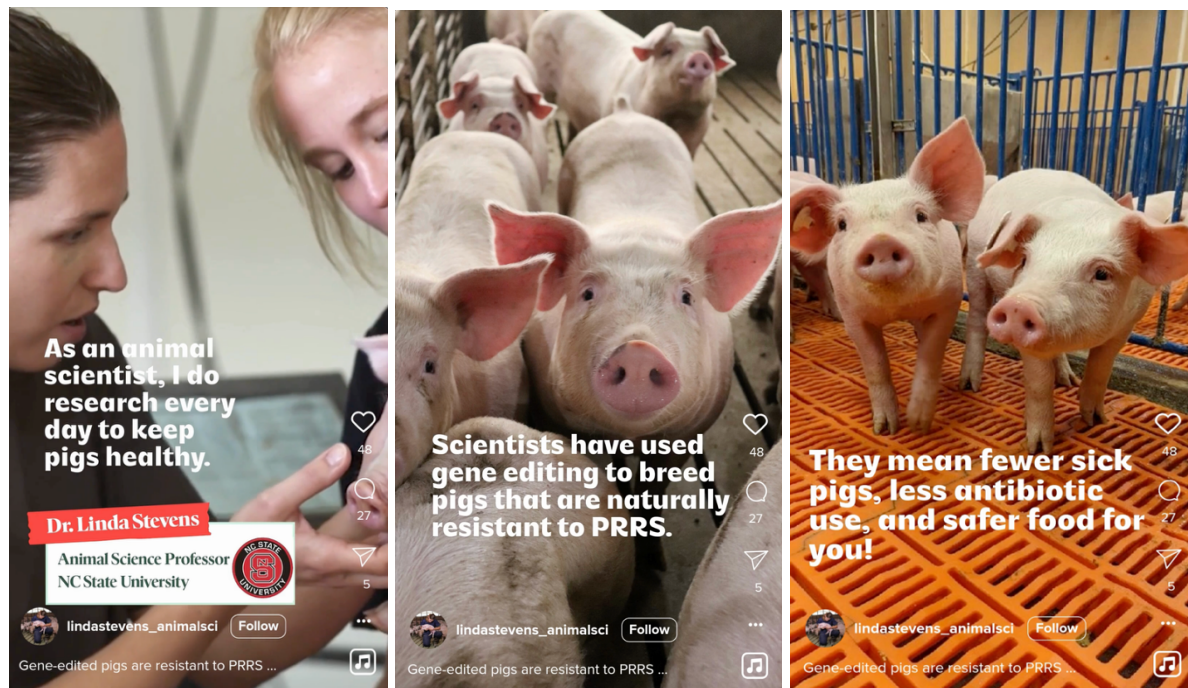
The research presented here was part of a larger study designed to explore public perceptions of pork to inform effective science communication around animal production practices. The instrument was pilot tested with 50 respondents representative of the population of interest. All scales were deemed reliable after they were assessed for internal consistency reliability using Cronbach's alpha and then full data collection commenced. The pilot test yielded Cronbach's alpha values of 0.86 for the hedonic scale and 0.92 for the elaboration scale. A total of 1,000 responses were obtained. Respondents were randomly assigned to one of five treatment groups where they were asked to watch an Instagram reel. Each group viewed an identical Instagram-style reel embedded in Qualtrics with a simulated Instagram user interface (UI). The reel was 35 seconds long and featured "Dr. Linda Stevens," a fictional animal scientist from North Carolina State University, making on-farm observations of pigs. The reel combined short video clips and still photographs, with text captions rolling across the screen from beginning to end. The content was edited into an Instagram-style reel using Adobe Express. A screenshot of the reel is provided in Figure 1. The reel script was designed to convey key concepts about gene-edited PRRS-resistant pigs in a concise, accessible format suitable for short-form social media. Message development drew on existing literature on PRRS-resistant pigs, antibiotic reduction, and science communication strategies that emphasize clarity and public accessibility. The script was also reviewed by an expert panel to ensure scientific accuracy and clarity for non-expert audiences. The script for the reel read as follows:

"As an animal scientist, I do research every day to keep pigs healthy. Sick pigs need antibiotics. But what if they didn't get sick in the first place? Scientists have used gene editing to breed pigs that are naturally resistant to PRRS. PRRS is a respiratory disease affecting millions of pigs each year. What do PRRS-resistant pigs mean? They mean fewer sick pigs, less antibiotic use, and safer food for you!"

Respondents were not provided with additional background information about PRRS before viewing the reel, allowing the stimulus to reflect the type of brief, stand-alone scientific content commonly encountered on social media platforms.

Figure 1.

Screenshots From the 35-Second Instagram Reel Used in the Study.



(a)

(b)

(c)

Note. (a) Opening frame introducing Dr. Linda Stevens, (b) midpoint frame explaining the innovation of scientists, (c) closing frame highlighting the benefits of PRRS-resistant pigs.

Visuals and captions were consistent across all treatments, with the only variation being the audio: rap music, pop music, country music, an AI-generated voiceover, or no-sound (control). The music consisted of instrumentals (defined here as recordings or versions of the songs that include only musical accompaniment and exclude any vocals or lyrics) from popular songs. *Not Like Us* by Kendrick Lamar was used as the rap treatment. *Blinding Lights* by The Weeknd was used for the pop treatment. *Tipsy* by Shaboozey was used as the country treatment. These songs were chosen not only for their familiarity and widespread use across social media platforms at the time of the study, but also to represent different musical genres (such as pop, country, and rap), which are often used in short-form social media content, including Instagram. At the time of stimulus development, each selected song had accumulated over one billion Spotify streams, with *Blinding Lights* exceeding five billion streams. All selections were matched for similar tempo and duration to ensure consistency across treatments and to naturally fit the pacing and tone of the Instagram reel message. The communication strategy guiding stimulus development focused on maintaining a consistent scientific message across all conditions while varying only the audio treatment to examine how genre-based hedonic cues influenced audience responses. Music selections were intended to function as peripheral and emotionally engaging cues commonly encountered in short-form social media environments while avoiding excessive distraction from the scientific content itself. The genres were classified using Wikipedia and cross-verified through Music Genre Finder to ensure alignment with public

perception. For the AI-generated voiceover, audio was created using the Hume AI application. A female voice, “Ava Song,” was selected within the platform’s text-to-speech feature to narrate the reel. This choice was made because it offered a clear, neutral, and natural-sounding female tone that suited the fictional Dr. Stevens character. The script was entered into the Hume AI interface, and the generated audio was exported and embedded into the reel as the voiceover treatment.

An attention filter was used to ensure respondents carefully read instructions and engaged meaningfully with the survey. This procedure ensured data quality, as respondents who failed the filter were flagged and removed from the final dataset, following established best practices for online survey research (Oppenheimer et al., 2009). Before viewing the Instagram reel, respondents were instructed to turn up the volume on their device to ensure they could hear the audio treatment. As a manipulation check, respondents were later asked to indicate which audio condition they heard (one of the three songs, AI voiceover, or no-sound). Responses inconsistent with assigned conditions were excluded from analysis to confirm accurate treatment exposure.

Measures

Hedonic Response

Respondents’ hedonic reaction was measured using a five-point semantic differential scale (Voss et al., 2003). Respondents were presented with the sentence “Watching this Instagram reel felt...” and asked to indicate their perception between five pairs of opposing adjectives; Unpleasant - Pleasant, Boring - Exciting, Indifferent - Interested, Sad - Happy, Anxious - Calm. The average of the five items was used to create a mean score to represent the overall hedonic reaction. The scale was deemed reliable ($\alpha = 0.87$), exceeding the recommended minimum of .70 for acceptable internal consistency (Taber, 2018).

Elaboration

Respondents’ elaboration was measured by asking them to indicate their level of agreement or disagreement with eight statements using a five-point Likert-type scale. An elaboration scale developed by Slater and Rouner (2002) was researcher-adapted to the content of gene edited pigs. Each item was measured on a scale from 1 to 5 (1 = Strongly Disagree; 2 = Disagree; 3 = Neither Agree nor Disagree; 4 = Agree; 5 = Strongly Agree) reflecting respondents’ depth of cognitive engagement and personal reflection on the topic presented in the reel. The items included: "I carefully considered the arguments in the message about gene edited pigs," "I thought deeply about the information provided on gene edited pigs," "I analyzed the quality of the recommendations for eating pork from gene edited pigs," "I tried to connect the message to my own experiences with the food I eat," "The message made me reflect on the potential use of gene editing in food," "The message was thought-provoking and made me reconsider my current thoughts about gene editing," "I considered how the information in the message applies to me," and "I thought about how I could use the information presented when making choices about the food I eat." The mean score was calculated by taking the average of the responses to the eight items and represented the respondents’ overall elaboration. The scale was deemed reliable ($\alpha = 0.93$). The real limits of the scale were 1.00 – 1.49 = Strongly

Disagree, 1.50 – 2.49 = Disagree, 2.50 – 3.49 = Neither Agree nor Disagree, 3.50 – 4.49 = Agree, 4.50 – 5.00 = Strongly Agree (Petty & Cacioppo, 1986).

Recall

Respondents' recall was measured by asking them to indicate whether each of five presented statements was true or false. All questions asked were based on the information presented in the Instagram reel. Statements included "Pigs can be gene edited," "PRRS is a disease impacting pigs' cardiovascular system," "Gene-edited pigs get sick less than pigs which are not gene edited," "Pork from gene-edited pigs is produced with more antibiotics," and "Pork produced with less antibiotics may be safer for humans." A respondent received a point for each answer they got correct. A total recall score was calculated by summing the correct responses and could range from zero (no correct answers) to five (all correct answers).

The survey was reviewed by an expert panel with expertise in survey design, animal science, agricultural communication, industry relations associated with the GE PRRS-resistant pig, and evaluation. Based on this review, minor adjustments were made to the Instagram reel to strengthen external validity, and recall questions were adjusted slightly. IRB approval was obtained from the University of Georgia.

The data were analyzed using SPSS version 23.0. Descriptive statistics, including means and standard deviations, were computed to address the first objective, and one-way ANOVA with Tukey's post hoc test was conducted to address the second objective.

Results

Levels of hedonic response, elaboration, and recall after viewing an Instagram reel accompanied by rap, pop, country music, an AI-generated voiceover, or no-sound

Respondents' hedonic, elaboration, and recall responses varied across audio treatments in the Instagram reel. Hedonic scores were highest for country music treatment ($M = 3.73$, $SD = 0.97$), trending toward the positive side of the scale, and the lowest in the no-sound treatment ($M = 3.35$, $SD = 0.90$), which was closer to a neutral position. Elaboration scores were highest for the AI voiceover treatment ($M = 3.78$, $SD = 0.79$), indicating respondents were generally in agreement with statements of engagement, while the lowest elaboration score occurred in the no-sound treatment ($M = 3.40$, $SD = 0.77$), reflecting a neutral stance. Recall scores were relatively similar across treatments, ranging from 3.19 ($SD = 1.18$) for the country music treatment to 3.60 ($SD = 1.12$) for the rap treatment (see Table 1).

Table 1*Hedonic, Elaboration, and Recall by Treatment*

	Hedonic ^a		Elaboration ^b		Recall ^c	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Rap	3.46	0.96	3.55	0.84	3.60	1.12
Pop	3.63	0.96	3.58	0.82	3.50	1.15
Country	3.73	0.97	3.65	0.83	3.19	1.18
AI Voiceover	3.58	0.92	3.78	0.79	3.42	1.22
No-sound	3.35	0.90	3.40	0.77	3.41	1.20

Note. ^a Scale: 1 = Unpleasant/Boring/Indifferent/Sad/Anxious, 5 =

Pleasant/Exciting/Interested/Happy/Calm. ^b Scale: 1 = Strongly Disagree, 5 = Strongly Agree. ^c

Scale: 0 = None correct, 5 = All correct.

Determine if Hedonic Response, Elaboration, and Recall Differ Based on Type of Music Accompanying an Instagram Reel

A one-way ANOVA was conducted to examine whether hedonic response, elaboration and recall differed by audio treatment (see Table 2). There were statistically significant differences between hedonic response based on audio treatment, $F(4, 995) = 4.83, p < .001, \eta^2 = 0.02$; elaboration based on audio treatment, $F(4, 995) = 5.87, p < .001, \eta^2 = 0.02$; and recall based on audio treatment, $F(4, 995) = 3.02, p = .017, \eta^2 = 0.01$. Although significant differences existed, they had small effect sizes, implying the audio treatment received explained only slight amounts of variance in the response.

Table 2*Differences in Hedonics, Elaboration and Recall across Five Treatments*

	<i>df</i>	<i>F</i>	<i>p</i>	η^2
Hedonic	4	4.83	<.001	0.02
Elaboration	4	5.87	<.001	0.02
Recall	4	3.02	<.017	0.01

Note. ** $p < .01$.

The specific differences between audio treatments for recall, elaboration, and hedonic response were examined using Tukey's HSD post hoc test (see Table 3). For hedonic response, respondents in the country treatment ($M = 3.73, SD = 0.97$) reported significantly greater hedonics than those in the rap treatment ($M = 3.46, SD = 0.96$; mean difference = 0.27, $p < .05$) and those in the no-sound treatment ($M = 3.35, SD = 0.90$; mean difference = 0.38, $p < .05$). Respondents in the pop treatment ($M = 3.63, SD = 0.96$) also reported significantly greater hedonics than those in the no-sound treatment (mean difference = 0.28, $p < .05$).

For elaboration, respondents in the AI Voiceover treatment ($M = 3.78, SD = 0.79$) scored significantly higher than those in the rap treatment ($M = 3.55, SD = 0.84$; mean difference = 0.23, $p < .05$) and the no-sound treatment ($M = 3.40, SD = 0.77$; mean difference = 0.37, $p < .05$).

.05). Additionally, respondents in the country treatment ($M = 3.65$, $SD = 0.83$) scored significantly higher than those in the no-sound treatment (mean difference = 0.25, $p < .05$).

Table 3

Tukey's HSD Post Hoc Test Results by Audio Treatment

Hypotheses tested			ΔM	p
Rap	Country	Elaboration	0.11	0.73
		Hedonic	0.27	0.05*
		Recall	0.41	0.01*
	Pop	Elaboration	0.03	0.99
		Hedonic	0.17	0.31
		Recall	0.10	0.90
	AI Voiceover	Elaboration	0.23	0.03*
		Hedonic	0.12	0.67
		Recall	0.17	0.55
	No-sound	Elaboration	0.14	0.36
		Hedonic	0.11	0.75
		Recall	0.19	0.48
Country	Pop	Elaboration	0.07	0.92
		Hedonic	0.10	0.86
		Recall	0.31	0.09
	AI Voiceover	Elaboration	0.13	0.59
		Hedonic	0.15	0.57
		Recall	0.24	0.31
	No-sound	Elaboration	0.25	0.03*
		Hedonic	0.38	0.001**
		Recall	0.23	0.35
	AI Voiceover	Elaboration	0.20	0.10
		Hedonic	0.05	0.98
		Recall	0.07	0.97
Pop	No-sound	Elaboration	0.18	0.16
		Hedonic	0.28	0.02*
		Recall	0.08	0.95
	AI Voiceover	Elaboration	0.37	<.001**
		Hedonic	0.23	0.09
		Recall	0.01	1.0

Note. * $p < .05$, ** $p < .01$.

For recall, respondents in the Rap treatment ($M = 3.60$, $SD = 1.12$) scored significantly higher than those in the country treatment ($M = 3.19$, $SD = 1.18$; mean difference = 0.41, $p < .05$). No other recall comparisons reached statistical significance. Therefore, Hypothesis 1 was partially supported.

Conclusions, Implications, and Recommendations

This study explored how different audio treatments such as rap, pop, country, AI voiceover, and a control (no-audio), impact viewers' hedonic responses, elaboration, and recall when watching an Instagram-style reel about gene-edited pigs. While the effects observed were small, the results provide insights into how audio treatments may influence social media users' reception of scientific agricultural messages.

Limitations

The study used a non-probability opt-in online sample in the U.S., so the results may not apply to other populations. Some other limitations should be noted. Respondents viewed the content in a simulated survey setting rather than the actual Instagram feed, meaning algorithmic cues, comments, and social context were missing. Responses were gathered immediately after a single exposure, so long-term effects are unknown. All music used was instrumental only, so the findings mainly reflected nonverbal musical features such as rhythm, tempo, timbre, and mode, rather than lyrics. Additionally, the deployment of this survey happened after the 2025 Super Bowl, which Kendrick Lamar headlined. There was some cultural and social controversy surrounding the performance that may have biased the results of the study given the recency and recognizability of the instrumental version of *Not Like Us*. The study also did not directly assess genre familiarity, preferences, or prior attitudes toward gene editing, or individual differences in the extent to which respondents value hedonic experiences, all of which could influence or moderate the results. Additionally, the songs chosen were popular across short-form videos and respondent familiarity with the treatment songs may have affected their responses. Respondents were instructed to turn on their device volume before viewing the reel, however, the study could not independently verify that respondents maintained the volume throughout exposure. Finally, the outcomes were self-reported, recall was measured using a brief true/false format which may have increased the possibility of correct responses occurring by chance, and respondents were not provided with background information about PRRS before watching the reel, meaning differences in prior familiarity with the disease could have influenced elaboration and recall results.

Conclusions and Implications

Despite these limitations, the findings align with earlier work and provide insights which can be used to direct future agricultural communication efforts and guide additional research. Previous research by Kämpfe et al. (2011) and Aksoy-Hasirci (2023) indicated background music can significantly shape emotions and influence activities like reading, often with small effect sizes, aligning with these findings. The results also reinforced that even subtle background audio can affect how audiences process and respond to scientific content on social media platforms (Gu, 2024). Overall, the findings implied that choosing specific audio styles can support communication objectives aimed at hedonic response, elaboration, and recall, thereby generating excitement, encouraging deeper reflection, or to some extent, improving memory. In line with digital communication research, hedonic cues may serve as hooks, while narration adds depth, consistent with dual-process models (Gu, 2024).

Congruency may also matter. The Instagram-style reel focused on farm animals; therefore, both country and pop music likely matched the topic's social imagery more than the rap song. This may explain why country music elicited stronger hedonic responses than rap music. Agricultural communication research has similarly suggested that congruent messaging may increase audience attention, engagement, and information processing when message elements align with audience expectations, values, or social meanings (Fischer et al., 2021). In contrast, rap music may feature dense lyrics, more pronounced rhythmic syncopation, and darker tones, which can be mentally demanding or less in sync with the visuals, depending on the listener. This may reduce enjoyment even if it supports other outcomes (Kresovich et al., 2021). Future research should explore whether the alignment between music genre and video topic has a greater impact on audience responses than musical structure alone. This could involve systematically varying the congruence between audio and visual content across a range of agricultural and non-agricultural topics.

The findings align with research indicating rap's emotional profile is not always pleasant in brief exposures, and that musical structure alone does not necessarily predict a positive emotional response (Susino & Schubert, 2019). In addition, silence eliminates social presence and hedonic cues that music provides, which can reduce perceived enjoyment (Herff et al., 2025). This may explain why the no-sound treatment did not outperform other treatments. This implies science communicators should use music that has a relatable tone rather than a dark one or no-sound to enhance their messages.

Overall, the findings indicated when incorporating instrumental music into short-form science videos on Instagram agricultural communicators should select music genres that match the mood and social imagery of the visuals. Communicators should use mid-tempo, simple rhythmic patterns with acoustic, rounded timbres like guitar, fiddle, or light percussion that create an inviting atmosphere rather than a tense one. Additionally, avoiding audio entirely should be reconsidered, as sound helps convey social presence and quality cues.

On the other hand, the rap music outperformed country in recall, while other contrasts were not significant. A possible explanation is the strong, regular rhythmic cues served as a temporal scaffold, aiding some viewers in encoding the message more effectively. Previous studies have shown no benefit to using rap in the background, and in some cases, classical music has outperformed rap in general memory tasks (Bugter & Carden, 2012). However, other research suggests that including rap or hip-hop as a mnemonic device, such as lyrics, hooks, or culturally relevant media, could improve retention and may be the case in our study when compared to the country treatment. Examples include lasting improvements in stroke knowledge through school-based 'Hip Hop Stroke' programs (Williams et al., 2018) and measurable vocabulary increases from listening to hip-hop (Chesley, 2011). Consequently, the difference in recall between rap and country likely stems from rhythmic salience and entertainment rather than genre effects, and these findings should be seen as context-dependent and warrant further research. Studies can investigate this by experimentally manipulating salience of the same track to assess whether stronger or lighter rhythms consistently support recall. Additional studies might include short lyrical hooks to determine whether mnemonic elements of rap enhance memory beyond just instrumental beats.

Respondents elaborated more deeply with the message when the AI voiceover was included rather than the music or no-sound. This implies spoken words may provide semantic structure, organize ideas clearly, and guide attention to main points (Evans, 2006; Wang et al., 2024). In comparison, the country treatment outperformed no-sound, indicating that even a consistent, relevant musical background can help maintain attention and reduce mind-wandering compared to silence, although it does not offer the explanatory clarity of narration. Practically, for deeper reflection, agricultural communicators should prioritize clear narration and consider adding a subtle, matching instrumental underneath, and avoid a silent background.

Recommendations

This research highlights the impact of music when communicating agricultural science through social media reels, specifically on Instagram. While music can increase hedonic response, improve elaboration, and enhance recall, certain music genres are more effective than others depending on the desired influence. The findings, while limited by their effect size, provide evidence-based strategies to improve interest in scientific messaging on social media. Future research should compare instrumental and vocal versions within genres, such as chorus hooks versus beats. It should also test human versus AI narration and analyze voiceover combined with music at various levels. Additionally, manipulating music-message congruence and core musical parameters like tempo, mode, syncopation, timbre, and beat density systematically, with multiple pre-tested exemplars for each condition, could also be explored.

Finally, the research can be replicated with these audio manipulations to explore topics beyond contentious issues like GE. Subjects like water conservation, invasive species management, and controlled environment agriculture are areas where public understanding and behavior are critical but often challenging to influence. For instance, emotional framing has been shown to greatly impact people's willingness to conserve water (Wang et al., 2021). When it comes to invasive species, effective communication strategies and outreach are key factors in engaging the public and shaping their perceptions (Banerjee & Huang, 2023). Since issue involvement can influence persuasion by affecting message-relevant cognitive responses (Petty & Cacioppo, 1979), the impact of audio effects on hedonic response, elaboration, and recall may vary depending on how strongly individuals feel about each topic. The findings imply music may play an important role in communicating agricultural science. As the use of social media continues, especially reels and videos where music is often present, agricultural communicators need to know how to capitalize on music's impact.

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