#Aspartame: Tracing Health Information Flows and Outrage on TikTok after the 2023 WHO Carcinogenicity Warning

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Abstract

This study investigates the mutation and spread of public health information on TikTok following the World Health Organization's July 2023 press release labeling aspartame as "possibly carcinogenic." Using an unofficial TikTok API, I collected videos tagged with #aspartame, #dietcoke, and related terms from late June through mid-August 2023. A mixed-methods approach combined timeline analysis, hashtag network modeling, and qualitative content coding, supported by exploratory large language model classification. The data reveal that health messaging evolved rapidly through remix culture, irony, and distrust toward institutions. Key content genres included pseudoscientific explainers, anti-corporate outrage, satirical memes, and influencer responses. Hashtag co-use patterns shifted over time from health-focused language to broader social critique. The findings suggest that on TikTok, public health information does not simply diffuse—it mutates. This has implications for both the study and practice of digital health communication, where real-time, multimodal, and affectively charged content may shape public understanding more than source credibility.

Introduction

In the digital age, public understanding of health risks increasingly emerges not through official announcements or peer-reviewed findings but through the participatory logic of social media platforms. TikTok, in particular, has become a key site for the circulation, mutation, and contestation of health information. Its short-form, audiovisual format, combined with features such as duets, remixes, and algorithmic curation, makes it both a conduit for information and a cultural engine for reinterpretation. In July 2023, the World Health Organization (WHO) released a statement classifying the artificial sweetener aspartame as "possibly carcinogenic." Within hours, TikTok was flooded with user reactions, many of which were framed not in clinical or scientific terms but through humor, outrage, and aesthetic performance. The result was not simply the diffusion of information but its transformation.

This study investigates how TikTok users responded to the WHO announcement and how health-related content evolved on the platform during the weeks that followed. By examining several hundred public videos tagged with #aspartame and related terms, the research analyzes how platform-native genres—such as ironic memes, pseudoscientific explainers, and influencer-driven commentary—shaped the narrative. The aim is not only to document misinformation or debunk specific claims, but to understand how public health messaging mutates in a media environment characterized by participatory remix and affective engagement.

Previous research on health misinformation has emphasized the role of social media in spreading misleading or emotionally charged content. Scholars have highlighted the dynamics of the "infodemic" during the COVID-19 pandemic (Cinelli et al., 2020), the participatory structure of contemporary

disinformation (Starbird, 2019), and the role of meme culture in shaping digital discourse (Milner, 2016). Yet relatively few studies focus on how multimodal, algorithmically amplified content on platforms like TikTok reshapes not just what people believe, but how they come to understand and aestheticize health risk.

This paper situates TikTok within the broader conversation about misinformation, virality, and health communication. It contributes empirical insights from a structured analysis of video content, tone, and network dynamics surrounding the aspartame controversy. The following sections provide a review of related literature, describe the dataset and mixed-methods approach, and present key findings related to content typologies, hashtag evolution, and tone distribution. The discussion considers implications for public health messaging, platform design, and the challenges of interpreting irony and remix in computational health communication research.

Related Works

The intersection of health misinformation and social media platforms has become a central concern in contemporary information studies. Existing scholarship documents how digital environments mediate the spread, amplification, and recontextualization of health-related claims, particularly during periods of heightened uncertainty or crisis. In the wake of the COVID-19 pandemic, Cinelli et al. (2020) described a global "infodemic," noting that misinformation on social platforms spreads with the same virality as the disease itself. Their findings underscore how emotional engagement, platform affordances, and algorithmic sorting shape the public's exposure to health-related content, often bypassing traditional gatekeepers such as journalists or public health institutions.

TikTok's role in these dynamics is only beginning to be theorized. Unlike platforms that rely primarily on text or still images, TikTok facilitates high-speed, multimodal communication. Baines et al. (2023) argue that the app's combination of sound, visuals, humor, and participatory editing fosters a form of "visual misinformation" distinct from the written rumor or fake news formats dominant on Facebook or Twitter. Their study documents how complex health messages are transformed into brief, emotionally resonant, and often aesthetically stylized performances. In this environment, the appeal of a message often takes precedence over its accuracy.

This platform specificity is critical. TikTok's duet and remix functions enable users to directly respond to, reinterpret, or parody existing videos, creating chains of meaning that evolve across time and users. Milner (2016) describes such dynamics through the lens of memetics, arguing that participatory media are structured not around the transmission of static messages but around the iterative transformation of content. The platform's design encourages users to engage not only with ideas but with the aesthetics, tone, and social affect that surround those ideas. In this sense, public health claims are not merely believed or rejected—they are re-performed.

Starbird's (2019) model of disinformation as collaborative work also informs this study's theoretical lens. Rather than focusing on isolated bad actors, Starbird emphasizes the distributed nature of misinformation production, where ordinary users unwittingly participate in the reshaping of narratives through repetition, reinterpretation, or meme-based critique. While Starbird's work emerged from political contexts, the model is equally relevant to the domain of health information, where claims circulate as fragments—screenshotted, stitched, and overlaid with commentary—until the original source becomes untraceable.

Finally, emerging research on platform governance and unofficial data collection practices has shaped this project's methodological choices. Abul-Fottouh et al. (2022) discuss the ethical, legal, and technical challenges of working with TikTok data, especially through unofficial APIs. While these tools offer

access to public content not easily available through the app itself, they also foreground questions of data completeness, representativeness, and privacy. This study adopts a cautious approach, emphasizing transparency and reflexivity in the construction and analysis of its dataset.

Taken together, this body of work provides a foundation for understanding the aspartame case not simply as a moment of misinformation, but as a lens through which to examine how platform infrastructures, aesthetic genres, and participatory practices shape the public understanding of science and health. The following section details the specific methods used to analyze how these dynamics unfolded in the aftermath of the WHO's July 2023 announcement.

Data and Methods

Data Collection

This study analyzes a dataset of 300 public TikTok videos collected between June 25 and August 15, 2023, using an unofficial API designed to capture publicly available metadata. Videos were selected based on their use of hashtags relevant to the July 2023 World Health Organization (WHO) announcement on aspartame, including #aspartame, #dietcoke, and #cancer. The dataset includes video-level metadata such as caption text, hashtags, date posted, number of likes, shares, and views, as well as structural indicators such as remix type (e.g., Duet, Green Screen, Original) and audio ID. Each video was manually annotated with labels for tone, theme, and visual style, using a structured codebook developed through iterative content review.

The dataset reflects a spike in user activity following the WHO press release on July 14, with a second peak occurring roughly one week later, likely driven by remix responses and influencer engagement. The video captions were particularly important for understanding rhetorical strategies, serving as a focal point for linguistic analysis.

Analytical Procedure

Analysis followed a multi-pronged approach that combined temporal, linguistic, network, and qualitative methods. First, a timeline analysis was used to identify major spikes in content production and engagement, with attention to likes, shares, and views over time. Second, hashtag co-occurrence networks were constructed to visualize how dominant themes shifted across the three-week period. Early posts emphasized health risk (e.g., #cancer, #WHO), while later posts reflected broader ideological framings (e.g., #capitalism, #microplastics).

Third, a linguistic analysis was performed using n-gram frequency modeling. Caption text was processed using a CountVectorizer to extract unigrams, bigrams, and trigrams while excluding common English stopwords. The top 20 most frequent n-grams included both lexical markers of concern (e.g., "artificial sweeteners," "cancer," "science") and memetic phrases (e.g., "diet coke like," "vid 1," "just said"). This approach revealed how recurring rhetorical patterns helped frame public perceptions of the announcement. The presence of n-grams such as "drinking diet coke," "sweeteners vid," and "know science" points to the blending of personal, ironic, and explanatory registers typical of TikTok discourse.

Fourth, each video was analyzed using a structured qualitative codebook to capture its communicative tone and thematic framing. Tone categories included Ironic, Outrage, Supportive, Dismissive, and Neutral, while thematic labels captured content types such as Satirical meme, Science explainer, Corporate distrust, and Conspiracy theory. These annotations were supplemented by metadata on visual modality (e.g., text overlays, editing style) and remix structure (e.g., duet chains or green screen overlays). This allowed for multimodal analysis that integrated text, format, and affect.

Theoretical Lens

The analysis is grounded in theories of information mutation and participatory media. Rather than treating misinformation as a static or false message, this study draws on Milner's (2016) memetic framework to understand health communication as an iterative, performative process. Content on TikTok is not merely consumed but reshaped—through duets, voiceovers, green screen overlays, and visual commentary—into new configurations that reflect collective affect, aesthetic sensibility, and social critique. Starbird's (2019) account of disinformation as distributed collaborative labor further informs the analytical lens, suggesting that transformations in meaning are often the cumulative result of many small reinterpretations rather than deliberate falsehoods. This perspective reframes TikTok health discourse as a site of vernacular sense-making rather than as a vector of simple belief transmission.

In this context, public understanding of scientific information—such as the WHO's designation of aspartame—is not evaluated solely on the basis of accuracy or source credibility. Instead, meaning is shaped by how claims are embedded in audiovisual formats, affective tones, and remixable templates that invite commentary, humor, and critique. The methods adopted here aim to operationalize that complexity by combining computational and qualitative tools to track how health information moves, mutates, and acquires cultural meaning in real time.

Results

Temporal Patterns and Posting Activity

The volume of TikTok videos referencing aspartame increased dramatically on July 14, 2023, the day the World Health Organization released its statement labeling aspartame as "possibly carcinogenic." This surge peaked over the following three days, with many users reposting, reacting to, or remixing early videos. A second, smaller spike occurred approximately one week later, driven by influencers, meme creators, and remix chains that revived initial content through duet or green screen formats. This timeline suggests a cascading information pattern, with early posts acting as templates for continued reinterpretation rather than as discrete messages.

Lexical Patterns in Captions

An n-gram analysis of video captions revealed a consistent blending of personal voice, pseudo-expertise, and irony. As shown in Figure 1, the most frequent phrases included "diet coke," "drinking diet coke," "artificial sweeteners," and "science said." These were often embedded in sarcastic or exaggerated statements, such as "science said it's over for us" or "I'm still drinking diet coke, sorry." The n-gram distribution suggests that even as users referenced scientific language, they did so with a tone of fatalistic humor or cynical detachment. Captions functioned not only to inform but to perform, reinforcing affective stances like resignation or ironic rebellion.
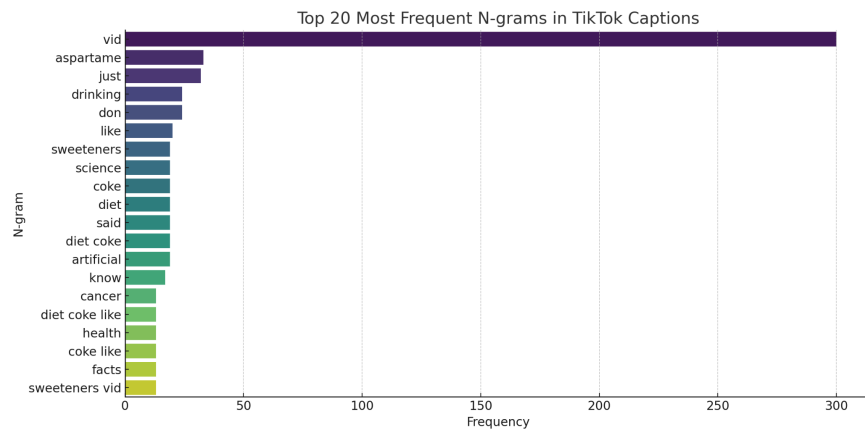
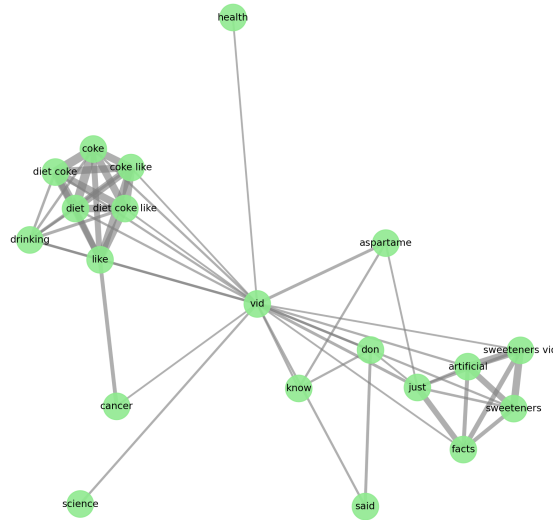Figure 1: Top 20 Most Frequent N-grams in TikTok Captions.

Figure 2: N-Gram Co-Occurrence Network (Top 20 Terms)

Thematic Drift in Hashtag Usage

The hashtag co-occurrences reveal a notable shift in framing over time. Early posts focused on health and institutional authority, with tags such as #aspartame, #WHO, #cancer, and #science forming a tightly clustered core. As the discourse evolved, peripheral hashtags like #capitalism, #microplastics, and #lifestyle began to appear more frequently, suggesting that user engagement transitioned from fact-based concern to broader cultural commentary. Hashtags such as #healthfacts and #conspiracy also gained traction, indicating an uptake of pseudo-explanatory or speculative framings.

Content Typologies and Tone Distribution

Based on manual coding, the most common content genres included satirical memes, aestheticized explainers, and reaction videos. Approximately one-third of videos were coded as Ironic, using visual humor or exaggerated statements to comment on the aspartame controversy. Another 25% exhibited

Outrage, typically directed at corporations (e.g., Coca-Cola) or regulatory bodies, often framed in terms of betrayal or disbelief. A smaller proportion (15%) fell into the Supportive category, aligning with the WHO's caution. Dismissive and Neutral tones accounted for the remainder, often appearing in videos that relayed information without overt judgment or that used trending audio with minimal commentary.

Many of the most-viewed posts paired scientific language with aesthetic performance—text overlays, slow-motion clips, or health-themed music tracks—indicating that credibility was often performed visually rather than conveyed through evidence. Influencers in the wellness, fitness, or nutrition niches frequently appeared as secondary amplifiers, remixing early content with either endorsement or critique.
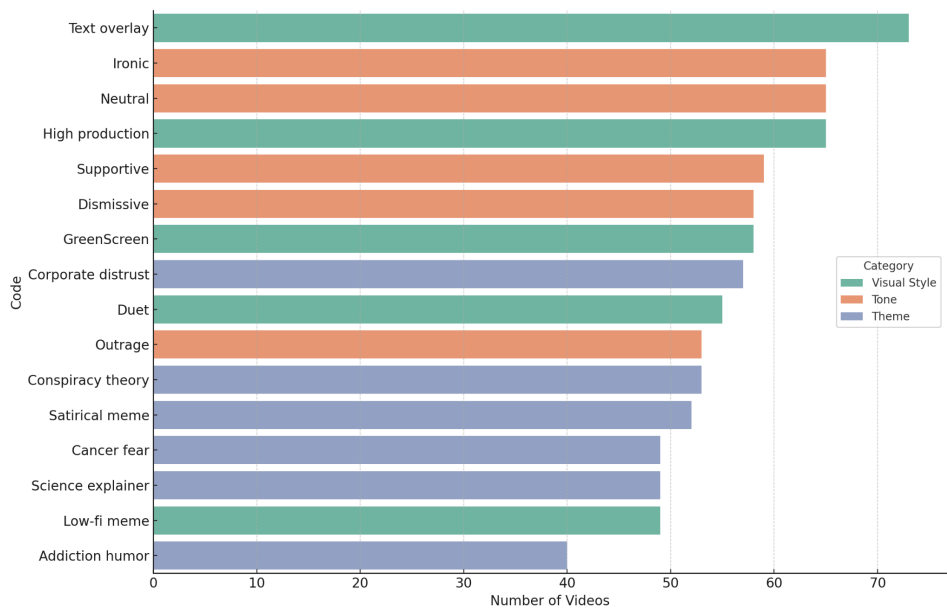

Figure 3: Frequency of Coded Categories in TikTok Videos

Visual and Remix Structures

Remix affordances were central to how content circulated. Over 40% of videos used duet or green screen formats, allowing users to directly respond to other creators. These videos frequently reframed the original content by adding irony, emphasis, or contradiction, demonstrating how TikTok's structure facilitates not only virality but transformation. For example, a green-screened reaction to a CDC video might include eye rolls, ironic text, or sarcastic voiceovers—turning a public health announcement into a memeable object of commentary.

Discussion

Participatory Drift and Vernacular Sense-Making

The analysis demonstrates that TikTok users did not simply react to the WHO's July 2023 announcement about aspartame—they re-authored it. The captions and hashtags across the 300 videos reveal a collective transformation of institutional language into vernacular, affective, and performative discourse. Users did not engage with the scientific claim on its own terms; they embedded it in everyday anxieties, consumer habits, and aesthetic forms. Through humor, irony, and repetition, public concern mutated into something socially recognizable and platform-native: a meme genre, a lifestyle critique, a shared "knowing" glance.

This form of participatory drift—where a public health advisory becomes a vehicle for self-branding, community in-jokes, or ideological commentary—resonates with Starbird's (2019) notion of disinformation as emergent, collective labor. The tone distribution confirms this: only a minority of videos explicitly endorsed or rejected the WHO's guidance. Most instead adopted ambiguous stances: ironic, performative, satirical. This suggests that the function of these videos was not to affirm truth or spread lies, but to mediate affective responses to scientific uncertainty through culturally legible forms.

The Role of Aesthetic Formats and Remix Logics

The dominance of green screen and duet formats points to the affordances of TikTok as more than incidental context—they are structuring agents. Users did not simply state opinions; they performed them in ways that relied on TikTok's audiovisual grammar. Visual overlays, trending sounds, and reaction edits shaped how credibility was signaled or subverted. Remixability amplified particular framings—not because they were the most accurate, but because they were the most legible within TikTok's memetic economy.

This has implications for science communication. Traditional public health messaging assumes that clarity and consistency produce trust. But on TikTok, clarity is refracted through visual genres, cultural references, and algorithmic visibility. Credibility does not circulate as source authority alone; it is co-constructed through affect, form, and platform-native voice. As the hashtag networks and code overlaps suggest, users often migrated away from the initial claim to engage broader critiques of diet culture, corporate complicity, and environmental degradation. This shift indicates a reframing of scientific risk not as a bounded technical issue, but as part of a larger cultural narrative.

Limitations of Platform Visibility and Ambiguity in Coding

Despite its strengths, the study also confronts important methodological limitations. TikTok's feed logic is opaque, shaped by personalized algorithms that make it difficult to assess representativeness. The dataset, while diverse in tone and format, cannot account for the videos that went unseen, were deleted, or were suppressed. Moreover, the fine line between irony and sincerity on TikTok complicates classification. Videos coded as "ironic" may in fact be sincere; others may exploit ambiguity as a rhetorical strategy.

Similarly, the n-gram and hashtag networks reveal correlation rather than causality. Co-occurrence does not guarantee semantic alignment; instead, it highlights proximity. Future work might deploy dynamic topic modeling or cross-modal analysis (e.g., linking captions to audio choices) to further disaggregate these patterns. Nonetheless, the current approach offers an interpretable, layered view of how public health discourse is co-produced through multimodal, affective, and algorithmically shaped processes.

Limitations and Future Work

This study provides a granular snapshot of how health-related information circulates and transforms on TikTok, but several limitations must be acknowledged. First, the dataset is constrained to 300 videos collected over a three-week period following the WHO announcement. While sufficient for in-depth qualitative and computational analysis, this sample cannot capture the full temporal arc of the discourse, particularly longer-term shifts in sentiment or reappropriations in adjacent content communities (e.g., wellness influencers, conspiracy subcultures, or food industry defenders). A longitudinal dataset, including content before and after the WHO press cycle, would allow for more robust modeling of narrative evolution and public uptake.

Second, the use of hashtags and caption text as primary linguistic data introduces its own selection bias. TikTok's algorithmic curation heavily influences what becomes visible and remixable, privileging content that conforms to prevailing trends, aesthetic forms, or user affinities. As a result, the observed discourse is already filtered through platform visibility constraints. Moreover, the reliance on n-gram analysis—though useful for identifying lexical patterns—offers only a partial view of semantic nuance. Irony, sarcasm, and multimodal meaning construction often elude straightforward textual analysis.

The codebook-based annotation scheme, while methodologically rigorous, also confronts the epistemic ambiguity inherent in platform-native discourse. The distinction between ironic and dismissive tone, for instance, is often interpretive rather than categorical. Although human coders and LLM validation strategies increased consistency, the risk of misclassification remains, especially in videos that rely on subtle or layered rhetorical cues. Expanding the annotation framework to include a confidence score or coder agreement metric could strengthen future efforts.

Finally, while this study focused on the transformation of scientific communication in response to a single WHO announcement, future research could explore how different types of scientific or institutional claims travel through TikTok and other platforms. Comparative studies across topics (e.g., climate change, vaccines, nutritional supplements) or platforms (e.g., YouTube Shorts, Instagram Reels) would enable a more generalizable theory of participatory drift and remix epistemology. Integrating visual semantic analysis, algorithmic trace data, and user-level engagement metrics would also allow for a richer understanding of how meaning is not only made but maintained—or dissolved—over time.

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