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# How Chinese online critics oppose genetically modified foods: discourse analysis and food policy implications

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This study examines public discourses of genetically modified foods (GMFs) on Chinese social media WeChat. Through a discourse-historical approach, it focuses on how critics of GMFs discursively construct and legitimate their views against GMFs and explores the ideologies underpinning their distrust. Findings show that opponents employ metaphors, ironies, moralization, and intertextuality to emotionally and morally appeal against GMFs, creating tensions with modern agricultural discourses. The paper reflects on researchers' stance as critical discourse analysts in analyzing such a significant yet controversial topic and demonstrates the importance of keeping a neutral, yet critical position in revealing the nuances of debates about GMFs. Implications for food policy researchers to address arguments against GMFs are also discussed in this paper.

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## Introduction

Ever since the first commercial use of Genetically Modified Foods (GMFs) in 1994, GMFs have become a controversial topic in both public and academic domains worldwide. In social science and discourse studies, researchers have taken interest in analyzing the discursive strategies employed in debates about GMFs, exploring the dialectic relationship between GMFs discourse and social practices (e.g. Lin 2021, 2023; Attar and Genus 2014; Cook 2004; Frayne 2021; Motion and Doolin 2007; Zheng and Zhang 2021; Yamaguchi 2007). These studies have primarily focused on addressing arguments for GMFs, while few studies have concentrated on the opposition itself, that is, how critics of GMFs discursively construct and legitimate their arguments against GMFs. Notable exceptions include discourse of New Zealand's kiwifruit industry (Henderson et al. 2007) and scientists' characterization of GM opponents (Cook et al. 2004), which show that counter-GMFs discourses frequently employ strategies such as identity position and highly emotive language. Building on existing findings on public discourses of GMFs, this study investigates how critics of GMFs in the context of Chinese social media landscape, discursively construct and legitimate their views against GMFs, a research topic that is relatively under-investigated and is important for food policy makers and researchers in relation to addressing distrust and arguments against GMFs.

Specifically, this study focuses on how critics construe and account for their arguments against GMFs on WeChat, the most popular social media platform in China. Drawing on methods from critical discourse analysis, a corpus of 48 WeChat articles written by critics of GMFs is analyzed. Analyses show that opponents of GMFs frequently employ metaphors, ironies, moralization, and intertextuality to convey and legitimate their emotional and moral appeals against GMFs, which, we argue, create ruptures and tensions with the discourses of modern agricultural technology and accompanied scientific values. Based on these findings, we further ponder on how our positionality, i.e., our stance as critical discourse analysts, may have influenced our analysis and interpretation of such a significant yet controversial topic. We discuss the significance of keeping a neutral, yet critical stance in revealing and examining the nuances of debates about GMFs, and outline the implications these nuances of debates offer to food policy makers and researchers.

## GMFs in China

The development and commercialization of GMFs in China have a significant history. China was among the early adopters of GM crop technologies, with the government approving safety certificates for seven GM crops, including soybean, maize, cotton, rape, tomato, papaya, and sugar beet. While insect-resistant cotton and disease-resistant papaya have seen widespread commercial use, the remaining GM crops are subject to mandatory labeling to inform consumers about their genetic modifications.

Public attitudes towards GMFs in China have evolved through distinct phases. In the 1990s, public awareness was minimal, but from 2000 to 2009, increased awareness led to growing concerns about GMFs. This period also coincided with the heightened attention to food security crises (Yan and Zhang 2024), which amplified public skepticism toward new food technologies, including GMFs. This shift was reflected in survey data showing a rise in the proportion of Chinese consumers who perceived GMFs as unsafe, from 13% to 45% (Deng and Hu 2017). By 2018, a national survey indicated that 11.9% of Chinese individuals viewed GMFs positively, while 46.7% held negative views (Cui and Shoemaker 2018). The growing attention to the GM technologies and foods has generated significant social and political debates. Notable events include the Golden Rice incident in 2012, where an US-funded study was conducted in a primary school in China's Hunan province to find out how genetically modified rice, i.e., golden rice, is converted into vitamin A inside children's bodies, and Fang-Cui's war on GMFs in 2013, where Fang Zhouzi, a biochemist and an outspoken GM advocate, and Cui Yongyun, a TV host and an anti-GM influencer, vehemently debated GM technologies and foods. These events garnered widespread attention and led to nationwide discussions, and may have prompted a rise in skeptical consumers who showed negative sentiments toward GMFs.

The public skepticism toward GMFs has caught the attention from many scholars in China. Some researchers categorize Chinese anti-GMFs discourses as online rumors that are devoid of scientific values but full of subjective emotions (e.g., Li 2011; Ji et al. 2019). Zhang (2015), for example, argues that the public's anti-GMFs attitudes are exploited by rumormongers who aim to create and spread social panic rather than to discuss GM technologies and foods in an objective and scientific manner. Within this academic discussion, Chinese opponents of GMFs are generally portrayed as individuals spreading rumors, so their voices and discourses are considered less important and not worth of rigorous analysis. However, against this backdrop, we argue that a critical discourse analysis of anti-GMFs discourses is meaningful because through examining the discursive strategies used in anti-GMFs discourses we can uncover the hidden ideologies that are evoked to legitimate and sustain people's distrust and opposition toward GMFs. By "ideologies", we refer to the "(often) one-sided perspective or worldview composed of related mental representations, convictions, opinions, attitudes, and evaluations" (Reisigl and Wodak 2009, p. 88). As our analysis will demonstrate, most anti-GMFs speakers base their arguments on emotional and moral appeals through the use of metaphors, ironies, moralization, and intertextuality, which is in stark contrast with scientific argumentations that value neutrality and objectivity. However, it is *not* our purpose to judge these anti-GMFs discourses as negative, but rather we hope that a critical discourse analysis of them can reveal the nuances, complexities, ruptures, and tensions around the public discussions of GMFs, which we believe can help reach the goal of broad consensus. This stance is in line with the principle of critical discourse studies. As Wodak (2001) maintains, the term "critical" in critical discourse analysis does not mean "negative" in common-sense, but rather it means opening complexity, showing the opaque structures of ideologies and power relations, and being reflexive in demonstrating research findings. We will further discuss our positionality in conducting this study and the implications for food policy makers and researchers in the data and method section.

## Previous studies of discourses of GMFs

Previous studies surrounding the discourses of GMFs mainly revolve around the perspectives of various stakeholders, encompassing scientists (Motion and Doolin 2007; Yamaguchi 2007), government officials (Cook 2004; Leitch and Davenport 2007), the media (Maeseele 2015; Zheng and Zhang 2021) and the general public (Attar and Genus 2014). This section reviews these discourses by comparing the rhetoric of influential actors with that of the general populace.

As developers of new technologies, scientists and government officials across different countries utilize specific discourses to justify and communicate their work. For instance, Yamaguchi (2007) illustrates that Indian scientists often appropriate the linguistic conventions of farmers to construe themselves as credible allies of farmers and persuade the public to support

GMFs. In New Zealand, Motion and Doolin (2007) find that scientists frequently evoke category memberships, such as "threatened citizens", "older people", "community members", and "working parents", to present themselves as advocates for the public interest and legitimize their roles as spokespersons on GMFs issues. Governments also strategically endorse GMFs through their communication strategies. Cook (2004, p. 10) examines the language used by European politicians, noting that vague terms such as "we" and "our" are often employed by politicians to garner public support for GMFs. Leitch and Davenport (2007) analyze New Zealand governmental documents and identify a tendency to employ strategic ambiguity around the term "sustainability" to guide the development of biotechnology.

The media's influence becomes increasingly evident as studies on scientific and governmental discourse grow. Maeseele (2015) investigates how two Belgian elite newspapers frame and interpret contentious events in the GMF debate, revealing two distinct ideological cultures: one that defends the status quo to stifle democratic debate, and another that challenge existing power relations to encourage democratic debate. Zheng and Zhang (2021) find that Chinese media tend to align their ideological stance with the government' dominant position in supporting GMFs. As media coverage expands, public attitudes towards GMFs evolve (Lv and Chen 2016), leading to a greater focus on public discourse research. Attar and Genus (2014) contend that public participation can mitigate opposition to technological advancements by fostering widespread consensus. Maeseele (2015) and Reis-Castro and Hendrickx (2013) stress the importance of integrating public perspectives alongside elite viewpoints in discussions on GMFs discourse.

The preceding review highlights the importance of public discourse within the spheres of GM science and governance. Previous research shows that both scientists and government officials attempt to align with the public to communicate and justify their work, while the media plays a crucial role in shaping public attitudes towards GMFs. The study of public discourse on GMFs is thus vital for several reasons: it reveals ideological and cultural differences among various groups, as well as their perspectives and attitudes towards societal issues. Moreover, increased public participation and empowerment in GMFs discourse can foster a more democratic and inclusive approach in GM policy-making and technological development (Attar and Genus 2014; Reis-Castro and Hendrickx 2013). Therefore, examining public discourse on GMFs is important for facilitating democratic debates, reducing societal divisions, and safeguarding public interests. This study aims to investigate the public discourses of anti-GMFs in China in order to contribute to this line of work.

## Data and method

This study investigates anti-GMFs discourses in China. We collected public articles from WeChat public accounts as the primary dataset for this study. WeChat is one of the most popular social media platforms in China. Similar to Facebook Page, it has a function called WeChat public account, which enables individuals and organizations to publish content, attract followers, and sell products and services. Using the keywords 转基因食品 (GMFs) and 食品安全 (food safety) in the search engine of WeChat, We manually identified 48 pieces of public articles that show negative attitudes toward GMFs. These articles were published by 34 individuals and 14 organizations from December, 2010 to March, 2018, a period of time when discussions of GMFs gone viral in Chinese online spaces (Lv and Chen 2016). Representative voices in WeChat articles on anti-GMFs and their percentage are listed in Fig. 1.

Given that approximately 91.99% of Chinese citizens use WeChat regularly, we believe that the articles presented in WeChat are significant since the platform provides quick access to information about GMFs. While WeChat is one of the most popular social media platforms in China and provides a robust dataset, we acknowledge that additional platforms such as online forums and newspapers may offer complementary perspectives. This limitation suggests a direction for future research.

An analysis of these datasets affords a robust analysis of the anti-GMFs discourses on WeChat. However, following contemporary critical approaches in the humanities and social sciences, we question the possibility of achieving a "total understanding" of any studied phenomenon (Saukko 2003, p. 19). Therefore, the research findings obtained in this study are considered partial answers to 1) how Chinese opponents of GMFs construct and legitimate their arguments against GMFs, and 2) what ideologies are embedded in their anti-GMFs discourses. Findings to these research questions are grounded within the contemporary knowledges and public attitudes about/toward GM technologies and foods, which may be unstable and shifting. Thus, with the analysis of WeChat articles, we aim to contribute to a dense and "thick" description of anti-GMFs discourses, not only describing the details of these discourses but also interpreting the meanings, strategies, and ideologies embedded in them (Clifford 1973; Ponterotto 2006, p. 543) so as to achieve "situated knowledges" (Haraway 1988) on this relatively underexplored topic.

To do so, we adopt a critical discourse analysis (CDA) perspective. CDA is primarily used to examine social practices by analyzing discourse, which refers to "the language associated with a specific social field or practice" (Fairclough 2013, p. 179). It asserts that discourse, as a social practice, entails a dialectical relationship between a particular discourse practice and its specific contexts and social structures. By analyzing language use within its socio-historical context, CDA aims to uncover how discursive strategies contribute to the creation and perpetuation of (un)equal power relations, also known as ideological effects. This objective aligns with the aim of this paper, which is to explore the discursive strategies and embedded ideologies in anti-GMFs discourses.

Specifically, we draw on Wodak's (2001, 2015) discourse-historical approach (DHA) for the analysis. DHA follows a top-down analytical process, starting with the examination of social practices (macro analysis) and then moving to specific textual analysis (micro analysis), creating a three-dimensional framework. This involves (1) identifying the specific themes or topics of a discourse, (2) investigating the employed discursive strategies, and (3) examining the linguistic means (types) and their context-specific linguistic manifestations (tokens) (Reisigl and Wodak 2009, p. 93). Discursive strategies are intentional plans adopted to achieve specific social, political, psychological, and/or linguistic goals (Wodak 2015, p. 8). For instance, metaphors can assist in the discursive construction of social actors, events, and processes. For the purposes of this study, we mainly use DHA to find out how critics of GMFs construct and legitimate their arguments against GM technologies and foods. We first explored the linguistic devices utilized in the texts, and then analyzed the argumentation strategies manifest in the data, followed by a revelation and discussion of the ideologies embedded in these discourses.

We extrapolated the discursive strategies through a close analysis of the linguistic means and devices manifested in the WeChat articles. Through multiple close readings and analyses, we found four discursive strategies that emerged from the data, including metaphor, irony, moralization, and intertextuality. To ensure methodological rigor, we used a systematic coding process. The initial coding was conducted by a primary researcher with

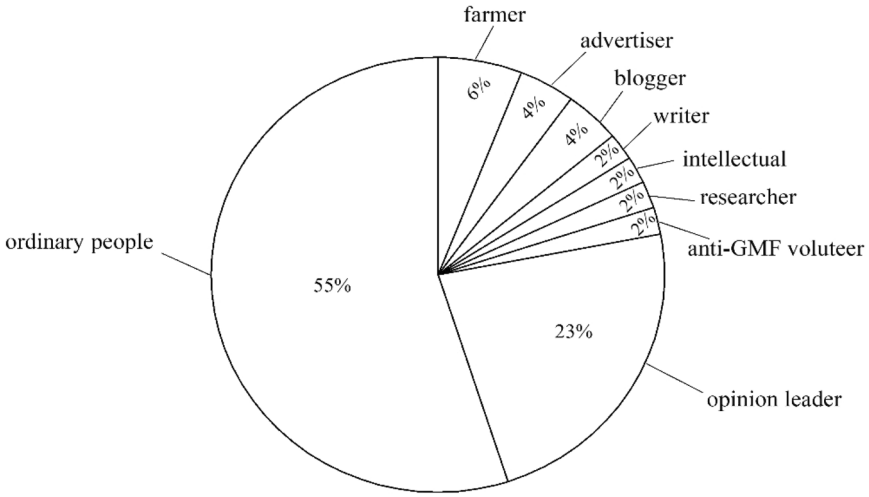


**Fig. 1 Representative voices in WeChat articles on anti-GMFs.** The figure presents the distribution and proportion of representative voices in WeChat articles that show a negative stance on GMFs.

**Table 1 Major discursive strategies manifest in the data.**

| Discursive strategies | Brief explanations |
|---|---|
| Metaphor | Metaphor of War: Anti-GMFs is a war. GMFs opponents are fighters. GMFs supporters are enemies. Opposing GMFs is achieving victory and seeking justice. |
| Irony | Professionals are unprofessional.<br>GMFs *zhuangjia* (pseudo experts) lack authority and are immoral. |
| Moralization | Abstraction: Supporting GMFs is unpatriotic. Opposing GMFs is patriotic. Eating GMFs violates the value of filial piety and patriotism. |
| Intertextuality | Intertextualize historical origins such as Chinese proverbs, idioms, ancients' sayings, and Chinese social conservative culture. |

The table provides brief explanations of the major discursive strategies manifest in the data.

expertise in CDA, followed by coding and verification by an additional researcher to achieve inter-coder agreement. Both researchers underwent training in CDA and thematic analysis to ensure consistency and reliability in coding and interpretation. These discursive strategies identified in the data were found to serve two primary functions, namely emotional and moral appeals against GM technologies and foods. Among these strategies, the technique of moralization predominantly moralizes the issues at hand and grants legitimating power to the arguments. To better illustrate these discursive strategies, we adopted van Leeuwen's (2008) legitimation theory to illustrate how discursive strategies were used to legitimate anti-GMFs arguments, such as the use of authorization and moral evaluation. Table 1 provides an overview of the discursive strategies examined in this study.

In the following analysis section, we illustrate the discursive strategies in detail with concrete examples. The selection of these extracts is based on the typicality and significance of these extracts, which can be seen from the important discourses they manifested. The study is designed as qualitatively-oriented research, so quantitative results were not presented. However, these qualitative findings are worthwhile in themselves as they demonstrate important discursive strategies that people use to oppose GM technologies and foods. Moreover, despite the study being conducted five years ago, its relevance in 2024 remains strong for several key reasons. First, the analysis of anti-GMFs discourses through WeChat, a major social media platform in China, continues to be pertinent. WeChat's role as a leading platform for disseminating information has not diminished, ensuring that the insights from this study on how anti-GMFs discourses are framed and communicated are still applicable today. Second, the discursive strategies identified are central to understanding how contentious topics like GMFs are debated and contested. These strategies are not only reflective of the past but continue to be relevant in contemporary discussions. The study's exploration of these rhetorical techniques offers enduring insights into how arguments are constructed and legitimized, which remains crucial for analyzing current discourses. Third, the study provides a foundational analysis that can inform ongoing research. By documenting the ways in which anti-GMFs sentiments were articulated at a specific time, the study offers a reference point for comparing with current discourse. This helps in understanding how strategies and attitudes may have evolved or persisted, making the study's findings valuable for current academic and practical discussions on GMFs.

Regarding our research positionality, as critical discourse analysts, we acknowledge that our scholarly training and research interests inevitably shape our interpretations, particularly when engaging with emotionally charged and ideologically contested discourses such as those surrounding GMFs. However, our background in Critical Discourse Analysis (CDA) underscores the importance of critically interrogating power relations and ideological structures within discourse. This focus can influence the analytical lens through which we examine texts, especially when addressing public opposition to GMFs, which, as this study shows, is often framed through moral and emotional appeals. Acknowledging this potential bias, we have employed reflexivity throughout the research process, actively considering how our own perspectives on GMFs, an issue crucial to democratic discussion, and the broader societal context, such as the power imbalance between grassroots opponents of GMFs and the expert

proponents, may have shaped our interpretation of the discursive strategies used by critics. Moreover, in analyzing the emotionally charged language used by anti-GMFs critics, we were cautious not to dismiss these emotions as mere irrationality. Instead, taking a reflexive approach, we recognized that emotional appeals are a legitimate discursive strategy rooted in cultural values, such as the survival ideology discussed in the concluding section. By maintaining a balance between critical analysis and empathy, we sought to understand the ideological tensions driving the discourses, rather than simply categorizing them as irrational or emotional.

## Findings

We base our analysis by asking the question of how critics of GMFs discursively construct and legitimate their standpoints and arguments in a context where their voices are often portrayed as irrational, such as by Chu and Wang (2019), Ji et al. (2019) as rumormongering. We show that a sweep description like this is insufficient as there are more details and nuances in anti-GMFs discourses. We demonstrate this point by showing that opponents of GM technologies and foods primarily employ metaphor, irony, moralization, and intertextuality to legitimate their anti-GMFs stances. These discursive strategies are often used to make emotional and moral appeals, which makes them discursively persuasive and worthy of scholars' close analysis. We illustrate these findings in the following sub-sections.

**Legitimation by metaphor and irony**. From the data, we first found out that metaphor and irony were the most prominent tropes in anti-GMFs discourse. War metaphors that compare anti-GMFs as an action of self-defense from the attack of GM advocates are the most salient type of metaphors in the data, which sets the tone for anti-GMFs discourses and naturalizes anti-GMFs actions as normal and necessary. As metaphors "structure the way we think and the way we act, and our systems of knowledge and belief, in a pervasive and fundamental way" (Fairclough 1992, p. 195), the war metaphors conveyed in the data establish an overwhelming, cognitive mechanism for people to comprehend GMFs as a battle between opponents of GMFs and GMFs advocates. These war metaphors are mostly expressed through the Chinese character, *zhan* (战), literally meaning war. Appearing 142 times in the data, *zhan* together with its collocations (see the extracts below) is imbued with evaluative connotations and entailments that grant persuasive and legitimating power to anti-GMFs argumentations. Take extracts (1), (2), and (3) from WeChat articles as an example.

(1) 转基因粮食蔬菜跟我有关吗? 我有吃到吗? 肯定有关, 并且我们已经被转基因食物包围。(2015-Dec-14)
*Are genetically modified food and vegetables related to me? Have I consumed them? Definitely yes. We are already surrounded by genetically modified foods (GMFs).*

(2) 崔永元是民族英雄, 是中国的脊梁! (2017-Jul-20)
*Cui Yongyuan is a national hero, the backbone of China!*

(3) 倘若有人自己不吃却哄骗于我哄骗于大众……此等无良者必为我的敌人, 若进一步, 也即是全民的公敌, 甚或是人类的罪人。(2017-Aug-22)
*If someone who do not consume GMFs deceives me and deceives the public by saying that people should eat GMFs, these people are unethical. They will definitely be my enemies. If we take it a step further, we can say that they are the enemies of the entire nation, or even the enemies of humanity.*

In extract (1), war metaphor is conveyed through the predicate, "are surrounded by", which sketches a war scenario where the author of this WeChat article is surrounded by GMFs and has no other choices but participates in this war against GMFs. This metaphorical expression contributes to the "militarization of thought and social practice" (Chilton 1988), through which war stands as a shorthand for the fight against GMFs and their advocates. Extract (2) further evokes the war metaphor by portraying Cui, a TV host who rose to fame through online debates with Dr. Fang on GMFs, as national hero. Cui's vehement arguments against GMFs, as the author of this extract claims, won him the title of national hero in China, who metaphorically backed the bone of China. Cui is thus positioned as a leader in this war against GMFs. He is not only a leader of these critics, but as the extract suggests, a leader/hero of the nation, which implies that anti-GMFs is or should be a national enterprise. By recontextualizing anti-GMFs as a national enterprise rather than an individual practice, this proposition popularizes anti-GMFs stance and legitimates it. In example (3), the word "enemy" is used explicitly to compare GMF supporters as enemies of the speaker, enemies of the entire nation, and enemies of humanity. Repetition or parallelism is employed to pin down GMF supporters as the number one enemy in the public's mind as though this conception is a demonstrated truth. When these war metaphors are frequently embedded and evoked in public discourses, readers may find it extremely difficult to escape from these metaphorical conceptions as the Us versus Them opposition is underpinned, whereas alternative discourses are backgrounded.

Another salient rhetorical trope is irony, as represented in extracts (4) and (5).

(4) 了解转基因对我是有些难度的，但，没有砖家说得那么难。啥叫转基因， 你祖祖辈辈吃的东西被人动了手脚，转入了一种叫'外源基因'的东西，虫子一吃肠穿孔了，死了，专家说它死你不死。……你害怕除草剂在作物上的残留，砖家说没事儿，这除草剂比五粮液还安全。砖家为什么说这话？因为拿了别人的钱（比如美国孟山都公司的钱）还分了国家的240亿元经费……(2017-Jul-29)
*I have some difficulty in understanding genetically modified organisms (GMOs), but it's not as complicated as some zhuanjia (砖家) claims it to be. GMFs mean that the food you and your ancestors have been consuming for generations has been altered and has been infused with something called "foreign genes". If bugs eat it, their intestines will get perforated and they will die. Zhuanjia (专家) say that the bugs will die but you will not. You're afraid of the herbicides residue on crops, but zhuanjia (砖家) say it's fine. They say these herbicides are safer than Wuliangye (a luxury white spirit/baijiu). Why do zhuanjia (砖家) say this? Because they received money from others (such as from the Monsanto corporation in the U.S.) and also received 24 billion yuan funding from the country…*

(5) 草甘膦致癌已经被全世界各国科学家证实，现在又被中国科学院和北京大学证实，草甘膦致癌已经是全世界科学界的共识！转基因公司和砖家推手已经再也无法用任何谎言来否定草甘膦致癌的事实了！(2017-Jun-27)
*Glyphosate having carcinogenic substances have been confirmed by scientists from all over the world. It has also been verified by the Chinese Academy of Sciences and Peking University. The carcinogenic properties of glyphosate are now widely accepted in the global scientific community. GMO companies and zhuanjia (experts) can no longer use lies to deny the fact that glyphosate has carcinogenic substances.*

In extracts (5) and (6), irony is conveyed through the recharacterization of experts (*zhuanjia* 专家) as *zhuanjia* 砖家, which literally means experts of bricks. This rhetoric trope mocks

and belittles experts' profession and their viewpoints on GMFs and implies that they are pseudo experts. The belittlement of experts is further reinforced by the use of a quoted speech (e.g., *Zhuanjia* (专家) say that the bugs will die but you will not). The quoted speech invokes an implication that would most likely be agreed by readers. That is, things that kill bugs would similarly kill human beings. Also, the second person pronoun you functions as a strategy of perspectivation, suggesting that the reader of this passage would agree with the author's viewpoints into believing that GMFs can kill them the same as they can kill bugs.

Furthermore, the portrayal of experts as corrupted experts, who receive bribe money and lie to the public delegitimates these experts' authority and their claims. The juxtaposition of these pseudo, domestic experts with scientists from other countries and the Chinese Academy of Science and Peking University also weakens the authority of these experts, making them laughing stocks. The sharp contrast between these pseudo experts and the real scientists can also be viewed as an intensification strategy, which strengthens the mockery effects of the ironic use of *zhuanjia* 砖家, experts of bricks, whose expertise is rendered untrustworthy.

**Legitimation by moralization**. Moralization is a way of legitimation based on values. In the data, we found that moralization is often realized through abstraction, which represents practices "in abstract ways that 'moralize' them by distilling from them a quality that links them to discourses of moral values." (van Leeuwen 2008, p. 111). Two social values were found to be abstracted and referred to by speakers in their anti-GMFs arguments. The first one is filial piety, which is the dominating concept of Confucian teachings about family values. It regulates parent-children relationship by requiring children to be respectful to their parents, take care of their older parents, and have a male heir, a son, to carry on the family's bloodline (Smith 2016). As the Mencius said, there are three things which are unfilial, and to have no posterity is the greatest of them. This aspect of filial piety is evoked by critics of GMFs as they believe that consuming GMFs would endanger a person's ability of reproduction. For example, in the data, expressions such as *having no heir, without descendants, being infertile, childless*, and *destroying our race*, are common expressions to indicate that GMFs will cause people infertile. Extracts (6), (7) and (8) in the following represent this argumentation scheme of filial piety.

(6) 老的可以吃 (甜玉米), 年轻的, 没成家的, 没生孩子的, 一律不要吃 (甜玉米)！(2014-Apr-07)
*The seniors can consume sweet corn, but young, unmarried, and childless individuals should avoid consuming sweet corn.*

(7) 医学家在婴儿的脐带血中已经发现了转基因BT毒蛋白, 看来转基因毒粮一代致病、二代致傻、三代绝育是真实不虚的事实。(2017-Apr-30)
*Medical experts have found transgenic BT toxin protein in the umbilical cord blood of infants. It seems that the harmful effects of GMFs, i.e., causing illness in the first generation, cognitive impairment in the second generation, and infertility in the third generation, are indeed real and not unfounded facts.*

(8) 转毒基因食品化推手们不择手段、肆无忌惮地欺骗党和政府、全国人民和世界人民, 以便掩盖转毒基因全方位危害人类健康、必然导致断子绝孙、亡国灭种的超严重后果……(2016-Jan-19)
*GMFs supporters lie to the Party, to the government, to our citizens, and to people around the world. They lie to cover the severest consequences of eating GMFs, including having no heirs, ruining the country, and destroying our race.*

The argumentation scheme of filial piety is developed from a lower personal level, to a higher family level, and ultimately to the highest national level, with each level progressively increasing the severity of the consequences of eating GMFs. For instance, formulated as a vital advice to young people, extract (6) warns young people to refrain from consuming sweet corn. Extract (7) describes GMFs as poisons that can cause sonlessness of a family. Extract (8) moves to say that GMFs could destroy the entire Chinese nation if people continue to consume GMFs. In this vein, GMFs are delegitimized by a discourse of filial piety and further by a discourse of nationalism, which positions those GMFs advocators and consumers as the internal enemies, who are here to destroy the nation and even human beings. The second social value that is abstracted in the data is patriotism. Patriotism in the data is presented in two ways. One is the positioning of those who support GMFs as the unpatriotic Other. Another is the representation of those who oppose GMFs as the patriotic Us. The juxtaposition of these opposite stances toward GMFs with national orientations (i.e., to love or betray one's country) evokes a powerful rhetoric trope since patriotism is highly regarded in the moral domains of Chinese society. For example, in the following extracts (9) and (10), we see that both extracts employed a discourse of patriotism to delegitimate GMFs supporters.

(9) 为了利益而宣传鼓吹转基因固然有问题，但拿钱办事这个逻辑还好理解，套用鲁迅的话，叫做走狗；而那些连钱也没拿到的还在鼓吹转基因的，则是'丧家的走狗'了。(2017-Aug-02)
*While it is understandable that some individuals promote GMFs for personal gain, which can be criticized, there is a logic behind their actions. To borrow the words of Lu Xun [China's famous writer, thinker, critic, and revolutionist], they can be referred to as "running dogs". However, those who continue to advocate for GMFs without even receiving any monetary benefits can be considered as "despicable running dogs".*

(10) 反转基因反卖国就是最大的政治！我们是为民族和人民生存，及全人类安全、健康、生存与繁衍而战！……团结一切可以团结的力量，彻底孤立一小撮汉奸卖国贼和转基因利益集团。(2016-May-29)
*Opposing GMFs is opposing treason, which is the most significant political action. We are fighting for the survival of our nation, the well-being and reproduction of all humanity, and the safety and health of everyone. Let us unite all the forces we can to completely isolate a small group of traitors and GMO interest groups.*

Example (9) contrasts people who advocate GMFs for interests and those who advocate GMFs for nothing. The former is labeled as running dogs (a metaphor for traitors) while the latter are regarded as homeless running dogs (a metaphor for traitors whose loyalty to others does not receive benefits in return). Both groups are people stigmatized for their perceived disloyalty to their country. Similarly, in examples (10), GMFs supporters are labeled as traitors and spies. These negative membership categories are used to tarnish GMFs advocates, positioning them in a morally disadvantaged position, who are the out-group within the nation. The Us versus Them opposition thus potentially evokes readers' sense of patriotism as they can position themselves as national heroes who resist GMFs and fight against those traitors.

**Legitimation by intertextuality**. Intertextuality is "the property texts have of being full of snatches of other texts, which may be

explicitly demarcated or merged in and which the text may assimilate, contradict, ironically echo, or forth" (Fairclough 1992, p. 84). Specifically, GMFs oppositional discourses intersperse many other discourse elements, including historical origins (proverbs, idioms, and ancients' sayings) shown in examples (11) to (13), and social conservative culture represented in examples (14) and (15).

(11) 农业部自己吃有机食品，却欺骗和强迫全国人民吃转基因毒食，司马昭之心，路人皆知。(2017-Jul-03)
*The Ministry of Agriculture itself consumes organic food, yet it deceives and forces the entire population to consume genetically modified toxic foods. This is a well-known case of hypocrisy, apparent to everyone, akin to the actions of Sima Zhao. As the saying goes, "everyone on the street knows what's in Sima Zhao's mind". [Si Mazhao is a military general, politician and regent of the state of Cao Wei during the Three Kingdoms period of China. What's in Sima Zhao's mind is his hidden intention of usurping the throne.]*

(12) 古人曰：试玉要烧三日满，辨材须待七年期，转基因食品没有几代人的验证，很难知其有多大危害。(2017-Aug-22)
*As the ancients said, "testing jade requires a full three days of burning, and discerning the quality of materials requires waiting for a period of seven years". Without several generations of verification, it is difficult to determine the extent of the potential harm of GMFs.*

(13) 强烈要求惩办鼓吹转基因的伪科学家！打倒祸国殃民的伪科学家！ 打倒弱智的脑残的愚蠢的祸国殃民的伪'精英'！ 打倒汉奸卖国贼！ 中华民族万岁！ 中国人民万岁！(2016-Jul-25)

*It is strongly urged to punish those pseudo-scientists who advocate for GMFs! Down with the pseudo-scientists who have squandered the country and the people! Down with the stupid pseudo-elites! Down with the traitors! Long live the Chinese nation! Long live the Chinese people!*

Example (11) intertextualizes a Chinese idiom that everyone on the street knows what's in Sima Zhao's mind to criticize the Ministry of Agriculture for intentionally hiding the severe risks of eating GMFs. Arguably, by constructing the government institution as the liar, the author of this text risks threatening their patriotic stance, a value often used by them to fight against GMFs supporters. Yet, their opposing stance towards GMFs in this example may have given them the boldness to break their alliance with the government, which testifies their determination in opposing against GMFs. Example (12) integrates the famous poet Bai Juyi's verse to imbue their claim with extra persuasive power. It suggests that to prove the safety of GMFs requires several generations' verification. Such a usage of ancients' sayings is very effective, as they stood the test of time, suggesting that the wisdom they contain is universal and enduring. By employing this ancient saying, the text convinces readers to fight against GMFs. Also, in example (13), the parallelistic expression of "Down with …" is used to convey opposition. This expression adopts historical elements from the Cultural Revolution era in China, when the proletariat were repressed by the bourgeoisie and the down-with bourgeoisie was frequently shouted by the mass to promote a class struggle between bourgeoisie and proletariat. The intertextual use of this expression in this example thus may potentially evoke people's revolutionary fervor and agitates the public's enthusiasm for carrying out a similar struggle between GMFs opponents and supporters. It can also be argued that the use of this expression with political and historical sentiments may work to politicalize GM debates, which is very similar to the politicized language infiltrating people's private lives in the Mao-era (Xing 2017).

These findings on intertextuality provide insights beyond texts and the situational context to a larger social historical context. They reveal that GMFs oppositional discourse is socially and historically rationalized through intertextuality. On the one side, through the intertextualization of Chinese idioms and proverbs in GMFs oppositional discourse, these discourses become much more acceptable and understandable given that they resonate with the public's shared social cognition. On the other side, blending the revolutionary discourse reminds people of the class struggle in the past era, in which the proletarian benefits most. This could potentially mobilize the public to resist GMFs elites in the name of class struggle, thus making the enterprise of anti-GMFs a political endeavor. The strategy of intertextuality thus connects anti-GMFs discourses with the larger social and political context, making them legitimate.

## Discussion and conclusion

As this study has shown, discourses of anti-GMFs are highly emotional, employing metaphors, irony, moralization, and intertextuality. Specifically, we find that a) War metaphors and ironic language are frequently used in anti-GMF discourses to provoke emotions; b) GMFs opponents first portray GMFs as immediate threats and dangers to the public, then employ emotional and moral appeals based on traditional Chinese values to position themselves as the patriotic Us so as to assert a sense of moral superiority; c) GMFs opponents also employ intertextual resources, including proverbs, ancient sayings, idioms, and revolutionary discourses to arouse a spirit of resistance among the public. These strategies are imbedded with ideological and cultural factors.

On one hand, these discursive strategies serve as a common survival ideology among Chinese opponents of GMFs. For example, the use of war metaphors reflects people's strong determination to fight for their survival, particularly reproduction. The utilization of moralization (appealing to filial piety and patriotism) urges people to oppose GMFs so that they can preserve their family bloodline and ensure the survival of the nation. The integration of intertextual elements and revolutionary discourse evokes a spirit of resistance in the public. These discursive strategies all work to reflect and reproduce the public's survival ideology.

Furthermore, many of these discursive strategies are morality-driven, reflecting a particular aspect of Chinese culture, wherein moral strength plays a significant role in shaping people's beliefs and actions. The opponents leverage morality to implicitly persuade the public against GMFs. Specifically, an Us versus Them opposition is constructed. Those who resist GMFs are referred to as brave fighters, heroes, filial sons and daughters, and patriots, creating a positive image of the Self, while those who support GMFs are labeled as enemies, running dogs, and traitors, casting them a negative image of the Other. This moral abduction effectively mobilizes the public's moral stance to resist GMFs.

However, considering the broad sociopolitical environment in China, particularly the power imbalance between the elites and the common citizens, we argue that underlying the survival ideology and the moral persuasion may reflect a power imbalance between the opposing parties. GMFs opponents typically have limited social status and financial resources given that they are mostly individuals or grassroots such as farmers. Therefore, they have few available resources other than social values, emotions, and morality, in contrast to GMFs supporters who are often backed by professional knowledge, government support, and legal protection. This power asymmetry may result in an imbalance of discursive rights in GMFs debates, making it difficult for different opinions, especially those of disadvantaged groups to voice their

thoughts. It is also not helpful to reconcile different opinions, if reconciliation is wanted. This power imbalance may partly explain the morality-laden argumentation pattern in anti-GMFs discourses. We think that this attention to the power imbalance is crucial for researchers to investigate such a controversial topic, as it may enable us to better understand the nuances of the opponents' stance and discourses. We thus stress the importance of keeping a balanced position in analyzing and interpreting GMFs oppositional discourses, despite that these discourses counter the modern agricultural technology and accompanied scientific values. Furthermore, we hope that the insights from this study will offer interpretive frameworks that can be applied to other contentious issues, such as debates surrounding surgical procedures and cosmetic surgeries.

The study has several implications for food policymakers addressing arguments against GMFs. First, given the moral and emotional nature of anti-GMF arguments identified in this study, there is a need for enhanced science communication that goes beyond mere dissemination of facts. Educational initiatives should focus on demystifying GMFs, addressing public concerns, and providing transparent information about the science and safety of GMFs. Effective communication strategies should aim to bridge the gap between scientific knowledge and public perceptions, helping to alleviate fears and misconceptions. Second, the research highlights a significant power imbalance between GMF opponents and proponents, which affects the representation and consideration of various viewpoints in the debate. To address this, food policymakers may consider establishing public forums and participatory policymaking processes. These platforms would provide opportunities for diverse voices, particularly those from grassroots groups, to be heard and integrated into the decision-making process. Such efforts could contribute to a more inclusive and democratic debate surrounding GMFs. Third, the use of traditional Chinese values, such as filial piety and nationalism, in anti-GMF arguments reflects the deep cultural and ideological contexts influencing public opinions. Food policymakers may find it useful to appropriate these traditional Chinese values, to foster more culturally sensitive and effective communication. By aligning policies with these values, they could resonate more deeply with the public and enhance trust in GMF-related policies. Finally, the study has advocated for maintaining a neutral yet critical stance when analyzing and interpreting anti-GMFs discourses. For policymakers and researchers, this means approaching the issue with an open mind and avoiding the demonization of opposing views. Engaging critically with all arguments, regardless of their source, can lead to more balanced and effective policy solutions. This approach also fosters trust and encourages constructive dialogue among stakeholders with differing viewpoints.

In conclusion, the findings of this study present a nuanced understanding of anti-GMFs discourses, demonstrating that critics of GMFs employ strategic discursive practices that serve not only as emotional appeals but also as legitimate modes of persuasion within their socio-cultural context. These findings challenge previous studies' simplistic characterization of anti-GMFs critics as rumormongers, underscoring the complexity of their discourses. Furthermore, the study advocates for a multifaceted approach to addressing arguments against GMFs, one that recognizes the emotional, moral, and cultural dimensions of the discourse. By understanding and addressing the rhetorical strategies employed by opponents, recognizing power imbalances, and promoting inclusive dialogue, policymakers and researchers can develop more effective and culturally sensitive strategies for managing GMFs debates. Continued research and critical engagement are essential for navigating this complex and evolving issue. Future research can build on these findings by incorporating diverse sources and exploring longitudinal changes in anti-GMFs discourse.

## Data availability

All data generated or analyzed during this study are included in this published article and its supplementary files.

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## Ethical approval

This article does not contain any studies with human participants performed by any of the authors.

## Informed consent

This article does not contain any studies with human participants performed by any of the authors. Informed consent is thus not applicable in the context of our specific study.

## Additional information

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