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Generation Z and CRISPR: Measuring information processing using animated infographics

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Generation Z and CRISPR: Measuring information processing using animated infographics

Abstract

CRISPR gene-editing technology, as it relates to food, has the potential to revolutionize the agricultural industry. Currently, 40% of global consumers are categorized as Generation Z. Gen Zer's are digital natives and use Instagram to discover new products; therefore, it is important to understand the most effective communications strategies to engage this segment of consumers with scientific information that will allow for informed decision-making regarding CRISPR technology. Infographics are a form of data visualization that can be used in a static or animated form. Previous studies have shown animated infographics to garner greater attention from respondents. Using the Heuristic-Systematic Processing Model (HSM) and the Risk Information Seeking and Processing (RISP) model as the guiding theoretical framework, this study used an experimental design to investigate respondents' information recall ability of CRISPR information using infographics. The results from the current study indicated respondents heuristically processed the information about CRISPR displayed to them through an infographic, as statistically significant differences were measured between the animated infographic treatment group and the respondent's recall ability on only 2 of the 3 recall questions asked. The exploration of demographic characteristics found a moderating effect on recall ability for only the static treatment group and political ideology. Key findings in the current research suggest the implementation of animated infographics may aid in more effective agricultural messaging if kept to one point of information and have a source of credibility.

Keywords

infographics, generation z, crispr, instagram

Authors

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Introduction

Although the United States is the primary producer of genetically modified (GM) produce, these foods are contested by many and the public remains divided on the subject (Kuntz, 2014; Wunderlich & Gatto, 2015). Even though the peer-reviewed science has given no indication genetically modified foods are unsafe, many consumers remain skeptical (Rumble et al., 2019). The terms genetically modified organism (GMO), genetically engineered (GE), and genetically modified (GM) refer to varieties of crops developed by means other than traditional breeding. Although GE is the terminology used by the FDA, GMO and GM food has better aligned with the public lexicon (Napier et al., 2004; Ruth et al., 2018). While consumer influence on agricultural production continues to grow, consumer perceptions of marketing and agriculture are predominantly negative regardless of scientific discoveries (Hughes et al., 2016). Research has found that over half of Americans believe GM foods are unsafe to eat (Funk & Rainie, 2015). However, this wasn't always the case; U.S. consumers' opinion of GM food was largely positive in the 1990s, as this was reflective of the way GM products were portrayed in the media at the time (McInerney el al., 2004; Rumble et al., 2017). After the 1990s, media coverage of GM foods has turned negative; mass media may not directly affect public opinion, but it does have a long-term influence on public opinion (Priest, 1995; Rumble et al., 2017). To date, consumers tend to believe that GM food is not as nutritious as organic options, despite numerous peer-reviewed studies that have indicated no significant difference between GM food crops' and alternative food varieties' nutritional value (Chassy, 2007; Lemaux, 2008). Although there has been growing use of GM crops over the past 20 years, Americans have indicated they know only a little about GM foods (Wunderlich & Gatto, 2015; Funk & Kennedy, 2016). Due to consumers' limited knowledge of new technologies, scientists have blamed consumer ignorance for the public's resistance to GM food (Durant et al., 1998; Frewer et al., 2000). However, not understanding the science of genetic modification within foods has made it difficult for consumers to understand information and make science-based decisions associated with the technology (Siegrest, 2008). A study conducted by the Food Policy Institute at Rutgers University (2013) found that consumers as a whole were fairly unknowledgeable about GM foods; just 48% knew that GM foods were available in supermarkets and only 31% believed they had most likely consumed a GM product. The gap between the public and scientists regarding the safety of GM foods was the largest among all issues studied by the Pew Research Center (2015). This divide indicated a need for better science communication; consumers rely on the trust of communication in order to make up for their lack of knowledge (Earle & Cvetkovich, 1995). However, the lack of communication with the public about GM food has led to debates about the safety of the product, which has led to distrust with consumers (McCullum-Gomez et al., 2010). This has highlighted the importance of getting ahead of the conversation when it comes to new agricultural technologies and innovations through communication efforts.

Clusters of regularly interspaced short palindromic repeats/Cas9, or CRISPR, is a revolutionary gene-editing technology that produces new plant and animal varieties that are indistinguishable from those developed through traditional breeding methods (Haskell, 2020; Liu et al., 2017). Currently, there are no CRISPR-derived staple foods commercially available; however, experts predict they will be on the market in the next 5-10 years (Synthego, 2019). CRISPR presents significant opportunities for improvement in crop production with little to no additional environmental pressure (Doudna & Charpentier, 2014). One form of improvement is in fruit production. Fruits are a major source of vitamins and minerals worldwide; however, fruit crops are also at high risk for production due to climate change (Giovannoni et al., 2018; Karkute et al., 2017). While GM techniques have had numerous applications in fruit crops, the development of new GM crops has largely been affected by the regulatory approval process, resulting in slowing the development process down (Wang et al., 2019). CRISPR technology currently falls outside of the U.S. Department of Agriculture (USDA) GM legislation because it does not contain foreign DNA, unlike GM products (Kim & Kim, 2016). To date, CRISPR has currently been successfully applied to tomatoes, strawberries, bananas, grapes, apples, watermelon, kiwifruit, and more (Wang et al., 2019). Therefore, CRISPR technology may be a more promising choice; improving crop productivity by maximizing the yield to its full biophysical potential without increasing environmental impact is an attractive solution to the global agricultural challenge (Frontiers, n.d.). While CRISPR can be a potentially pivotal innovation for agricultural production, a lack of public acceptance or understanding can suppress its development before it can be commercialized (Huang et al., 2016; Ishii & Araki, 2016).

If consumers equate CRISPR- produced foods to traditional GM foods, the full market potential may never be achieved for this technology. Currently, there are very few studies that have evaluated public attitudes and understanding of CRISPR information. This is largely in part because it has not widely been subjected to the same public scrutiny as GM food (Shew et al. 2018). Shew et al. (2018) conducted a study looking at consumers' willingness to consume a hypothetical non-GM CRISPR rice compared to transgenic GM rice. Findings showed that U.S. consumers were more willing to consume food produced with CRISPR compared to GM-produced food. This is the first study conducted looking at the public valuation and acceptance of CRISPR and indicates there is an opportunity to reduce the flow of skepticism about agricultural biotechnology with consumers. While the results of this study seem promising, more research is needed to provide a greater basis of consumer understanding. Additionally, a significant difference between GM technology and CRISPR technology is that CRISPR is being applied the medical field as well. CRISPR is revolutionizing the medical field as it is being used to correct mutations at the DNA level and curing once incurable diseases (Prabhune, 2019). With CRISPR winning the 2020 Nobel prize in chemistry for the unprecedent impact on life sciences, there is an opportunity for communication practitioners to capitalize on the positive public perception of CRISPR in the medical field and apply it to agricultural communications.

With the potential for CRISPR to generate excitement among consumers, that could result in a positive perception of CRISPR-produced foods and a market demand. Currently, 40% of global consumers are from Generation Z (1997–2012) (Giblin, 2019). This generation is the first generation of true digital natives, as they have never known a world without the internet, mobile devices, and social media (Institute of Business Management, 2017). However, Generation Z consumers are showing unique online behavior as they are currently driving the trend of fusing commerce, social networking, and entertainment together (Maguire, 2020). Generation Z is using social media in a completely new way compared to previous generations, such as following brands on Instagram (Marketing Charts, 2019). Of Generation Z consumers, 85% indicated they use social media to learn about new products, and six in 10 indicated they often discover products through social media platforms. Social media can operate much like the traditional news media and influence public opinion (Rumble, 2017). Therefore, communication practitioners should consider new tools and platforms to reach younger consumers (Maguire, 2020).

In addition to being the most digitally connected generation yet (Pew Research Center, 2020), smartphone ownership within Generation Z is nearly universal among different genders,

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races and ethnicities, and socioeconomic backgrounds; 95% of Generation Z reported they have a smartphone or have access to a smartphone, while 60% who lived in a $30,000 household or less still had a phone (Anderson & Jiang, 2018; Turner, 2015). Social media channels are an accessible and scalable form of providing individuals with two-way communication and information broadcasting (Teng et al., 2015). More than 74% of Generation Z reported they spend their free time online and check their phone about 80 times per day (Institute of Business Management, 2019). However, as technology use has increased exponentially, so has the amount of data to which communicators and their audience have access to (Cairo, 2013; Burnett et al., 2019). A communication tool that has gained popularity in the digital era is informational graphics or infographics (Holt et al., 2020). Infographics enable consumers to visualize complex data through graphics and texts (Afify, 2018; Holt et al., 2020). The two most prominent types of infographics are static and animated; static infographics do not include any motion or animations while animated infographics include motions or animations that can only be presented on video screens (Afify, 2018). Infographics assist with data visualization as well as improved memory recall (Kouyoumdjian, 2012). Identifying if infographics can be used as an effective form of communicating CRISPR-related information to Generation Z may assist with individuals understanding and making informed decisions about this technology.

Theoretical Framework

Heuristic-Systematic Processing Model

Social media presents opportunities for researchers to create effective marketing campaigns that optimize non-publication information dissemination efforts. Understanding how the public processes information of new gene-editing technology is crucial because in the past genetically modified foods have attracted public attention (Guo et al., 2020). Even if the public does not know anything about new gene-editing technology, they still make judgments about it and actively look for related information (Zhu et al., 2018; Lusk et al., 2004). In most circumstances, individual attitudes and behavioral tendencies of gene-editing technology are largely determined by overall perceptions of them; perceptions include risks and benefits (Poortinga & Pidgeon, 2005). A key component of understanding how people process messages related to risk-related behaviors is to understand the depth in which individuals process new information (Dunwoody & Griffin, 2014; Kahlor et al., 2003). The Heuristic-systematic model (HSM) of information processing is a model that explains how people are persuaded by messages (Chen et al., 1999).

Earlier cognitive theories focused on how individuals process the quality of persuasive messages; however, the HSM also recognizes a host of variables conceptually independent of message quality that influence people (Todorov, 2002). While people can peripherally attend to the content of a persuasive message, they can also attend to it superficially, meaning attention is focused on aspects such as the length of the message and the source of the message (Todorov, 2002). The HSM assumes that an individual's motivations (*i.e.*, environmental constraints) and cognitive resources (*i.e.*, cognitive constraints) drive him/her to process information in qualitatively disparate ways: systematic and heuristic modes of processing information. Systematic processing involves attempts to thoroughly understand any and all available information carefully through deep thinking and intensive reasoning (e.g., thinking carefully about the arguments presented, the person arguing, and the causes of the person's behavior) (Chaiken & Ledgerwood, 2012). Heuristic processing is much less demanding in terms of mental work required as it is less dependent on having the ability (*i.e*., enough knowledge and enough time) to think carefully about information (Chaiken & Ledgerwood, 2012). The model is applied when individuals are presented with material they must make a judgment on or about (Kahlor et al., 2003). The HSM is a dual-process model, which states that two different modes may act simultaneously, especially in the context of processing persuasive messages (Teng, 2015).

The HSM also operates under a “sufficiency principle”, in which a person’s desire for sufficiency motivates their evaluation of the message, in a manner of bridging the gap of their actual and desired level of confidence (Chen & Chaiken 1999). If heuristic processing fails to satisfy sufficient accuracy, message recipients are likely to apply systematic processing to reach satisfying goals and desired confidence (Chen & Chaiken 1999). Motivations to process information are derived from the desire of humans to form and hold valid attitudes (Teng, 2015). Additionally, within the HSM individual characteristics and experiences can impact the type of processing an individual engages in to understand an issue; however, those attributes are not examined within the model (Holt et al., 2020). These two types of analytic processes, individual characteristics, and experiences are foundational components of the risk information seeking and processing model (Kahlor et al., 2003).

Risk Information Seeking and Processing Model

The Risk Information Seeking and Processing (RISP) Model combines several theories to further understand how individuals identify, seek, and process gaps in their knowledge about a topic with a level of uncertainty or risk (Griffin et al., 1999) (Figure 1). The RISP Model is an extension of the HSM that attempts to map predictors of these processing strategies within a risk setting. It also takes into account additional variables that apply specifically to a risk information context (Griffin et al., 1999).

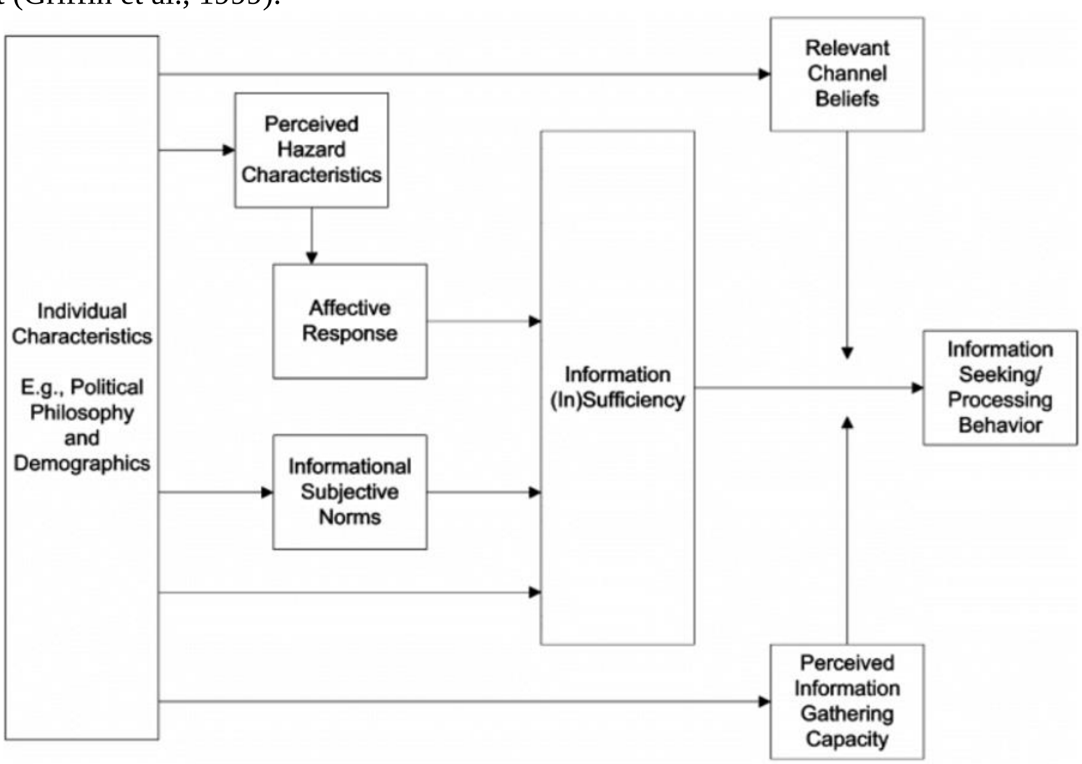

Figure 1. Risk Information Seeking and Processing Model (Dunwoody & Griffin, 2015)

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In a study conducted by Harrison (2004), consumers' risk perceptions toward GM foods in the U.S. and Italy were examined. The findings showed that consumers' risk perception was influenced by demographic characteristics including age and gender. Additional research has also indicated that consumers' demographics play a role in how they respond to genetically modified food (Frewer et al., 2013; Pechar et al., 2018; Puduri et al., 2010; Vecchione et al., 2014; Wunderlich et al., 2015). Holt et al. (2020) found that respondents' political beliefs moderated GM food information recall. Research related to food risk has shown the RISP model to be an effective model to explain and account for information processing and engagement because of the model's ability to account for predictors that stimulate the public to seek information (Griffin et al., 2004; Kuttschreuter et al., 2014; Griffin et al., 1999). Additionally, research has found that social media can be used as an informational source to provide consumers with information about public health information and food risk (Kuttschreuter et al., 2014; Choi et al., 2017). Therefore, within the RISP model, social media could potentially influence people's risk perceptions of CRISPR technology as it related to food.

Infographics and Instagram

Research has found that nearly three-quarters (73%) of Generation Zers indicated they actively use Instagram, with 62% checking Instagram daily (Institute of Business Management, 2017). Additionally, the way that Generation Z is using social media differs than Boomers (1945-1965) and Generation Xers (1965-1980); 57% of Boomers and 50% of Generation Xers indicated they used social media to share pictures and updates, while only one-third of Generation Z respondents indicated that was the reason they used social media (Marketing Charts, 2019). Compared to other generations, Generation Zers prefer to follow brands on Instagram. A 2018 Market Chart survey found that 6 in 10 Generation Z shoppers indicated they often discover products through social media platforms and 85% use social media to learn about new products. In recent years, efforts to form new relationships between food producers, retailers, and consumers have been established through improved marketing communication tools intended to engage audiences (MacDonald et al., 2004; Hughes et al., 2016).

Both static and animated infographics are compatible with Instagram and can be used to convey complex scientific information to a variety of audiences (Holt et al., 2020; Otten et al., 2015). Animated infographics are composed of moving and dynamic elements that enhance visualization and have been found to improve recall (Holt et al., 2020; Al Hosni, 2016; Alrwele, 2017; Bateman et al., 2010), values, and attitudes toward certain products (Lai et al., 2009). A study conducted by Li et al. (2018) found that when viewers were presented with complex scientific information, they relied on heuristic cues (design quality and source attribution) to judge the credibility of the visualized data. Additionally, when used in agricultural messaging, infographics have suggested an increase in cognitive interaction and attitude (Burnett et al., 2019). A study conducted by Lamm et al. (2020) sought to understand how consumers' trust in science, personal attitudes toward GM science, and perceived attitudes of others toward GM science would be affected by viewing either a static or animated infographic. It was found that the animated group had the highest mean in trust in science. The findings reveal that it is important to further examine the role infographics play in communicating about agricultural science (Lamm et al., 2020). CRISPR technology as it relates to food and agriculture is becoming an important tool that can lead to enthusiasm or reluctance in different sectors of the population (Gatica-Arias et al., 2019). Therefore, understanding how consumers engage with infographics while considering how demographics may influence risk processing will contribute needed insight in future agricultural communication efforts.

Purpose and Objectives

The purpose of this study was to examine the impact static and animated infographics on recall of Generation Z when presented with CRISPR information. The following research objectives guided the study:

RO1: Determine respondents' level of information recall after being presented with a static or animated infographic.

RO2: Determine if respondents' level of information recall differed based on being presented with a static or animated infographic.

H1: Respondents receiving the animated infographic treatment will exhibit a higher level of information recall than respondents receiving the static infographic treatment.

RO3: Determine if respondents with different demographic characteristics exhibited the same levels of information recall when viewing a static or animated infographic.

H2: Respondents' demographics will impact information recall when viewing either a static or animated infographic about CRISPR.

Methods

This study used an experimental design to examine Generation Z's recall of an Instagram post about CRISPR. The study was conducted through an online survey hosted by Qualtrics, to fulfill the research objectives and test the hypotheses. This study was part of a larger research effort being conducted to identify how to use visual messaging to communicate CRISPR technology information to Generation Z college students.

Instrument

The instrument in this study contained demographic and recall questions. Demographic questions asked respondents about how they identify regarding sex, race, and political ideology. The infographic used in this study was exploratory in nature and design inspiration was taken by the researcher from viewing various other infographics on Instagram. Bright colors were chosen to attract the viewers' attention to the information presented; bright colors are more pleasing than dull colors (Diaz-Soloaga, 2017). The information presented and the amount of information presented were selected as information that would best inform participants. After viewing the infographic, respondents were given a quality check question to ensure the infographic was viewed and the respondent adequately viewed the instrument. Based on previous infographic research conducted by Holt et al. (2020), to measure the respondents' information recall, respondents were asked three multiple-choice questions (Table 1) based on the infographic shown (Figure 2). For each question, a respondent answered correctly, a score of one was given, for each question answered incorrectly, a score of zero was given. The three scores were summed to create an overall information recall score with a maximum score of three and a minimum score of zero (Holt et al., 2020; Lamm, et al., 2020).

Respondents were randomly assigned to one of two treatment groups receiving an infographic: 1) static (control group), or 2) animated (treatment group). The infographic viewed by the control and treatment groups were identical in design and content except for the visual effects introduced in the animated version. Animations included the image of the hands cupping the flower, the glass beaker, the light bulb moving side to side, the gaveling tapping, the arrow and the apple dropping down, the calendar running through days 1-31, and the shopping cart bouncing up and down. The timing was set on both treatments to ensure each participant spent time necessary to view the entire infographic. After viewing the infographic treatment, respondents were asked to respond to a multiple-choice question, with one correct response and three incorrect responses, asking what the infographic they just viewed was about. This question was used as an indicator of their ability to view the infographic and a check for attention.

An expert panel with expertise in visual communication, science communication, and public opinion research reviewed the instrument for content and face validity, as well as survey design. Institutional Review Board approval was obtained for the current study. The instrument was pilot tested with a similar but separate sample to ensure the scales were reliable and the randomization of treatments was working correctly.

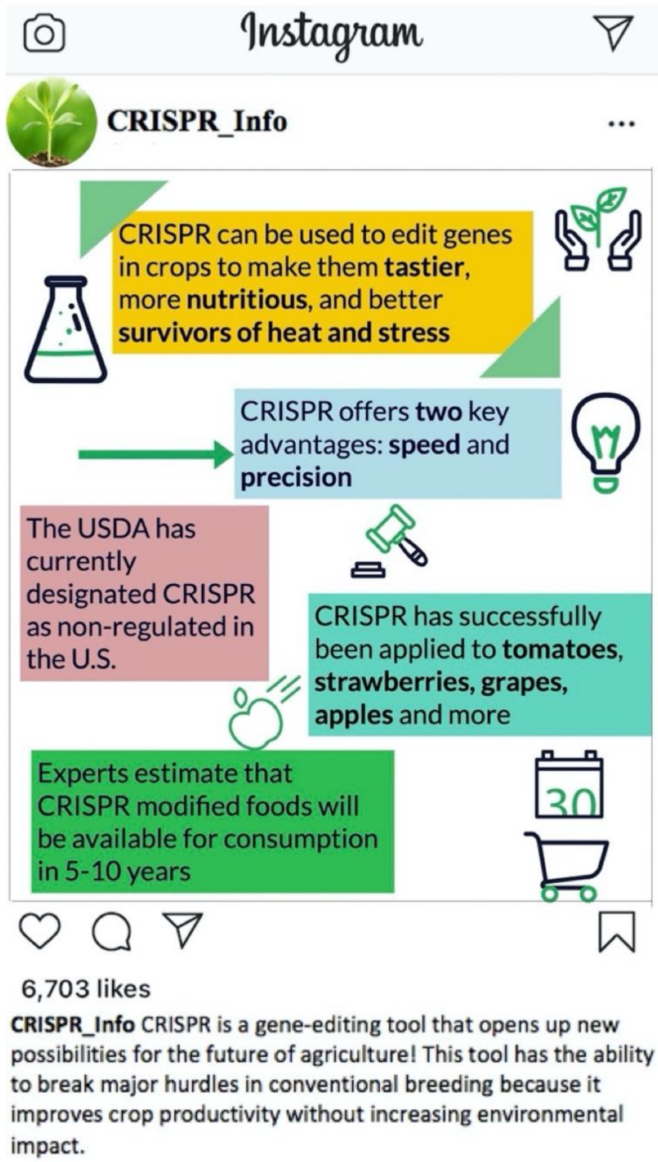

Figure 2. Static infographic design

Table 1
Information recall questions utilized

Question	Possible responses
In how many years will CRISPR modified foods be on the market?	1-5 years **5-10 years** 10-15 years
What are the 4 CRISPR modified foods identified?	Watermelon, kiwi, avocado, and blueberries **Tomatoes, strawberries, grapes, and apples** Bananas, pears, peaches, and guava
What are two key advantages of CRISPR?	**Speed and precision** Accurate and cost effective Available and error-free

Note: the bolded response indicates the correct answer for each question.

Sample

The population of interest for the current study was students enrolled at the University of Georgia age 18 to 23 (*i.e*., Generation Z population). A total of 158 responses were obtained, with all respondents meeting the criterion. Of the respondents, 72.3% (*n* = 115) identified as female, 24.5% (*n* = 39) identified as male, and 2.5% (*n* = 4) identified as non-binary or other. Respondents were primarily white (69.8%, *n* = 111) and identified as moderate in their political views (34.6%, *n* = 55). Detailed respondent demographics can be viewed in Table 1. The current research focused on one section of the survey instrument; the level of information recall.

Table 2
Demographics of Respondents (N = 158)

		n	%
Sex			
	Female	115	72.3
	Male	39	24.5
	Non-binary/ other	4	2.5
Race			
	White	111	69.8
	Black or African American	9	5.7
	Asian or Pacific Islander	19	11.9
	Multiracial	13	8.2
	American Indian or Alaska Native	1	.6
	Other	5	3.1
Ethnicity			
	Not Hispanic		
	Hispanic	18	11.3
Political Ideology			
	Very Liberal	26	16.0
	Liberal	53	33.3
	Moderate	55	34.6
	Conservative	18	11.1
	Very Conservative	6	3.7

SPSS 26.0 software was used to analyze the data. Categorical and numeric data were collected in this study; therefore, both ANOVAs and Chi-squared tests were used to address the research objectives and test the hypotheses for this study.

Results

Respondents' level of information recall and differences after viewing a static or animated infographic

Respondents were randomly assigned to either a control or treatment group. Once the respondent viewed the infographic, they were then prompted to answer three multiple-choice questions. Each of the questions had only one correct response. Table 3 shows the percentage of respondents who answered each of the three questions correctly organized by the treatment group. More respondents who received the animated infographic answered questions 1 and 2 correctly. However, respondents who received the static infographic answered question 3 correctly by .2% more than those in the animated infographic treatment group.

Note. *= p < .05 level.

The overall recall score was then obtained by summing the responses to the three recall questions. Each correct response received one point; an incorrect response received zero points. Therefore, an overall information recall score could range from zero to three. The control group had a lower overall mean score (M = 2.14, SD = .86) than the treatment group (M = 2.34, SD = .80).

An ANOVA was used to determine if the difference in overall information recall scores

Table 3
Information recall after viewing a static or animated infographic

Question	Correct Answer %			
	Static n = 76	Animated n = 82	X^2	p
In how many years will CRISPR modified foods be on the market?	69.5	84.2	4.7	.02*
What are the 4 CRISPR modified foods identified?	81.7	86.8	.78	.37
What are two key advantages of CRISPR?	63.4	63.2	.00	.97

between the two treatment groups had a statistically significant difference. The results indicated no statistically significant differences between the two treatment groups and respondents' recall ability related to CRISPR technology in foods ($F_{1, 156} =$ 2.15, p = .14, n_p^2 = 1.5). To further investigate each question individually, a series of Chi-squared tests were also used to determine if there were statistically significant differences between the expected and actual percentage of positive responses within the two treatment groups. The results revealed a statistically significant difference between the two groups in the level of correct answers to question 1, but not to question 2 and question 3. Therefore, the findings reject the first hypothesis (H1); however, information recall is greater on question 1 when a respondent viewed an animated infographic versus a static infographic.

Moderation of level of recall after being presented with a static or animated infographic by demographic characteristics

Multiple chi-square tests were performed within each treatment group to determine if there were statistically significant differences in recall based on sex, race, and political ideology. In order to have enough statistical power with the sample size, each of the demographic variables were coded to be dichotomist variables with sex as male and female, race as white and nonwhite. In order to achieve statistical power with the political ideology variable, the five groupings of very liberal, liberal, moderate, conservative and very conservative were combined into three groupings to include very liberal and liberal together and very conservative and conservative together while moderate was kept the same (Table 4). Using a chi-square test, the only statistically significant difference between the two treatment groups and demographic characteristics were between the control group and political ideology. This finding indicated a

Table 4
Examining Recall within Static and Animated Infographic Treatments by Demographic Variables

		Static n = 82			Animated $n = 76$		
		n	%	X^2	n	%	X^2
Sex				1.08			3.05
	Female	59	72.0		56	73.6	
	Male	20	24.3		19	25.0	
Race				1.41			.432
	White	57	69.5		54	71.0	
	Nonwhite	25	30.3		22	28.8	
Ethnicity				1.32			3.76
	Not Hispanic	71	86.5		69	90.7	
	Hispanic	11	13.4		7	9.2	
Political Ideology				12.72*			6.27
	Liberal	39	47.4		40	52.5	
	Moderate	29	35.3		26	34.3	
	Conservative	14	17.0		10	13.1	

relationship between a respondent's political ideology and recall score only within the control group. As a result of these findings, the second hypothesis (H2) was partially accepted.

Note. *= p < .05 level.

Conclusions/Discussion

In a previous study conducted by Market Charts (2018), it was found that Instagram is the social media platform the Generation Z population indicated as their preferred media channel to learn about new products. Infographics have been the most common way that agricultural information has been communicated (Burnett, 2018) and have also been found to be three times more effective than an image on Instagram (Venngage, n.d.). Literature has indicated infographics improve cognition and retention of information (Hassan, 2016), and the findings in the current study support these previous findings. It is important to recognize that unlike the results found by Holt et al., 2020, respondents in both treatment groups had moderately high recall scores. This finding implies the information presented in both infographics reached consumers at a higher level of information processing. However, although both infographics reached consumers at a higher level of information processing, the fluctuation of scores between questions correctly answered and the treatment group indicate that respondents processed the information heuristically as systematic processing would have resulted in a higher and more consistent recall score as an indicator of deep thinking and intensive reasoning (Chaiken & Lederwood, 2012). Specifically, the greatest fluctuation can be observed within the static group, where 69.5% (n = 53) of respondents answered the first question ("Experts estimate that CRISPR modified foods will be available for consumption in 5-10 years") correctly, 81.7% (n = 63) correctly answered question two ("CRISPR has successfully been applied to tomatoes, strawberries, grapes, apples and more"), and 63.4% (n = 48) correctly answered question three ("CRISPR offers two key advantages: speed and precision").

Based on the literature, it was hypothesized that respondents in the animated treatment group would have a higher recall score for all the questions presented (Holt et al., 2020); however, this study found the recall score was only higher for the first two questions presented. Animating the infographic resulted in a 14.7% (n = 17) higher recall score for the first question, a 5.1% (n = 9) higher score for the second question, and a .02% (n = 4) decrease in recall score for the third question. These findings also contribute to the implication that respondents heuristically processed the information. Research has found that the most prominent cues when seeking information are related to credibility (Hill, 2009), the two main dimensions of credibility having been identified as expertise and trustworthiness (Metzger et al., 2003). Both questions with the highest percentage of respondents recall score (questions 1 and 2) had words that indicated credibility in the statements that the questions were based on, while the statement in which question 3 was based on, did not, and had the lowest percentage of respondents recall score. The word “successfully” in statement two and “experts” in statement one gives a source of credibility, while statement three offers no credibility. Studies examining information seeking and processing can consider informal learning or recall, however when examining heuristic and systematic seeking and processing on social media, cues such as credibility are the most important (Hill, 2013). The questions in this study were not chosen to test credibility on heuristic and systematic seeking and processing, therefore future research should be conducted to determine if infographics with fewer statements and more credibility (*i.e*., use the two main dimensions of credibility: expertise and trustworthiness) moderate information seeking and processing.

The second hypothesis, respondents’ demographics will moderate their recall ability when viewing an infographic about CRISPR, was partially accepted by this study. Previous research has found that gender and political ideology influenced risk perception (Harrison, 2004; Holt et al., 2020), therefore it was not surprising that this study found that political ideology moderated recall within the static treatment group in this study. However, it was surprising that political ideology only moderated recall in the static treatment group and not both, and it is unknown why this was the result. Therefore, future research should be conducted examining political ideology and information recall after CRISPR in relation to food and agriculture is more widely known.

Overall, the findings from this study spoke to the difficulty of engaging with the public through non-academic publications in a digital age. While animated infographics did not result in a higher recall score for all three questions, this can be a result of how respondents processed the credibility of the statements (Hill, 2013). Therefore, animated infographics should be used to communicate single points of credible CRISPR information because the results lend themselves to the idea that animated infographics will be able to capture Generation Z’s eight-second attention span (Bump, 2020). However, additional research should be conducted on the use of infographics to communicate reliable statements of CRISPR information as it relates to food and agriculture and systematic and heuristic processing. Additionally, the findings that only demographic characteristic that was statistically significant was between the static treatment group and political ideology confirm that future research should be conducted in this area with short credible animated infographics. Generation Z is the largest segment of a population in the history of the world, large blanket statements simply cannot be made with these findings, therefore the findings are not generalizable. However, it is not a matter of “if” but “when” CRISPR-produced food will be available for consumption. Science-based communication will always be advancing, and infographics are a tool that should be further examined on different social media platforms and with different generations of consumers.

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