Italian Sociological Review
ISSN 2239-8589
DOI: 10.13136/isr.v14i10S.747 2024, 14(10S), pp. 787 – 808

Audiovisual Languages for Health. Social Representations of Obesity on TikTok: A Case Study*

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Abstract

Actors in the digital public sphere contribute to the public discourse on health and well-being by producing big data in various ways. User-generated health data are natural digital traces that social networks, wearable devices, health apps, and search engines can generate. The proliferation of user-generated content impacts the production, circulation, and consumption of health news, ensuring a vibrant public sphere on the topic. In today's world, it is crucial to identify how new health-produced datasets can be used to assess Social Determinants of Health (SDH). SDH includes non-medical factors that influence health outcomes, such as the conditions in which people are born, grow, work, live, and age and what shapes the conditions of daily life. Health technologies hold great promise for developing digital health skills and improving health outcomes for patients with chronic diseases. Contemporary societies have undergone an epidemiological transition that has seen infectious-predominant diseases transform over the years into chronic-degenerative diseases.

Social media provides an open forum for communication between individuals, and content creators on TikTok are progressively changing the way

* The article is the result of the work of the Unit of the University of Rome "Foro Italico", coordinated by Prof. Francesca Romana Lenzi, as part of the PRIN SIDERALE: Susceptibility to Infectious Diseases in obEsity: an endocRine trAnslational socioLogic Evaluation. The conceptualization is attributed to Lenzi and De Falco; the theoretical investigation to Iazzetta; the methodology to De Falco and Esposito; the data analysis to Capuano and Esposito; and the discussions and conclusions to Lenzi and Iazzetta.

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Received: 25 October 2023
Accepted: 28 March 2024
Published: 26 July 2024

audiovisual texts are produced and enjoyed, following a logic that tends towards media convergence and intermediality. This article aims to conceptualize how influencers providing public health information promote knowledge related to the obesity debate. Based on a sample of TikTok videos, we can gather insights and interpretations that help analyze the messages and themes conveyed by social media influencers. This analysis can help us to identify information and dimensions relevant to health advocacy and shed light on the underlying discourses and themes in their content.

Keywords: obesity, Tik Tok, social determinants of health, digital representations.

1. Introduction

1.1 Social Networks for a complexity approach to health issues

The digital society is characterized by an interesting phenomenon. Some of the elements that can be associated with this phenomenon are: information overload, the acceleration of the pace of life and the speed of cognitive changes (Cipolla, 2015). They also provide emotional support, assistance, services and information, and additional social connections (Walker, 1983).

In recent years, social networks have become the medium and place where it is possible not only to tell one's story but also to compare one's experience with other users, to be able to talk to professionals, or to be able to communicate with patients with similar conditions (Hawn, 2009). This information, in turn, creates health data and digital traces that can be used and analyzed (Hodgetts et al. 2008). Actors inhabiting the digital public sphere also contribute to the public discourse on health and well-being through the production of big data by using different modalities. User-generated health data can be generated by social networks (Ayers et al., 2016), wearable devices, health apps (Casselman et al., 2017), and search engines (Mavragani et al., 2018). The frequency with which health issues are discussed among social platform users suggests a valuable dimension of social media applications in improving users' lives. Numerous studies have examined how social media platforms provide information on communicable and non-communicable diseases. Most of these studies have nonetheless demonstrated a positive impact on their target audiences, although it has been suggested that social media may not be the preferred method of contact for health information (Moorhead et al., 2013). For example, one study, targeting adolescents at high risk for STDs (sexually transmitted diseases), found that brief preventive counseling in the form of a

message posted on social media reduced the display of risky behaviors (Moreno et al., 2009). This shows that social media users offer a narrative of their lives by sharing different life experiences with a wider audience, often revealing social pressures, problems and different expectations. These messages provide opportunities for health professionals to detect health risks and problems that might be overlooked by routine health checks, and offer new opportunities for intervention.

Thus, it is critical to consider social media both as an effective way to engage the public and communicate important "public health" messages, and as a valuable source of data to detect or predict disease or illness. The content is revealed as a trail and data source that, if used appropriately, can provide local and timely information on diseases and related events.

This can be described as digital epidemiology, i.e. epidemiology using digital data generated for the main purpose of epidemiological studies and involving the adoption of digital methods from the data collection stage to the analysis stage (Eckhoff & Tatem, 2015; Salathé, 2018; Lenzi & Iazzetta, 2023). The aim of digital epidemiology is identical to that of traditional epidemiology, namely to study the various factors that influence the occurrence, distribution, prevention and control of diseases, injuries and other health-related events in a given population (Lenzi & Iazzetta, 2023). The aim of epidemiological studies is not simply the identification of the causes of a disease, but the application of the findings to prevention and health promotion (WHO, 2004).

Specifically, as we will see in the following paragraphs, this work will focus on the representation of obesity. Overweight and obesity are the result of a complex interaction of biological, behavioral and social factors (Bosello & Cuzzolaro, 2006). In recent years, it has been possible to outline some of the causes of obesity: genetic predisposition, excessive and unbalanced diet and increasing sedentary lifestyles. The number of elements involved is remarkable: economic, political, cultural and lifestyle. A premise of this work is that the role of the mass media in obesity is ambiguous (Bosello & Cuzzolaro, 2006). Excessive media exposure, for example, is generally considered to be a characteristic of an obesogenic environment, one that promotes high energy intake and sedentary behaviour (Lake & Townshend, 2006).

Misinformation and misleading content can also harm users with less credible sources that could hurt obesity-related behaviours. As you scroll through different posts, tweets or videos on different platforms, you will often find information from experts (doctors, nutritionists, dieticians...). In a scientific study, Erdem & Sisik (2018) analyzed the content of videos posted on YouTube about bariatric surgery, also known as weight loss surgery, and suggested that the content of professional accounts tends to be more accurate. Over the years, YouTube advertisements for rapid weight loss products and commercial videos

have focused too much on exercise rather than maintaining a balanced diet (Basch et al., 2017). A content analysis of obesity tweets (So et al., 2016) found that four main social determinants of obesity are discussed on Twitter: cheap and unhealthy food, school food systems, portion sizes, and dysfunctional food systems. Among these determinants, easy access to cheap and high-calorie food had the highest rate of text and audiovisual material produced.

This finding suggests that the obesogenic physical environment is related to the web-based information environment through the influence of user behaviour. Social media can contribute positively to the reduction of obesity by effectively disseminating credible information among key stakeholders and supporting informative social influence. From this perspective, social media provide a new context for social learning dynamics and play an essential role in setting the public agenda, framing issues of public concern and attributing causes and possible solutions. Although several studies have successfully explored social media and the positive impact of text messaging on healthy eating (Hall et al., 2015), weight loss (Hayes & Napolitano, 2012) and physical activity (Laranjo et al., 2015), few have established evaluation metrics for the type of strategy used. This means that while we know that text messages can have a positive impact on these behaviors, we do not yet have a thorough understanding of what types of messages or strategies are most effective and in what contexts.

1.2 TikTok: a social network as a health search engine?

The possibility of analysing new spaces for finding and selecting information about lifestyles and health issues is still being debated today (Ruspini & Rossi, 2013). In the social media environment, social and digital dynamics are emerging that contribute to the creation of virtual spaces where obesity-related stigma is challenged (Dickins et al., 2011). People with obesity are embedded in a social context where they are held accountable and represented, giving them a voice that is rarely heard in the physical world (Zavattaro, 2021). This phenomenon reflects the potential of digital technologies and online communication platforms to raise awareness and promote the inclusion of people with obesity in a context that often excludes and marginalises them.

This new reality has in turn created a division between those who see big data as a form of quantophrenia (Boyd & Crawford, 2013) and those who embrace it as the new gold of social science (Lazer et al., 2009; Mayer-Schönberger & Cukier, 2013). Given the prevalence of smartphone and social media use, social media-delivered health interventions are a promising approach

to engage people, especially adolescents, in healthy weight management (Yonker et al., 2015).

The premise is that video sharing platforms have changed the way health information is communicated, shared and viewed (Moorhead et al., 2013). One of the socials that represents this generational shift is TikTok, which is proliferating among children, adolescents and even adults, creating a new and exciting intergenerational hybrid context (We Are Social Digital 2022, 2023). TikTok is a social platform that allows users to create and share videos lasting from a few seconds to several minutes with the community. Its proliferation as a social platform and its use for rating different content is essential for understanding the impact of this application as a health and medical information tool. In essence, it provides a user (or content creator) with an interface for creating short microvideos, with easy incorporation of preferred music backdrops and user-friendly editing capabilities (Yang et al., 2019).

TikTok's mission is to inspire and stimulate creativity by encouraging content creators to share their passions and real moments through stories related to everyday life. Specifically, the platform shifts the paradigm of contextual collapse, as the community identifies with well-defined characteristics, leading to a real digital revolution thanks to a series of algorithms (some unknown, managed in hybrid and complex modes). These are the needs of performative production which are not fully met by the exchange of text and photographic content on other social networks like Facebook, Twitter and Instagram.

In a world where engagement and authenticity are at the core, TikTok creators (who may become famous and well-known TikTokers) share content through amateur videos, often dealing with weight and the various issues of obesity, types of diets and physical activity. Lupton (2012) argues that people's health-related perceptions, beliefs and actions are shaped by both exposure to cultural elements and personal experiences and encounters with others, including health professionals.

It must be stressed that the presentation of diet culture, with content relating to food, ideal weight and ideal body image on social media, is worrying when considering the demographics of the various content creators. The majority of TikTok users belong to the newer Z and Alpha generations (i.e. born 1995 and later). They are in a period of intense personal growth and change (especially adolescence) when the fundamental factor of personal identity comes into play, leading them to crave self-expression by trying to construct attractive and positive self-images. Platforms such as TikTok allow patients to search for information about their medical conditions and treatments in an unlimited way, as rates of obesity and associated psychiatric co-morbidities rise. At the same time, developing an acceptable way to use

social media for health purposes can be challenging, as adolescents generally prefer to seek help from peers and people they know rather than from health professionals and strangers (Whitehill et al., 2013). This development of social media as a 'search engine' has also attracted the interest of health professionals, who are increasingly using TikTok to share health and medical information (Comp et al., 2021).

Several studies in health communication (Harter et al., 2005) have found the power of helpful storytelling to better explain how people understand and behave about health. This is because storytelling addresses the complex situations that involve the construction of our identities, how we order or disorder experiences, how it gives us autonomy, and how we communicate who is involved in health care. In practice, stories are a powerful tool for exploring complex health-related experiences. Practical implications include the importance of paying attention to health-related "language" (Lupton, 2012) to gain a comprehensive understanding of broader cultural understandings, beliefs, attitudes and practices, and their premises and implications. This is particularly important in strategic initiatives to mitigate 'epidemic' and 'crisis' health problems such as obesity. People who identify with the obesity narrative described above may find public health campaigns based on a purely biomedical approach to obesity less persuasive, or perhaps irrelevant. The possibility of intervening in the dominant narratives is also suggested by this study. It argues that intervention strategies, coupled with broader changes in cultural awareness, are a fruitful approach for health communication professionals.

2. The social complexity of obesity at a glance

The complexity of socially and culturally mediated representations of individual and group health phenomena requires such a study. This complexity stems from the fact that these phenomena are interrelated and thus influenced by socio-cultural factors, or rather determinants, in their management, understanding and representation. This is true not only when it comes to its individual and social understanding and definition, but also when it comes to how it is dealt with. The WHO states that: "Overweight and obesity are defined as abnormal or excessive accumulation of fat that constitutes a health risk. Obesity can be assessed using the Body Mass Index (BMI): WHO argues that "The Body Mass Index (BMI) is a simple index of weight for height that is commonly used to classify overweight and obesity in adults. It is defined as a person's weight in kilograms divided by the square of their height in metres (kg/m2)".

The index divides weight in kilograms by the square of height in metres to determine a person's body fat. According to the WHO, a person can be defined as "underweight" if he or she has a BMI of less than 18.5; "normal weight" if he or she has a BMI between 18.5 and 24.9; "overweight" if he or she has a BMI between 25 and 29.9; "obese" if he or she has a BMI of more than 30. This measurement is highly regarded for its simplicity and reliability. However, BMI does not only ignore individual differences such as age, physical activity, gender, ethnicity, etc., but also obesity trends. According to a study carried out by the Italian Barometer Obesity Report, produced by the IBDO Foundation in collaboration with Istat (see Figure 1), the percentage of obese adults in 2021 will be 12%, an increase compared to the pre-pandemic level of 10.9%.

Chart 1: Obesity trends 2001-2021 by gender and total. Source Istat and IBDO.

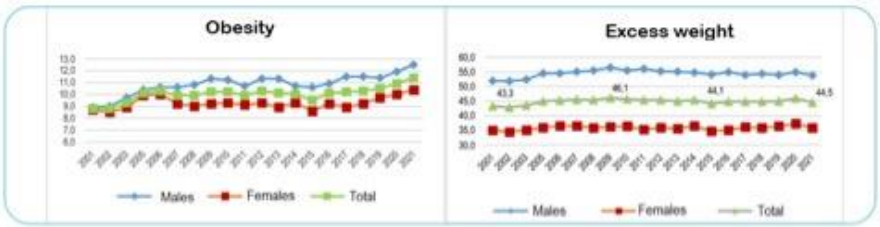
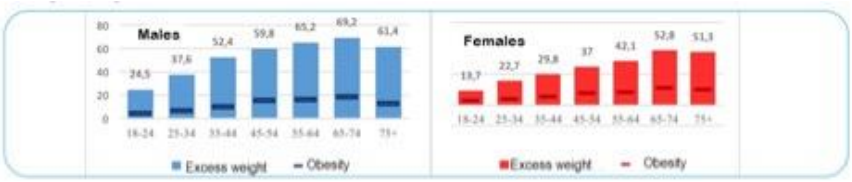


Chart 2 shows that weight increases with age. In Chart 1, it is interesting to note that obese women in the 18-24 age group accounted for 13.7%, while women in the 65-74 age group accounted for 52.8%. Similarly, obese men in the 18-24 age group accounted for 24.5%, while the percentage of obese men aged 65-74 increased to 69.2%. Obesity thus affected 12.9% of men and 11.1% of women in 2021.

Chart 2: Adults with obesity aged 18 and over, by age group and gender. Year 2021. Source Istat and IBDO.



Many other studies show that global childhood obesity, like obesity in general, is directly linked to poverty and poor diets, often associated with 'food deserts': difficult access to fresh food, sedentary behaviour, poor health, obesity,

diabetes, other metabolic diseases and premature death (Levine, 2011; Thorp et al., 2011; Hamilton et al., 2007).

These studies suggest that obesity is a multifactorial pathology, influenced by aspects beyond the physical, including sociocultural patterns and environmental and economic dimensions such as psychosocial, economic and health systems.

In particular, people with significantly more adiposity are often subject to social prejudice based on the idea that they may not conform to society's idealised 'normal' (Rich & Evans, 2005). This type of prejudice is widely recognised as 'weight stigma'. Negative and biased judgments about people with obesity characterise obesity-related stigma. These prejudices are often based on the mistaken belief that obese people are responsible for their weight, despite clear evidence that genetic and environmental factors are the main influences on obesity. As a result, assumptions are made about the personality and behaviour of obese people, who are often labelled as lazy, unhealthy, lacking in willpower, gluttonous or incompetent, and more generally as impure, immoral or defective. This leads to a social legitimisation of stigma and discrimination against people with obesity, making them one of the groups most frequently subjected to socially accepted prejudice, contempt and ridicule. Disease-related stigma is a social situation in which certain groups, often those with pre-existing vulnerabilities or predispositions, are discriminated against because of a medical condition. This manifests itself through the creation of stereotypes, negative labels, isolation and changes in their social status. Ultimately, this leads to a form of discrimination (Link & Phelan, 2001). Goffman states that "stigma" generally refers to a damaged identity (Goffman, 1963). At that time, he suggested that the phenomenon of obesity should be analysed on an intersubjective level of the individual, taking into account his or her cultural background. In the past, sociologists such as Durkheim (1895) suggested that stigma was inevitable, even in an ideal society without crime, because even minor mistakes could cause scandal. Stigma theories argue that stigma plays a role in promoting group cohesion by helping to define who is part of the group and who is considered an outsider. In other words, although everyone has different characteristics that make up their identity, stigmatised characteristics are often the most emphasised (Becker, 1991).

According to Mead (2010), the self is a product of collective action that emerges and evolves from processes of interaction or social constructs and relationships with others, as opposed to identity, which instead evokes subjectivity and reflexivity.

About obesity, these dynamics can be applied to analyse the frequent exposure of obese people to unfavourable judgments and prejudices based on their weight, even though obesity is influenced by multiple factors.

3. Methods and Materials

This study aims to explore and reconstruct the phenomenon of obesity on TikTok in narrative form. The use of the platform is limited in the field of scientific literature (Copani, 2022), but very popular among young people[1]. To achieve this objective, a content analysis was carried out. By content analysis we mean the different methods of analysis aimed at breaking down a complex communicative unit, into simpler elements suitable for variable coding, often categorical, and classification units (Rositi, 1988; Pandolfini, 2017). There are three types of content analysis (Rositi, 1988; Losito, 2007). The one we chose for this research is a 3rd type. We speak of a 3-type analysis with no decomposition between context and classification units. The communicative objects in our case are the videos on the TikTok platform, which are analysed in their entirety (Pandolfini, 2017). There are different techniques for the third type of content analysis, and the one we have adopted in this paper is what Losito (2007) calls 'content analysis as inquiry'. To paraphrase Corbetta (2014), when we talk about inquiry, we are talking about all those tools that are designed to gather information by asking questions. This technique of content analysis applies to any message, verbal or non-verbal, and is suitable for gathering information from different types of messages, such as videos, films and posters.

Similar to a survey, it uses semi-standardised or standardised procedures, tools and techniques to gather information. The information collected is then coded in an analysis sheet (which will form our matrix that will be analysed when the work is completed) with categorical and continuous variables. Therefore, when the work is completed, the sheet will constitute a case matrix with the variables resulting from the operational definition of the concept in the columns and the units of analysis in the rows (Rositi, 1988; Losito, 2007; Tipaldo, 2014).

In this way, the information is organised to proceed with the most elementary statistical analysis techniques. In our case, once the matrix was completed, univariate and bivariate analyses were carried out (Di Franco & Marradi, 2020). Once the methodological path was chosen, 4k Tikkit was used to extract the videos that would be useful for the content analysis and for the construction of the matrix. The extraction was performed using the word 'obesity'; all videos containing this word in the title, description or between the # characters were collected. The program allows you to use # to collect videos, links to profiles to retrieve videos from those profiles, or simply the link of a

[1] Report We are social 2024

video you want to download. The maximum limit for video extraction is 1000 videos. Thus, after eliminating duplicates and videos with a length of 0 minutes, there were 1000 videos collected for this analysis. Therefore, they could have been more useful for the analysis; the videos used to complete the analysis file were 926. The result produced by the software used to retrieve the videos was a file composed of the metadata of the users who created the videos: the number of followers, their nickname, the link to the video and to the user, and finally the figures on the engagement rate that the video generated among the users of TikTok (the number of video views, the number of likes and comment count).

Subsequently, the analysis sheet was constructed using a bottom-up procedure, in which the links of the previously retrieved videos were inserted. The purpose of the dashboard was to collect some data after watching the videos. The composition of the board and the methods used to fill it were as follows:

Table1. Variables' settings.

Variable name	Variable Type	Variable Mode
Gender	Categorial	1) Male, 2) Female
Age	Categorial	1) Very young, 2) Not very young
Representations of the causes of obesity	Categorial	1) Perceived as pathology, 2) Perceived as resulting from individual problems, 3) Social determinants
Body image representation	Categorial	1) Bodypositive, 2) Bodynegative, 3) Neutral
Weight loss strategy	Categorial	1) Pharmacological, 2) Surgical, 3) Dietary course, 4) Sport and physical activity, 5) Medical
Topic	Categorial	1) Rebirth, 2) Motivational, 3) Professional sponsor, 4) Pharmaceutical sponsor, 5) Information, 6) Prevention and health, 7) Bullying, 8) Obese-ex-obese daily life
Triggering factor	Categorial	1) Prevention and health, 2) Bullying, 3) Social relationships, 4) Image care
Type of users	Categorial	1) Doctor, 2) User, 3) Coach, 4) Nutritionist
Users Status	Categorial	1) Obese, 2) Not obese, 3) Formerly obese
Weight loss Objective	Categorial	1) Prevention and health, 2) Image care, 3) Social dimension
Number of Follower	Continuous	Follower Count
Number of views of the video	Continuous	Video view count

The dashboard seeks to collect two different types of information:

- The first is used to describe the person who uploaded the video to TikTok. In this case, in addition to gender and age, it also includes the user's current obesity status (whether the user is formerly obese, currently obese or has never been obese), the type of user (if the user does not fall into the category of doctor, trainer or nutritionist) and the number of followers he or she has on the social network;

- The second type relates to the content of the video itself. The data collected therefore allowed us to understand how obesity was perceived by the video author (whether as a pathology or as a result of other issues), how and in what way body image was dealt with, possible weight loss strategies and the trigger, i.e. the reason that led the user to start the weight loss journey. The theme category helped us to understand the overall theme of the video, while the weight loss goal allowed us to understand the goal to be achieved at the end of the weight loss journey.

To complete the form, the modes were numbered and the number of the corresponding mode was entered into the analysis form. If one of the suggested modes was not present, mode 99 was entered.

After completing the matrix, other videos that did not become part of the final analysis were eliminated. At this stage, a video had to meet at least one of the following exclusion criteria to be eliminated.

1. The video does not talk about obesity (some doctors or nutritionists used #obesity in the video description but do not talk about this issue);
2. The video has been deleted by the author;
3. The author of the video was banned from TikTok;
4. The video has a length of 0 minutes.

Finally, the total number of videos that became part of the final analysis was 651.

4. Data Analysis

Analysis of the data collected provides a fascinating overview of how obesity is narrated on TikTok. Different actors are involved in the construction of this narrative. All of them are somehow connected to the issue of obesity. The 651 videos analysed were generated by a total of 290 users or channels, with a subset of these entities showing a notable level of engagement with the issue. Specifically, twelve channels produced no fewer than ten videos on the topic of obesity (see Table 2), accounting for a total of 38% of the videos analysed. It should be noted that these channels have considerable reach, as evidenced by their respective follower counts.

As shown in Table 3, around 60% of channels are run by women, and although the platform targets a very young audience, only around 20% of video creators can be classified as 'very young'.

The data showed that 44% of users had a personal history of obesity as formerly overweight individuals, 25.5% were currently obese and 35.5% had never been obese.

Table 2: Number of video and fans for principal channel

Channel	fansauthor	numvideo
Page1	45000	52
Page2	31100	42
Page3	42700	23
Page4	3840	22
Page5	102900	20
Page6	35700	15
Page7	2644	14
Page8	1545	13
Page9	0	12
Page10	2997	10
Page11	5268	10
Page12	5459	10
Total		243

Table 3: Descriptive statistics of content creators

Sex	Male (40,4%) - Female (59,6%)
Age	1) Very young (18,2%) 2) Not very young (87,8%)
Type of users	1) Doctor (12,4%) 2) User (77,7%), 3) Coach (2,8%) 4) Nutritionist (7,1%)
Users Status	1) Obese (44%), 2) Not obese (35,5%), 3) Formerly obese (25,5%)

Among the 35% who had never been obese, we found a mix of medical professionals such as endocrinologists or psychologists, discussing the medical aspects of obesity, as well as online coaches, nutritionists, and non-specialized users engaging in debates about the definition of obesity and its causes.

Table 4. Obesity representation.

Representations of the causes of obesity	1)Perceived as pathology (54,9%), 2) Perceived as resulting from individual problems (42,8%), 3) Social determinants (2,3%)
Body image representation	1) Bodypositive (22%), 2) Bodynegative (22,4%), 3) Neutral (41,3%)
Topic	1) Rebirth (25,4%), 2) Motivational (14,4%), 3) Professional sponsor (6,1%), 4) Pharmaceutical sponsor (1,1%), 5) Information (23,7%), 6) Prevention and health (5,3%), 7) Bullying (2,8%), 8) Obese-ex-obese daily life (20,7%)
Number of views of the video	Video view count

It is noteworthy that 25% of the videos aimed to provide information about obesity or to express opinions on how to deal with it appropriately (see Table 4). The question of whether obesity is a pathological condition that requires a multifactorial approach to treatment, or a condition that individuals can overcome through sheer force of will, is a central point of debate in some of the videos. The importance of this issue is evident from the analysis of the videos, which do not present a single unified view of the causes of obesity. Of the videos that explicitly or implicitly mentioned the causes of obesity, 54.9% defined it as a pathological condition, 42.8% as the result of personal lack of

motivation and only 2.3% attributed obesity to environmental factors. This imbalance in favour of presenting obesity as a pathology is even more apparent when we look at the pages where 69% of the respondents presented obesity as the result of a medical condition. These results are quite encouraging given that, unlike other social media platforms, obesity is not presented as an individual's fault. It should be emphasised that the portrayal of obesity is not the only central theme of the videos. In addition to the 25% of videos providing information or expressing opinions about obesity, 25.8% are about 'rebirth'. These videos are shared by people who have overcome obesity and are sharing their journey with the community. Experience sharing is also prominent in videos where users motivate others to go on a weight loss journey (14.4%) or simply talk about their experience of being obese and the challenges they face in their daily lives (20.7% of videos). Everyday experiences are the ones that generated the highest engagement in terms of 'diggy count', 'play count' and 'share count' (see Table 5). This is in line with the fact that the communicative style in these videos tends to be more emotional and less rational, thus generating more reactions and shares.

Table 5. Engagement by topic.

Topic	*Comment_Count*	*Digg_Coun*	*Play_Count*	*Share_Count*
Rebirth	95,04	3541,19	63121,07	29,98
Motivational	21,90	278,83	6004,33	3,70
Professional Sponsor	24,87	394,87	11531,18	24,97
Pharmaceutical sponsor	393,71	2942,00	169185,71	1427,71
Information	73,57	1446,68	23899,49	29,72
Prevention and health	24,88	238,35	11560,18	22,00
Bullying	24,78	380,44	5745,83	4,33
Obese-ex-obese daily life	108,60	5535,73	87230,35	85,08
Total	75,38	2513,75	44049,26	51,41

A good level of engagement is also achieved by sharing personal experiences of obesity and discussing one's own transformation, as well as through motivational videos and those created by professionals. Sharing of experiences by obese users on platforms such as TikTok seems to find a supportive online community, which can have positive effects on several levels. This community support can provide encouragement and motivation to users who are on a weight loss journey or want to improve their health. It is worth noting that videos with pharmaceutical sponsors have generated the highest number of reactions ever recorded. However, it should be noted that the total number of videos containing this type of content is only 7. The engagement

analysis suggests that users are interested in discussing obesity and its challenges.

This interpretation is further supported by a hermeneutic analysis of comments on randomly selected videos. The comments are not intended to be harassing or discriminatory, but simply supportive of those sharing their experiences.

In terms of a supportive community, the analysis of engagement yielded encouraging results, in contrast to the portrayal of obesity.

Table 6. Engagement by cause of obesity.

Representations of the causes of obesity	***CommentCount***	***diggCoun***	***playCount***	***shareCount***
Perceived as pathology	60,72	884,08	18835,13	49,20
Perceived as resulting from individual problems	49,19	1859,34	33351,66	20,98
Social determinants	19,64	583,64	9885,18	4,55
Total	54,83	1294,78	24844,42	36,08

Interestingly, although in smaller numbers, videos in which obesity is portrayed as a result of individual factors generated higher engagement (see Table 6). In many of these videos, the representation of obesity was unintentional; however, its impact on the community of users struggling with obesity may be significant and should be closely monitored.

It is interesting to note that female users represent the majority of the analyzed population (80%), 13.7% are doctors and 5% nutritionists. In contrast, male users represent 68.8%, 16% are doctors, 9.3% coaches and 5.2% are nutritionists.

Table 7. Gender and User Type cross-reference.

		Type of users					
		Doctor	**Users**	**Coach**	**Nutritionist**	**Not Specified**	**Total**
Gender	**Woman**	13,7%	80,2%	0,5%	5,1%	0,5%	100%
	Man	16,0%	68,8%	9,3%	5,2%	0,7%	100%
	Not specified	0,0%	0,0%	0,0%	0,0%	100,0%	100%

Table 8: Gender and User Status Cross-reference.

		Ex Obese	**No obese**	**Obese**	**Not Specified**
	53,6%	23,1%	22,3%	1,1%	53,6%
Gender	52,4%	35,3%	11,5%	0,7%	52,4%
	0,0%	0,0%	0,0%	100,0%	0,0%

It can be noted that 53.6% of women are formerly obese, 23.1% are non-obese and 22.3% are obese. The majority of men were also formerly obese

(52.4%), non-obese (35.3%) and only 11.5% are still obese. Of these, 1% of women and 0.7% of men did not specify their obesity status.

In terms of weight loss strategy, it can be seen that 33.8% of women followed a diet, 29.5% did not specify, 13.4% chose surgery, 7.8% sport and physical activity, 6.7% did not follow any strategy, 6.2% relied on a doctor, and only 2.7% followed a pharmacological treatment. In contrast, the majority of men (42.4%) did not indicate their weight loss strategy, followed by sport and physical activity (17.8%), diet (14.5%), surgery (13.8%), doctor (5.9%), no weight loss strategy (3.3%), and similar to women, only 2.2% relied on a pharmacological treatment.

Table 9. Gender and Weight loss Strategy Cross-Reference.

		Weight loss Strategy Cross Reference						
		Pharmacological	**Surgery**	**Diet**	**Sport and physical activity**	**Medical**	**No strategy**	**Not specified**
Gender	**Woman**	2,7%	13,4%	33,8%	7,8%	6,2%	6,7%	29,5%
	Man	2,2%	13,8%	14,5%	17,8%	5,9%	3,3%	42,4%
	Not specified	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	100,0%

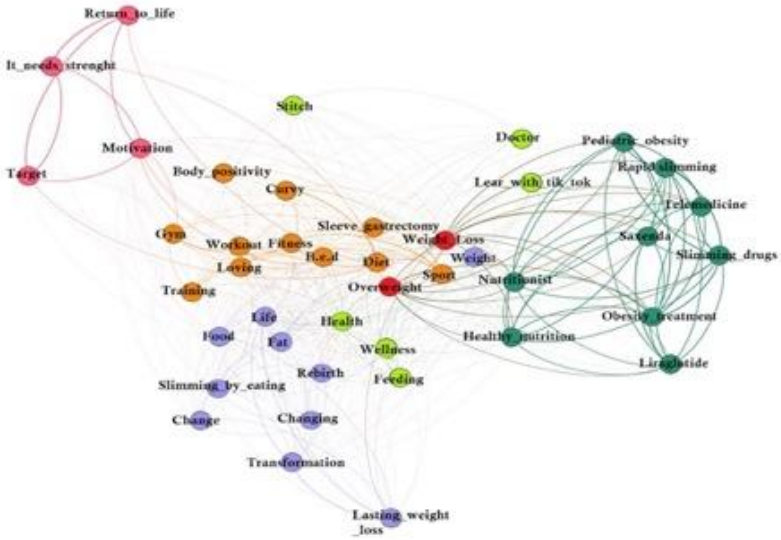
In order to consolidate the different viewpoints presented in the analysed videos, a cluster analysis algorithm was used to examine the keywords in the videos. By using cluster analysis algorithms (modularity) it was possible to identify five distinct groups of keywords across the network. These keyword groups serve as a thematic core around the obesity discourse.

The first cluster (red), which is labeled "Self-confidence", collects hashtags such as "motivation", "it_needs_strength", "target" (see Figure 1) and groups together videos and content that seek to motivate overweight people. The messages in this cluster provide effective way to communicate with people with obesity about weight loss by placing the recipient at the center of a tough (it_needs_strength) but highly rewarding (return to life) journey. Moreover, the content seems to give the viewer complete decision-making autonomy by focusing on their desires, abilities, reasons, needs and commitment to losing weight. The users appear to seek empathy with other overweight people by formulating content and supportive expressions necessary to promote people's self-efficacy.

The second cluster (dark green) is titled "Exchanging useful information". The hashtags contained in this group include "nutritionist", "obesity treatment", "learn with tiktok" that are associated with content conveying conversations to understand people's medical history and experiences of the illness and to formulate treatment recommendations. In this cluster, the most

important thing seems to be the exchange of information by those who have already experienced the illness and want to disseminate clearly and promptly information about therapeutic measures that can help people with obesity.

Figure 1. Keyword cluster.



The third cluster (purple), with the hashtag "change", "rebirth", testifies that change requires people to adopt a healthy lifestyle. The content of this cluster, entitled "Changing my own life", is characterized by encouraging good intentions to engage in healthy behaviors to change the lives of people with obesity. The messages are intended to push people into action or healthy behavior in a positive direction to make substantial, lasting changes. The content aims to make simple the changes required, providing information on how to follow a healthy diet, regular self-monitoring and exercise.

The fourth cluster (orange), called "self-acceptance", collects the following hashtags: "Gym", "fitness", "love", "workout". The content of this cluster engages with body-positive content for positive and healthy body image as well as good habits. Negative body communication, such as size discrimination or shaming, may cause a person to consume unhealthy or large amounts of food

and avoid exercise. On the contrary, body-positive communication content seeks to challenge beauty standards and promote healthy thinking, which in turn inspires healthy consumption and sport activity. Moreover, positive body image content is an important component of overall health. Through these messages, people are challenged to develop and maintain a proper definition and self-perception of what constitutes "normal" weight, combined with weight management and regular exercise, with continuous progress toward self-improvement.

The fifth cluster (light green), named "Experiential Pleasure of Food", collects the hashtags: "alimentation", "wellness". The content of this cluster provides a view that characterizes healthy food as a positive path to well-being. These messages convey the fact that there are a lot of benefits to having greater awareness during healthy food experience. Moreover, they are characterized by a view on food as a meaningful experience to be savored, promoting healthy eating.

5. Discussion and conclusion

The definition of the phenomenon of 'obesity', which still seems to be ambiguous in the community interacting on TikTok, is the first topic of discussion to emerge from the research. Indeed, as the digital data analysis shows, the way obesity is portrayed and acknowledged as pathological and multifactorial, both as regards its causes and consequences, is itself controversial.

Another important issue that emerges from the data analysis is that the representation of obesity on TikTok does not seem to convey an image of obesity as caused by individual behaviour.

A significant proportion of the videos analysed deal with obesity as a real pathology. This gives a very complex and, in our opinion, effectively realistic picture of the phenomenon. This is particularly relevant when compared to other studies on the phenomenon of obesity in social media, which instead present an image of obesity as a consequence of poor eating habits and therefore largely attributable to the individual, their choices or their immediate family and cultural context. In these studies, obesity is framed by social media with obvious stigma (Jeon et al., 2018; Stanford, Tauqeer & Kyle, 2018; Wanniarachchi et al., 2020), where obese individuals are often portrayed as unhealthy people who lack strength, determination, self-control and discipline (Yoo & Kim, 2012; Lupton, 2018; Stanford, Tauqeer & Kyle, 2018; Razzak et al., 2023).

Another piece of evidence derived from the hermeneutic analysis of the comments concerns the value of the social network in creating a supportive community of people who share experiences and empathy for each other's condition. There is an almost complete absence of haters and a rather ubiquitous phenomenon of active support and participation in the emotion and commitment of the video's author. By analysing the profiles of the authors of the obesity videos, we can also see the importance of the presence on TikTok's impact in terms of visibility: this can be seen from the number of followers (see Table 2). The videos reflect sensitivity and curiosity about obesity, acknowledging its social stigma and emphasizing the importance of spreading awareness without assigning blame. However, a universally appealing profile for addressing obesity couldn't be identified across all videos. Regarding the most frequent themes, the bivariate analysis by topic also revealed the creation of a community that goes through the emergence of stigma, combined with sharing the difficulties and limitations of obesity in everyday life and the signs on the body. This complex theme is the most frequent and the most followed. Another theme with a high frequency is that of motivation and rebirth. Finally, the representation of obesity in an individual aspect also attracts interest because of the risk it poses to the internal locus of control, with the suffering it generates and the subsequent involvement of commentators (Holder & Levi, 2006).

Research limitations stem from the difficulty of making broad generalisations from video analysis. This complexity arises because the analysis is specific to TikTok, a social network with its unique modes of expression and user base, making it difficult to apply the findings universally. The messages and, we believe, also the content, are adapted to the social networks: this acts as a filter that affects the possibility of generalising the results of a research based on this type of digital data (Rogers, 2013). Another limitation of the study is related to the extraction keys. To provide a representation of the phenomenon, the research limited itself to extracting videos that could be retrieved using the keyword 'obesity', thus omitting other related words that would have allowed the inclusion of other videos that could be associated with the phenomenon (i.e. body positivity, BMI, overweight, diabetes, etc.). Finally, it should be noted that it would have been interesting to understand how socio-economic factors such as education level, income and occupational status influence both the type of video constructed and the reaction to it. The only insight in this regard comes from the fact that the content of doctors' videos is somehow related to their profession, but this, apart from being an expected result, does not allow us to take a broader view. Not surprisingly, social media analysis is also referred to as post-demographic. Further research in this direction will therefore be necessary.

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Sitography

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