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HEALTH, IMAGE AND CORPORALITY: Visual Narratives and Gender on TikTok

IÑIGO MARAURI-CASTILLO [1]
inigo.marauri@ehu.es
MARÍA DEL MAR RODRÍGUEZ-GONZÁLEZ [1]
mariadelmar.rodriguez@ehu.es
GUILLERMO GURRUTXAGA-REKONDO[1]
guillermo.gurrutxaga@ehu.eus
YAZMINA VARGAS-VELEDA[1]
yazmina.vargas@ehu.eus
[1] Universidad del País Vasco (UPV/EHU), Spain

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ABSTRACT

TikTok is, along with Instagram, the social network of reference in the younger age groups. The visual narratives associated with health and image are analysed. In this case, we explore the influence of gender in content collected around 17 tags in Spanish. The thumbnails of the videos have been analysed, recognised through artificial vision algorithms and classified thanks to network analysis. We observed a greater focus on healthy eating in the female stories and a greater emphasis on training and fast food in the male ones.

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1. Introduction

Social media influences global conversation, both in terms of content and the way information is conveyed. And in that global conversation, food and body image occupy a significant space. The omnipresence of images of appetising food and ideal bodies may motivate some people to adopt healthier lifestyles, but it can also generate pressure and unrealistic expectations, which has an undesirable effect on the stigmatisation of those who do not fit into the standards that define what is considered the norm.

This pressure also has a marked gender bias, as it is women who are explicitly and implicitly targeted by messages that amplify the desirability, if not the obligation, of conforming to what has come to be described as the norm.

2. Background

2.1. Food, body weight and social media

The presence of food on social media is an area of research that combines perspectives related to communication and nutrition. Its use as a channel of communication and as a source of information on food and nutrition is growing, particularly among younger profiles and women (Gil-Quintana et al., 2022), who are its main users (Comscore, 2018). This increased use brings with it greater interest and concern about what is said about food, how it is said and who says it. However, specific research in this area is limited (Marauri-Castillo et al, 2023; Rogers et al., 2022).

This limited amount of research has not prevented us from noting that nutrition content on social media is generally of poor quality (Byrne et al., 2017; Kabata et al., 2022) and that *influencers* have a special ability to influence behaviour (Schouten et al., 2020), even more so than conventional celebrities, which is not unlike what happens in other areas.

Linked to the relevance of *influencers*, in recent years, studies have appeared that focus particularly on Instagram in their analysis of the relationship between food and social media (Black et al., 2019; Karathra et al., 2021; Marauri-Castillo et al., 2021a; Marauri-Castillo et al, 2021 b; Marín et al., 2021; Zielinska-Tomczak et al., 2021). The reason for this can be found in the popularity of this network among the so-called millennial generation and also among Generation Z. It is among the latter that Instagram's dominance is threatened by TikTok, the Chinese network that has expanded in the wake of the Covid-19 pandemic. Despite its rapid growth, or perhaps because of it, research on food and this social network, beyond studies such as those by Minadeo and Pope (2022), is scarce.

2.2. Gender perspective and TikTok

The use of the gender perspective as an element of analysis to study the content and behaviour found on social media is becoming increasingly relevant as the influence and opportunities offered by social media in the work of empowerment and promotion of equality and feminist demands are recognised (Webb and Temple, 2015).

In the case of issues related to food or body weight, studies addressing how content influences people's body image and weight predominantly focus on women (Cohen et al., 2019; Fardouly et al., 2017; Rodgers et al., 2021). In this regard, the social network of reference for the study has been Instagram. Its popularity among the younger sector of the population and among women are two of the reasons that explain this circumstance.

However, since its exponential growth following the pandemic, TikTok has attracted the attention and interest of the research community. And within that interest, the gender perspective is one of the references (Harriger et al, 2023a; Harriger et al., 2023b; Huber y Baena, 2023; Peña et al., 2023).

3. Objectives, hypotheses and methodology

The objective of this research is to identify the extent to which gender influences the content published on the Spanish-language social network TikTok regarding food and body weight.

The research questions on which the study is based are as follows:

RQ1. What topics predominate in the conversation about food and body weight on TikTok in Spanish?

RQ2. Is there a gender difference that influences the topics addressed?

RQ3. What topics and approaches characterise the content in which women and men predominate?

Data collection for this study focused on the analysis of posts on the social network TikTok, a platform that is widely popular among young people and plays a significant role in shaping discourses on food, exercise, and body image (Minadeo and Pope, 2022).

From an initial list of 42 terms, 17 hashtags relevant to the topics of interest in the study were identified: #physicalactivity, #healthyeating, #bodypositive, #fastfood, #fastfood, #curvy, #diets, #physicalexercise, #physicalexercise, #fatshaming, #fat, #fats, #healthyhabits, #obesity, #sedentary lifestyle, #overweight, and #eating disorders. These hashtags were selected for their popularity and relevance in discussions related to healthy eating, eating disorders, and body perception.

For data acquisition and the more technical aspects of the methodology design, EnsembleData, a data provider specialising in social media information extraction, and the company Eudan were used. The process allowed for the collection of 2,249 relevant posts in Spanish, published on TikTok from 2019 to August 2023. The selection of this time period and the Spanish language was intended to provide a detailed and specific analysis of the Spanish-speaking community on TikTok, reflecting the prevailing trends and discourses in this demographic group.

To acquire thumbnails from videos posted on TikTok, we used Python's requests library (Reitz et al., 2014), a widely used tool for making HTTP requests easily and efficiently. This approach allowed us to automate the extraction of thumbnail images associated with each of the 2,249 posts collected in the study. Each image was stored in a common directory and assigned a unique identifier corresponding to the original TikTok post from which it originated. This method of organisation facilitated the subsequent analysis and processing of the images.

OpenAI's CLIP (Contrastive Language–Image Pre-training) model (Radford et al., 2021) was used to convert the video thumbnails into high-dimensional numerical vectors. CLIP is particularly well suited for this purpose thanks to its ability to understand and relate visual content to textual descriptions in a zero-shot approach, i.e., without the need for specific prior training on our dataset. This feature proved essential for analysing a wide range of images without requiring a labelled training dataset.

The vectorisation process was carried out using Hugging Face's transformers library (Wolf et al., 2019), which provides an interface for interacting with pre-trained deep learning models, including CLIP. Each thumbnail was processed by the model, resulting in a representative vector that captures the essential visual characteristics of the image. With the generated vectors, the cosine distance between each pair of images was calculated to determine their degree of similarity. The cosine distance, a common measure in vector similarity analysis, was calculated using the sklearn library (CITA), specifically its distance metrics module.

Based on these similarity calculations, a graph was constructed using the networkx library (Hagberg et al., 2008). In this graph, each node represented a thumbnail, and an edge was created between two nodes if the cosine distance between the corresponding images was equal to or greater than 0.7, indicating high similarity. To improve the quality and diversity of the dataset, an additional filtering step was implemented where similarities greater than 0.95 were interpreted as indicative of duplicate or extremely similar images. These images were removed from the graph, thus avoiding redundancies and focusing on the variety of visual representations within the dataset.

This approach allowed us to identify and group images with similar visual characteristics, facilitating the subsequent analysis of the predominant themes and narratives in the dataset. The graph structure also provided a basis for exploring the relationships and clusters that emerged from the visual data, which was crucial to the research objectives of our study.

To complement vectorisation and similarity analysis, an additional strategy was employed that involved the complementary use of Meta AI's DETR (Detection Transformer) model (Carion et al., 2020) and OpenAi's CLIP model (Radford et al., 2021) for the classification of objects within thumbnails and, in particular, to identify and classify images of people according to gender. For our study, DETR was used to scan thumbnails and detect the presence of people, marking an essential first step towards identifying gender narratives in the analysed content. Once the images containing people had been identified, the CLIP model was used again for a more detailed analysis to classify these figures into gender categories, i.e., to distinguish between images of men and women. This step was crucial for the objective of analysing the differences in gender narratives present in TikTok content.

Python libraries such as pandas and networkx were used for the quantitative and qualitative analysis of the data enriched by the classification algorithms and network analysis implemented. The matplotlib

library and Gephi software were used to visualise the data and analysis results, specifically to visualise the similarity graph of the thumbnails.

Quantitative analyses were applied, including the calculation of Pearson's correlation coefficient, to examine the relationships between different variables of interest, such as *engagement* metrics in posts. In addition, several *rankings* were created to better understand the conversation on the platform. These rankings included the posts with the most *likes* for each identified community and the main geographical locations of the authors of the *posts.* Social Network Analysis (SNA) techniques were also used to analyse the structural characteristics of the thumbnail graph.

4. Results

Analysis of TikTok thumbnails, using a combination of DETR and CLIP models, has revealed significant data on gender representation on the platform. Of the thumbnails examined, 45.8% could not be determined as male or female. Those classified as male and female are almost equally represented, at 26.96% and 27.24% respectively. This near-equal balance in gender classification contrasts with the considerable number of unclassified thumbnails and suggests that, when gender can be identified, there is a similar presence of men and women. This balance may reflect diversity in content creation and audience interest in health and nutrition topics on TikTok.

The fact that the presence is equal in volume does not mean that it is symmetrical or that the narratives are undifferentiated. Word clouds generated from posts featuring men or women (Figure 1) illustrate interesting nuances in the topics and language used. In *posts* with images of men, words such as "health," "exercise," "overweight," "fat," "fast food," "physical activity," and "training" are very prominent, suggesting a tendency to discuss exercise and weight management from a more active perspective focused on fitness and fast food. On the other hand, in *posts* with images of women, terms such as "healthy," "nutrition," "body," "overweight," "eating," "active lifestyle," "diet," and "obesity" appear frequently, indicating a focus on mindful eating, holistic health and body image, as well as the importance of an active lifestyle and overall well-being.

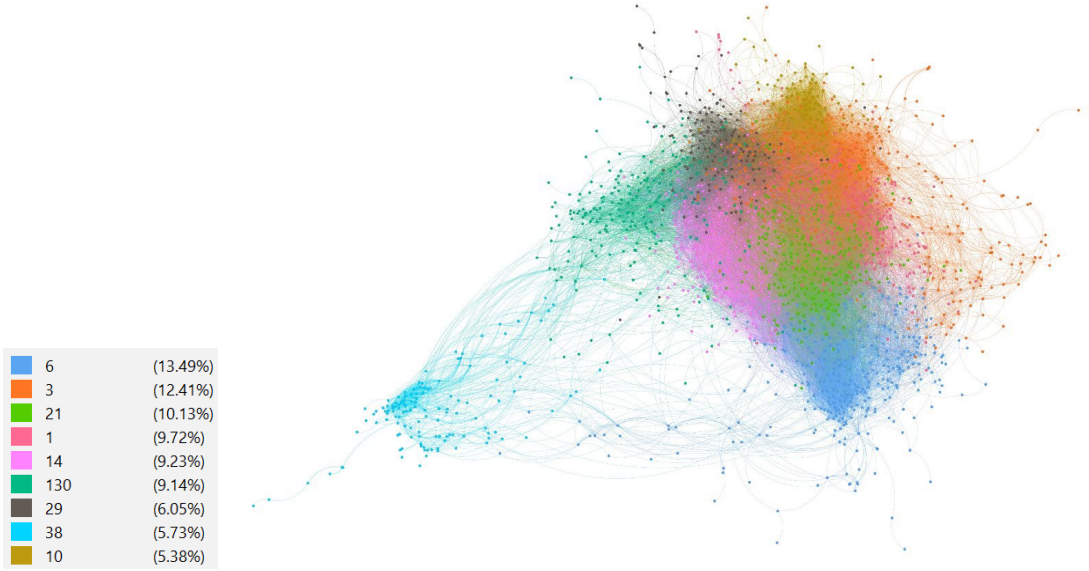
Figure 1. Word clouds with *posts* by men and women

Source(s): Own work with Matplotlib.

The graph of TikTok video thumbnails, which was created based on the cosine distances between the vectorised images, consists of 2,232 nodes and 47,299 edges. The density of the graph, which is approximately 0.019, although relatively low, is to be expected in large and dispersed social networks; it suggests that, although there is a vast amount of content, only a fraction of the nodes (posts) are directly connected to each other. Likewise, the weighted average degree of 30,909 indicates that, on average, each node is connected to approximately 31 other nodes. This can be interpreted as a measure of cohesion within the analysed dataset, showing a level of connection between posts that share similar visual characteristics.

The Louvain algorithm identified 416 communities within the graph, reflecting a diversity of groups or themes within TikTok's global content. The visualisation created using Gephi's ForceAtlas 2 algorithm only considers the nine communities that exceed the threshold of 1% of the nodes (Figure 2). The presence of a high number of communities suggests that, although there are some common trends in content related to health and obesity, there is significant variety in the way these topics are addressed by users. The modularity of the graph has a value of 0.362, indicating a moderately strong community structure. This means that the identified communities are relatively well defined and that the nodes within each community are more densely connected to each other than to nodes in other communities.

Figure 2. Graph of the nine communities comprising more than 1% of the nodes



Source(s): Prepared by the author using Gephi.

Below, we will provide a detailed analysis based on the characteristics of each community identified in the TikTok thumbnail graph. This analysis will focus on unravelling the particularities of each group, looking at elements such as prevalent themes and visual trends. In addition, we will examine the most representative content, key post authors, and specific interactions within each community.

4.1. Community 6

Community 6, which represents 13.12% of the total, shows a predominant female presence with 45.86% compared to 22.07% male and 32.07% of indeterminate presence. The visual narratives revolve around personal health and the challenges of weight control, with an emotional focus evident in the faces and expressions of concern or reflection. The messages focus on self-improvement, nutrition and exercise tips, reflecting a search for empowerment and well-being.

4.2. Community 3

Community 3, which constitutes 12.07% of the network, shows a more balanced gender profile with a slight male preponderance (25.74%) compared to 22.06% female and 52.21% undetermined. The images and messages focus on motivation for fitness, exercise routines, and rapid weight loss, emphasising strategies and visible results. The *posts* tend to be inspirational, encouraging followers to commit to an active and healthy lifestyle.

4.3. Community 21

In Community 21, which covers 9.85% of the network, a significant majority of content is marked as female (52.94%), with 17.65% male and 29.41% undetermined. The images and texts focus on debunking weight loss myths and present a critical approach to diets and weight loss products. The visual narrative emphasises authenticity and scepticism towards quick or miraculous weight loss solutions, promoting a message of comprehensive health and well-being.

4.4. Community 1

Community 1, with 9.46% of the nodes, is characterised by an overwhelming male presence of 73.61%, a low female percentage of 1.39%, and 25% of indeterminate presence. The content focuses on advice on exercise, nutrition and overcoming personal obstacles. The images show men in contexts of activity and discussion about personal goals and achievements, suggesting a narrative of self-improvement and drive for change.

4.5. Community 14

In community 14, with 8.98% of the nodes, we find a marked female presence with 69.31%, while the male and undetermined presence are significantly lower, with 4.46% and 26.24% respectively. The visual content reflects a focus on empowerment, with motivational messages and strategies for achieving health and wellness goals. Featured *posts* promote mindful eating and demystify misconceptions about diets and health. With Mexico as the most mentioned location, these topics resonate particularly within this context, implying an active dialogue about nutrition and healthy lifestyles.

4.6. Community 130

Community 130, representing 8.89% of the network, shows an indeterminate predominance with 76.33%, while male and female presence is 14.79% and 8.88% respectively. The most prominent content focuses on recipes and tips for a healthy lifestyle, with a bias towards natural and organic foods, and detoxification strategies. This group reflects a community committed to mindful eating and preventive health practices.

4.7. Community 29

Community 29, representing 5.88% of the network, shows a higher undetermined presence (42.86%), followed by a significant male representation (42.06%) and a lower female representation (15.08%). The content focuses on education and questioning narratives around obesity, personal responsibility, and demystifying quick fixes for weight loss.

The authors promote a holistic and critical approach to wellness and health, highlighting the need for a deeper understanding of the underlying issues. Mexico is the most frequently mentioned location, indicating a particularly active dialogue in this country on these issues.

4.8. Community 38

Community 38 represents 5.58% of the network and is distinguished by a largely indeterminate presence (81.15%), with a smaller proportion of females (13.93%) and males (4.92%). The visual content is dominated by images of food, suggesting a celebration of gastronomy, possibly as part of a narrative of indulgence or culinary pleasure. The focus may be on the appreciation of traditional food or the exploration of food as a cultural and sensory experience, rather than as a health issue.

4.9. Community 10

Community 10 reflects an interest in wellness and nutrition with a balanced presence of men (25.25%) and women (23.23%). The content suggests an introspective approach to eating habits and exercise, indicated by topics such as managing sweet cravings and specific exercises. The high level of gender indeterminacy (51.52%) may indicate a variety of approaches in the posts.

5. Discussion and conclusions

The success of TikTok as a platform for content creation and consumption, especially among young people, has attracted the attention of governments, parents, and researchers due to the impact its use can have in different areas. One of these areas is related to eating and weight loss or gain (Minadeo and Pope, 2022). This research sought to address this issue from a novel perspective, that of analysing visual narratives from a gender perspective. The object of analysis was the video thumbnails, i.e. the still images offered to the user as a preview of the content.

To this end, through a search for *posts* associated with hashtags linked to food, perception and body weight, 2,249 relevant publications in Spanish published on TikTok between 2019 and August 2023 were collected. Of the number of thumbnails that could be identified by gender, there was a balance in the presence of men and women (29.96% and 27.24%). This balance may reflect diversity in content creation and public interest in topics related to food and body image on TikTok, an area in which research is still in its infancy (Harriger et al., 2023a, Harriger et al., 2023b, Minadeo and Pope, 2022).

In terms of the content covered by men and women, and in response to the research questions posed, interesting nuances have been found in the topics and language used. "Health," "exercise," "overweight," "fat," "fast food," "physical activity," and "training" are very prominent in content attributed to men,

suggesting a tendency to discuss exercise and weight management from a more active perspective focused on fitness and fast food. In the case of messages with images of women, terms such as "healthy," "nutrition," "body," "overweight," "eating," "active lifestyle," "diet," and "obesity" appear frequently, indicating a focus on mindful eating, holistic health and body perception, as well as the importance of an active lifestyle and overall well-being. This overall view is corroborated by the analysis of the main communities that have been identified in the messages studied.

The results obtained open an interesting avenue of research that aims to be expanded by replicating the methodology designed in other social networks, with a special interest in Instagram, a network with which TikTok competes due to similarities in formats, content, and user community.

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