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Exploring the Roots of GMO Disapproval: Cognitive, Emotional, and Institutional Factors

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ABSTRACT

This essay examines the complex public perceptions of GMOs, underlining how cognitive biases, emotional responses, and societal trust shape acceptance or rejection towards it. The study also highlights the significant role of emotions, such as fear and disgust, in overshadowing empirical evidence. It suggests that the media's amplification of GMO risks and the lack of trust in scientific institutions further complicate public attitudes. By addressing these factors and enhancing transparent communication, the essay suggests pathways to develop more informed discourse on GMOs. Future research should therefore focus on cross-cultural comparison and longitudinal studies in order to understand evolving societal norms and improve public understanding.

Introduction

Understanding the multifaceted nature of public perception towards genetically modified organisms (GMOs) is crucial to navigating GMO acceptance and rejection. In general, food selection does not require much involvement, "until [risk perceptions] exceed a certain threshold" (Klerck & Sweeney, 2007, p. 173). Research from the 1980s studied this threshold when unbranded food products entered the marketplace and found no difference in consumer decisions. This greatly contrasts with the case of GMOs, which have exceeded this consumer threshold. People tend to form attitudes toward "risk levels and usability of the technology" before determining how it might be "risky or helpful" in a particular circumstance (Siddiqui et al., 2022, p. 8). Those who reject GMOs may see the problem in their production, calling it genetic interference, and choose to focus on that rather than the potential benefits of GMOs. By recognizing the influence of risk perceptions, broader attitudes, and public thresholds, there can be a greater understanding of how to temper the polarization of GMO opinions.

In exploring the dynamics of GMO acceptance and rejection, it becomes evident that public perceptions are not solely driven by scientific evidence but influenced by emotional responses and societal trust. This "emotion and fear overwhelming the audience" phenomenon is not limited to GMOs (Boccia et al., 2018, p. 683). While GMOs are perceived as risky, emotions and fear play a disproportionate role in their perception in competition with empirical evidence. This differs from the majority of ideas today, where studies, surveys, and data-led opinions suggest otherwise. Consequently, it is important to understand "the different social representations of key issues in risk communication between experts and non-experts" to overcome the barriers to risk communication (Frewer et al., 2003, p. 1131). There is a divergence in the social representations of key issues in risk communication between experts (scientists) and non-experts (average people). Experts assume what non-experts want to hear and what they can understand, but this knowledge gap has resulted in a trust gap. In contrast to the portrayal of public perception of GMOs as divided, attitudes toward GMOs rely heavily on psychological factors, emotional responses, and trust in higher institutions. Exploring these dynamics offers a deeper understanding of the complexities surrounding GMO acceptance and rejection.

Risk Perception and Cognitive Biases

Despite the potential benefits they offer, GMOs continue to be perceived as risky among consumers. As Phillips and Hallman (2013) highlight, "greater perceptions of risk lead to more efforts to avoid risk" (p. 740). Consequently, consumer behavior is directly shaped by their perception of risk, influencing decisions regarding the acceptance or rejection of genetically modified foods (GMFs). Moreover, "the less information possessed by an individual, the greater the change induced by new information" (Frewer et al., 2002, p. 710). For a relatively new technology such as GMFs, the anticipated risks are greater in the absence of widespread dialogue. The lack of comprehensive dialogue and informed messaging exacerbates consumer uncertainty and contributes to heightened perceptions of the risk associated with GMOs. Effective messaging is essential in dispelling misconceptions, fostering understanding, and mitigating unfounded fears regarding GMOs.

Other cognitive factors contribute to this continued skepticism of GMOs, with confirmation bias and conservatism bias playing pivotal roles. Confirmation bias is a cognitive bias where individuals tend to favor information that confirms their beliefs and avoid information that contradicts these beliefs. In direct relation to perceived risk, individuals who believe they have "sufficient science knowledge" are more likely to display confirmation bias (Jang, 2013, p. 160). This is a matter of perceived knowledge versus actual knowledge, which indicates that once people are certain about their views, they are likely to avoid information incongruent with what they know. Individuals are more likely to engage in confirmation bias in the case of agricultural biotechnology due to how controversial GMOs are (Pribic, 2017, p. 43). This overconfidence in one's knowledge and unwavering belief leads to people selectively engaging in content that further reinforces their beliefs. Overcoming confirmation bias requires individuals to recognize and actively mitigate their tendencies, which is one step in the GMO debate.

Conservatism bias is a cognitive bias where individuals prefer existing beliefs over new information that disproves these pre-existing beliefs. One of many reviews stated, "We have reviewed the scientific literature on GE crop safety for the last 10 years that catches the scientific consensus matured since GE plants became widely cultivated worldwide, and we can conclude that the scientific research conducted so far has not detected any significant hazard directly connected with the use of GM crops" (Nicolia et al., 2014, p. 8). Despite scientific consensus and various statements put out by international and national organizations, a great deal of doubt amongst the public persists. According to the Pew Research Center, "88% [of American Association of Advancement of Science] members said it is generally safe to eat GM foods compared with 37% of the general public" (2016). This significant gap highlights the discrepancy between scientific consensus and public perceptions concerning the safety of GMOs in the US. Despite there being enough evidence to disprove these concerns, cognitive biases can lead people to overestimate the risks associated with GMOs, leading to an underestimation of potential possibilities, which contributes to polarization within the GMO debate.

Emotional Responses

Mass media played a significant role in amplifying fear surrounding GMOs, labeling them as "frankenfoods," evoking the idea of GMOs as monstrous and mysterious creations. According to Laros and Steenkamp (2004), "... [GMOs] evokes significantly higher levels of fear than other types of foods, namely, functional food, organic food, and regular food" (p. 903). Notably, this study refrained from educating participants on the different technologies used to produce the food products, mirroring real-world scenarios. This discovery highlights the depth of public apprehension towards GMOs, especially when surrounded by options they may understand even less. This conclusion is furthered because "fear of GM food is positively influenced by consumer apprehension for the environment and negatively affected by their faith in new food production technology" (Boccia et al., 2018, p. 683). This highlights how external factors can influence fear, suggesting opportunities to sway these

fears, and introducing another layer of complexity to the interactions between risk and fear. The media's portrayal of GMOs has perpetuated these fears, despite the absence of empirical evidence justifying them. Addressing these fears will be an uphill battle in a society that has staunchly rejected them.

While fear typically stems from the unknown, disgust typically arises from the unfamiliar. Disgust possibly arises from the interpretation that sees "genetic modification as an unwarranted and contaminating intervention into the essence of an organism" (Liu et al., 2019, para. 4). This intervention can be interpreted as tarnishing foods that are traditionally considered "natural" and "pure," evoking a visceral sense of repulsion at the prospect of eating tainted food. This is further exacerbated when genetic modification involves the introduction of DNA from a different species through cross-breeding. Blending two or more species to create new produce, something people associate with coming straight from the Earth, further pushes those against GMOs deeper into their opinions. Royzman et al. (2017) found that "individuals higher in trait disgust were significantly more inclined toward "absolutist" opposition to GMF" (p. 467) suggesting a binary viewpoint among those who feel disgust towards GMOs. The emotional response of disgust carries profound implications for consumer behavior. Understanding and addressing the underlying mechanisms of disgust can thus be crucial in effectively communicating the GMO production process to the public.

Institutional Distrust

Trust is vital in establishing and maintaining healthy relationships, this applies to the relationship between GMOs and consumers. Data has shown consumers lack trust and confidence in the regulatory processes behind GMOs, where 57.4% of people "[doubt] the reliability of studies showing positive health effects of GMOs" and 64.1% see media reports on GMOs as "untrustworthy" (Sohi et al., 2023, p. 2). The skepticism towards GMOs stems from a multitude of factors heavily impacted by third-party involvement, including health impacts, corporate control over the food system, and reported food scandals. When speaking about GMOs, "it is imperative to note the lack of trust in institutions and institutional activities regarding GMOs and the public perceive that institutions have failed to take account of the actual concerns of the public as part of their risk management activities" (Bawa & Anilakumar, 2013). The disapproval of GMOs by the general public should have been a sign to various institutions that steps needed to be taken to alleviate them. However, these concerns were not considered by national organizations, leaving the task of persuasion to companies and institutions that already face low levels of trust with the public.

The credibility and transparency of information provided by scientific institutions, agencies, media outlets, and food manufacturers significantly influence public perception. "It is not so much that Americans don't *care* about genetically modified food but that they don't *know* about GM food," encapsulates the critical issue concerning public perception and acceptance of GMOs (Weasel, 2008, p. ix). It does not all come from internal factors, but also a lack of information from higher institutions and proper dissemination of this information. On December 4, 2014, Intelligence Squared US held a discussion on TV titled "World is better off with or without GM food," which addressed the safety of GM foods and their potential environmental impact. Before the debate, 32% of attendees were in favor of GM foods and 30% were against, after the 100-minute debate, the responses changed to 60% in favor and 30% against (Ali et al., 2020, p. 184). With time, proper knowledge, and institutional performance, people's perceptions can change. By prioritizing accurate information dissemination and institutional transparency, we can cultivate and facilitate a more nuanced understanding of both the benefits and risks associated with GMOs.

Methodology

This study investigates a multitude of influences on public perception of GMOs while highlighting the need for future research and avenues for improvement. Drawing from a range of scholarly sources including journal articles, research books, relevant statistics, and scholarly essays this research project aims to address several questions. Firstly, it scrutinizes the impact of cognitive biases on individuals' perceptions of risks and benefits associated with GMOs. Secondly, it examines the role played by emotions in shaping opinions regarding GMOs. Lastly, it looks beyond internal factors such as biases and emotions to institutional trust and its pivotal role in shaping public responses to GMOs.

This study is limited by its reliance on secondary research and predominantly focuses on studies conducted in Western cultures, mainly the USA and the UK. Furthermore, the factors influencing public perception are heavily interrelated and interact in a complex manner, posing challenges in isolating their individual impacts on attitudes towards GMOs. To address these limitations, future studies should consider conducting cross-cultural comparisons to gain insight into cultural determinants of GMO acceptance or rejection. Additionally, continuous research is needed to monitor changes in attitudes over time, providing a better understanding of evolving societal norms and advancements in scientific understanding. To see the impact of institutional distrust and find the best avenues to combat this, future studies can explore the role of education in shaping perceptions of GMOs. This could involve examining curriculum designs in K-12 schools and science literacy programs on public understanding of GMOs or assessing policy implications and practices concerning information dissemination. By addressing research gaps, future studies can contribute to a more comprehensive understanding of the complex factors influencing public perceptions of GMOs.

Conclusion

"Information should act as a preparatory stage to help people stop fearing GMOs" (Boccia et al., 2018, p. 687). Providing information about GMOs can help alleviate fears and counteract cognitive biases associated with them. By providing factual information and addressing public concerns, trust can be fostered, ultimately contributing to a more balanced perception of GMOs. However, people often allow their risk perception regarding GMOs to overshadow contradictory information, as they selectively focus on evidence that proves their point no matter how significant. Fear and disgust further perpetuate these opinions as they push the narrative of GMOs being unnatural, making consumers weary of consumption. These sentiments are compounded by institutional distrust, where higher institutions fail to bridge the information gap between experts and the general public. Moving forward, it is imperative to prioritize evidence-based decision-making and transparent communication. Making science more accessible to the average person empowers individuals to make informed choices grounded in evidence, facilitating constructive and well-informed surrounding GMOs.

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