# Types of discourse disseminated by food influencers: Trends on *Instagram* in France, Germany, Italy, Spain, and the United Kingdom

**Paula Von-Polheim; Lorena Cano-Orón; Empar Vengut-Climent**

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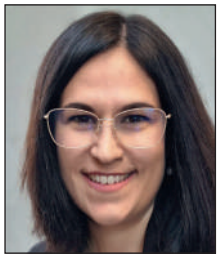
**Paula Von-Polheim** ✉
*https://orcid.org/0000-0001-6012-1187*
*Universitat de València*
*Instituto de Políticas de Bienestar Social (Polibienestar)*
Serpis, 29.
46022 València, Spain
*paula.von@uv.es*



**Lorena Cano-Orón**
*https://orcid.org/0000-0003-4270-1924*
*Universitat de València*
*Facultad de Filología, Traducción y Comunicación*
Av. Blasco Ibáñez, 32
46010 València, Spain
*lorena.cano@uv.es*

**Empar Vengut-Climent**
*https://orcid.org/0000-0001-6909-3194*
*Universitat de València*
*Instituto de Políticas de Bienestar Social (Polibienestar)*
Serpis, 29
46022 València, Spain
*empar.vengut@uv.es*

## Abstract

This research examines the discourse of nutrition influencers on *Instagram* within five European countries (France, Germany, Italy, Spain, and the United Kingdom) during 2021. The research aims to analyse the visual and textual content disseminated by these influencers and compare the predominant narratives among them. The corpus consists of 98 food influencers, and computer vision networks were employed to analyse visual discourse, linguistic analysis software for text analysis, and quantitative and qualitative methods to analyse hashtags. While promoting global trends (such as vegetable juices or bowls made with natural and unprocessed cereals, nuts, and fruits) to a lesser extent, influencers from the five countries highlight traditional food from their respective cultures in their visual discourse. The predominant discourse in all countries promotes the need for physical change through exercise and nutrition, sometimes fostering a diet culture. Sports and fitness are present in the discourse of influencers from these five countries, predominantly emphasising weight loss, muscle gain, and sports training with specific diets. Sports plays a significant role, with a preponderance of photographs depicting physical transformations and the promotion of food products and sports brands through inspiring images. Spain stands out in this regard as having the most images showing physical changes, especially in women. Although no evidence has been discovered to suggest that the sponsorship of unhealthy foods affects consumers' preferences for them, the results show the widespread promotion of diet-related goods and foods. Notably, the real food movement was not emphasized in this extensive data analysis.

## Keywords

Food communication; Health communication; *Instagram*; Social media; Social networks; Influencers; Opinion leaders; Nutrition; Sport; Diets; Visual communication.

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## 1. Introduction

Among food-related communication stakeholders, such as nutrition and health experts, food industries, celebrity chefs, and food influencers, the latter are considered experts whom people listen to (**Van-Royen** *et al*., 2022). By "influencers," we refer to Internet users who have attained a certain level of fame, typically determined by their number of followers, and who set trends in specific domains (**De-Veirman**; **Cauberghe**; **Hudders**, 2017). However, many food influencers are not genuinely knowledgeable about food, nutrition, or health, despite presenting themselves as such (**Van-Royen** *et al*., 2022).

Food influencers on social media can contribute to food confusion and exert influence over people's purchasing habits and dietary choices (**Van-Royen** *et al*., 2022). According to data from *YouGov* (2023), an international online research data and analytics technology group, 25% of global consumers believe that celebrities are effective at promoting food products. Given that many underage youths follow influential figures on social media, it is important to reflect upon the ethical nature of these endorsements, particularly considering their relevant persuasive effects (**Hudders**; **De-Jans**; **De-Veirman**, 2021).

The discourse of food through social media and its ability to influence society is a research topic that is becoming increasingly relevant. However, research on the use of technology in relation to traditional and visual food consumption is still scarce, even though the sharing of food images is an extremely popular activity worldwide (**Herrero-Ruiz**; **Navarro-Beltrá**, 2021; **Kozinets**; **Patterson**; **Ashman**, 2017). In fact, there are more studies focused from the consumer's point of view than from the influencers. Moreover, studies such as **Ye** *et al*. (2021) point to a progressive increase in publications focusing on ethical issues and the impact of influencer discourses as opposed to those derived from influencer marketing persuasion, publications which have been decreasing since 2019.

In this sense, analysing the Internet publications disseminated by opinion leaders on gastronomy is relevant to better understand this phenomenon. People tend to follow such influencers because they are visually attracted to images and videos of food. In fact, users themselves become prosumers by also posting pictures about their food, thus becoming a recurring topic on social networks (**Zappavigna**, 2016).

From the health field, previous studies reaffirm the need for research on healthy eating, specifically highlighting the importance of focusing the study on the type of intakes (**McCarthy** *et al*., 2013). Research studies confirm the numerous research findings resulting in the prevalence of promoting unhealthy product contents and its positive focus (**Hudders**; **De-Jans**; **De-Veirman**, 2021). Besides the issues associated with the promotion of unhealthy foods, ethical concerns may arise with influential individuals who focus on physical appearance and sports, sharing exercise routines, displaying idealized, slender yet muscular bodies (**Hudders**; **Lou**, 2023).

Due to the influence of visual social networks on this topic, we consider the analysis of healthy eating discourse on social networks is a contribution that will shed light on the trends that are promoted about healthy eating. This information would also allow us to advance in future public policies or institutional campaigns to improve these behaviours.

Studies in the field of nutrition and health sciences such as the one by **Schneider** *et al*. (2013), which analyses the top six most popular international food blogs in 2012 and determines whether food blogs offer nutritionally balanced diets, warn that readers may be unaware of the health effects of mixing certain foods. The authors also highlight the opportunity for dietitians and health professionals to promote appropriate recipes through social media. Linked to this study, research by authors **Dickinson**, **Watson** and **Prichard** (2018), a comparative analysis of international blogs on organic and non-organic food recipes, found that less than 10% of organic recipes complied with *World Health Organisation* (*WHO*) restrictions on the proportions of energy from sugar and fat intake. In this sense, the authors warn that some of the greener food alternatives disseminated on the Internet are not healthier alternatives.

In this line, **García-Puertas** (2020) states that the effects of the use of *Instagram*, one of the most popular visual networks nowadays, imply a direct influence on body image and eating attitudes. In their study, the consumption of content from this social network for young people is associated with an increased tendency to develop eating disorders. **Boepple** and **Thompson** (2014) already made these types of warnings in the blog era. In their study, which looks at international healthy lifestyle blogs that have won a recognised award and have a considerable number of visits, they concluded that these types of web environments can be problematic, as users modify their diets according to the content of the sites, and, among other consequences, also promote eating disorders.

In the field of scientific communication studies, we find previous studies that focus on the analysis of the discourse on food and nutrition on Instagram. **Mota** *et al.* (2019) analyse the discourse of three macro-influencers on food and conclude that, in these cases, they focus on the consumption of certain foods -with brand sponsorships- and on the promotion of following certain diets that are not necessarily healthy. This study also highlights how most of the comments they received from their followers supported their speeches without hesitation. Crosswise to this type of study, it would be interesting to highlight that others provide insight on how sponsorship affects the messages posted by influencers. In this regard, **De-Veirman** and **Hudders** (2020) ascertain that a sponsorship disclosure in the disseminated information content can generate more positive responses towards the brand due to lower recognition and skepticism of advertising.

**Saboia** *et al.* (2018), who also analyse how the discourses of opinion leaders on Instagram on healthy eating and healthy living are articulated, state that the profiles of health professionals (nutritionists) opt for a scientific discourse; while other leaders who also stand out for creating content on this topic, explore the trauma of getting fat/slimming down more from an emotional perspective. In all these profiles, the content is extremely focused on food and images of recipes, with one of their objectives being to explain how to eat correctly.

The study by **Romero-Cantero, González-Díaz** and **Quintas-Froufe** (2019) reaches the same conclusion regarding content. The research analyses the content published by Spanish influencers on Instagram about veganism, with the aim of gaining in-depth knowledge of the profiles, content, topics, scientific sources, formats, and degree of specialisation in veganism. **Romero-Cantero**, **González-Díaz** and **Quintas-Froufe** (2019) found that content about recipes is the most common topic, but only two of the 13 influencers examined have a background in nutrition or related subjects.

In this sense, Instagram is a communicative sphere where users find a wide variety of food content, but as **Zappavigna** and **Ross** (2021, p. 198) state:

> "appreciating fine food, criticising the food choices of others, expressing various political orientations through food consumption and purchasing decisions, and countless other social practices are central to food discourse".

All these studies conclude that science communication is essential in this area, which potentially affects everyone interested in food. Citizens look to the scientific community for answers, keys to understanding and improving their daily lives (**Calvo-Roy**; **Moreno-Castro**, 2021), which means that leaders in science communication outreach are authoritative points of reference for citizens.

As **Donghong** *et al.* (2008) note, the social role of science goes beyond scientific knowledge, and its importance in modern life means that it is not outside culture. Thus, a dialogue between the two is imperative that goes beyond communication and considers the social and cultural context of thinking as well as scientific activities. Here the role of science communication and journalism, especially in the field of health, requires ethics and responsibility to avoid creating confusion, alarm, or false expectations in the reader. In emergency situations, such as the covid-19 pandemic, the most important and challenging task of science communication is to decide which information is relevant and deserves to reach the public and which does not, even if that means not publishing at all (**Ferrer**; **Peñafiel-Saiz**, 2023).

This article focuses on the trends adopted by opinion leaders on Instagram in several countries (France, Germany, Italy, Spain, and United Kingdom) during a year, 2021, marked among other events by the COVID-19 pandemic. The main objectives of the study are to analyse the visual and textual discourse of nutrition influencers on Instagram and to compare the different predominant discourses in five European countries.

## 2. Healthy eating discourse and influencers on social media

A systematic review on the scope of food communication identifies five key dimensions related to the perception of food's healthiness and its influence on society (**Pinto** *et al.*, 2021). These dimensions include the impact of misconceptions and knowledge gaps on attitudes, the role of pleasure in food choices, how the importance of healthiness shapes perceptions, the importance of purity, and the sense of environmentally friendly or ethical issues. The review highlights that many consumers see food as having a purpose for both physical and mental well-being. However, it also notes that these perceptions do not always align with actual health-related attitudes and behaviours. In other words, even though individuals may have a positive idea about the importance of healthy eating, it does not guarantee that they will adopt healthy habits in their daily lives. This is why sources of information directly or indirectly through more informal channels, such as social media, are important to reinforce certain trends.

Due to society's increasing interest in nutrition, there has been a rise in new channels dedicated to food and health content, especially on Instagram, with influencers being the promoters of food-related products (**Casino**; **Rabassa**, 2021; **Moreno-Castro** *et al*., 2021). The influencers impact on the promotion of food and health-related products and services is undeniable. The influencers representation, promotion, and authenticity on social media is crucial for understanding their power to influence audiences' perceptions of food and health (**Truman**, 2022).

In the case of Twitter, specifically in the UK, there is some diversity among food opinion leaders who publish about what is healthy food. The majority consist of celebrity chefs and influential middle- and upper-class female wellness influencers. Their most shared content includes recipes, promotion of healthy lifestyles, brand endorsements, food education,

as well as charity and awareness campaigns (**Goodman**; **Jaworska**, 2020). In the case of Instagram, no similar studies have been found that analyse content from an entire country or linguistic community of influencers.

In this line, the type of discourse that influencers support is important. The exposure to socially endorsed images of low-energy foods on this type on Instagram may influence people to consume more of these foods and derive a greater number of calories from them compared to low-energy foods (**Hawkins**; **Farrow**; **Thomas**, 2021). For example, we found studies on the impact that influencers have on teenagers. Both on the part of young influencers, whose most promoted food products were chocolate, convenience foods, beverages, and savoury snacks, as was the case of the top 100 German-speaking analysed (**Winzer** *et al.*, 2022). As well as by the type of discourse found in networks, such as the case of Instagram posts seen by teenagers from Italy and Belgium that discover how food-related discourses and visual styles had a persuasive power to make them change their consumption habits (**Qutteina** *et al.*, 2019; 2022; **Ellison**; **Truman**; **Elliott**, 2023).

Users turn to social networks and virtual communities such as Instagram to seek and receive support, motivation, and emotional encouragement. Furthermore, they aim to provide this support to others in similar situations (**Chung** *et al*., 2017). Instagram is also utilized as a platform for individuals to promote their own dietary behaviours as an expression of their personality and to engage with others (**Riesmeyer**; **Hauswald**; **Mergen**, 2019). Sometimes even, these practices could become obsessive, causing them anxiety, and being perceived as self-imposed discipline on their consumption and healthy lifestyle. This directly can affect their self-esteem, generating a sense of immorality and wrongdoing (**Kent**, 2020).

Analysing the food discourse through hashtags that is generated and disseminated in networks is fundamental to understanding current eating habits and food trends on social media. For example, on platforms such as Twitter, three main communities were defined from a collection of over 686,000 tweets that were posted with hashtags related to the discussed food topic #healthyfood. These three main communities were conversations about healthy lifestyle, home cooking and fast food. They also found minority clusters about breakfast, brunch, and food travel. The most recurring topics were vegan diets, followed by vegetarian and gluten-free diets (**Pilař** *et al*., 2021).

On Instagram, focusing on healthy eating discourse, **Walsh** and **Baker** (2020) examined the social dimensions of images from the top posts associated with hashtags related to clean eating, such as #cleaneating and #eatclean. Clean eating, in this context, refers to a diet comprising healthy, whole, and unprocessed foods. The authors were able to establish correlations between the kind of photographs shared and the practices that promote this lifestyle. These images represented idealized and strategically enhanced depictions of food to create a greater impact and generate interest.

**Walsh** and **Baker** (2020) observed that those pictures on #cleaneating only showed the food but omit literal acts of eating. Authors alerted on the emergence of communities seeking attention by idealizing food products. One important reflection that they pointed out is that the discourse on clean eating on Instagram reinforces the connection between diet, status, gender, and identity.

In Spain there is a particular case of the creation of an online community started on Instagram about healthy food, called "realfood" movement, which has emerged primarily through social media platforms like Instagram and advocates for the consumption of natural, unprocessed, or minimally processed food (**Luján-García**, 2021, p. 186). The concept not only represents a movement but has also had recognized social and academic impacts (**González-Oñate**; **Martínez-Sánchez**, 2020; **Marti-del-Moral**; **Arrúe-Ishiyama**, 2021; **Stano**, 2022; **Gil-Quintana**; **Santoveña-Casal**; **Romero-Riaño**, 2021). The use of more scientific terminology to promote healthy eating as a marketing claim has been coined years before the emergence of this movement (**Moreno-Castro**, 2006).

*Realfooders* post photographs of recipes, advice, habits, and nutritional behaviours that are promoted as trustworthy dietary patterns or guides (**Gil-Quintana**; **Santoveña-Casal**; **Romero-Riaño**, 2021). This movement encourage people to share their change of habits on social media. Through self-promotion, they project an image of individuals highly knowledgeable in the field of nutrition.

Healthy food users with a large number of followers can exert influence over a significant audience by consistently posting images that depict a specific diet or behaviour (**Turner**; **Lefevre**, 2017). This is alarming because of the uncertainty type of content they share, as well as the sources of information they access. All this content no reviewed can sometimes jeopardize the health of digital citizens (**Gil-Quintana**; **Santoveña-Casal**; **Romero-Riaño**, 2021). Thus, the dynamics of health communication by influencers on social media, particularly in relation to food, will continue to gain importance in the coming years (**Pilgrim**; **Bohnet-Joschko**, 2019).

The role of nutritionists and dietitians in alerting people through social networks about the consumption of certain foods, serving as sources and verifiers of information, is crucial. There is currently no data on how this group of experts works with social networks. Two scoping reviews highlight the gaps in the literature regarding how nutritionists utilize social networks, the type of content they share, and their attitudes towards the public (**Saboia** *et al.*, 2020; **Dumas**; **Lapointe**; **Desroches**, 2018).

Anecdotally, there are two pilot studies in which a small sample is asked about their type of social media use and content (**Saboia** *et al.*, 2021; **Sbardelotto**; **Birck-Martins**; **Buss**, 2022). In general, they use Instagram more than any other social network, but the type of use differs from country to country. While Portuguese professionals tend to use it for personal purposes (**Saboia** *et al.*, 2021), Brazilian professionals use it mainly to create professional content and showcase their services to attract clients and improve the professional relationship between colleagues, especially since the Covid-19 crisis (**Sbardelotto**; **Birck-Martins**; **Buss**, 2022). Dissemination of content on healthy eating is not among their main tasks or interests. Therefore, exploring the type of content published by nutrition disseminators on social media, specifically Instagram, across five countries, represents a significant advancement in the field.

## 3. Methodology

### 3.1. Corpus design

The present research study which examines the informative discourses of influencers who disseminate nutrition content and whether there are inequalities or similarities in the trends, has taken as a corpus a selection of Instagram macro-influencers, with over 100,000 followers (**Villegas-Simón** *et al*., 2022), who focus on promoting healthy lifestyle habits. To identify these influencers, we utilized the digital platform Starngage, which provides data on the most influential individuals by country and allows us to filter them based on the predominant theme of their content. We analysed macro-influencers accounts that fell into two categories of tags related to a healthy lifestyle: 'Food and Beverages' and 'Health and Wellness/Exercise'. To facilitate comparisons and explore trends within different countries, data from France, Germany, Italy, Spain, and the UK were analysed.

Out of the 1,923 accounts that met the specified criteria, only 98 were found to be primarily focused on nutrition outreach on Instagram. To identify these accounts, we conducted a review of their most recent content published within the last month to determine the type of discourse they were currently engaged in.

The corpus consists of content published by the 98 influencers specializing in nutrition dissemination during the year 2021. To collect all the posts, including images, captions, and hashtags, we utilized *4CAT* (**Peeters**; **Hagen**, 2022), an open-source web-based research tool, in conjunction with *Zeeschuimer*, a browser extension for scraping (**Peeters**, 2022).

Given the nature of the multimodal analysis conducted, the corpus includes a total of 28,138 images, 28,602 texts, and 25,100 unique hashtags used by the 98 nutrition influencers from the five countries. From the collected posts, the first image was retrieved in cases where a photo carousel was published, while videos were excluded. Additionally, duplicate hashtags were eliminated from the corpus for each country.

Table 1 provides detailed information for each country, and the complete list of the 98 influencers can be found in Annex 1.

Table 1. Corpus analyzed

| | Suggested influencers on food | Food influencers | Unique hashtags | Posts | Images analyzed |
|---|---|---|---|---|---|
| France | 259 | 8 | 2,286 | 1,909 | 1,909 |
| Germany | 612 | 23 | 9,005 | 10,771 | 10,465 |
| Italy | 251 | 12 | 2,298 | 2,237 | 2,204 |
| Spain | 318 | 35 | 7,791 | 9,031 | 8,906 |
| United Kingdom | 483 | 20 | 3,720 | 4,654 | 4,654 |
| Total | 1,923 | 98 | 25,100 | 28,602 | 28,138 |

### 3.2. Research methods

The following are the three types of analysis applied to the various elements comprising the discourse produced on Instagram by nutrition influencers in five European countries: images, captions, and hashtags. The research protocol can be found in Figure 1.

#### 3.2.1. Visual discourse analysis through computer vision networks

To understand the visual discourse generated by influencers, an analysis of the images has been conducted using computer vision networks (**Omena** *et al*., 2021). This analysis was performed on all the images published by influencers belonging to the same country, allowing for meaningful comparisons of the results.

Initially, an automated content analysis of the images was conducted using the *Google Vision API* algorithm. This algorithm employs algorithmic techniques to identify and classify objects and scenes, enabling the recognition of visual features. For this research, the *Memespector Graphical User Interface* (**Chao**, 2021) was utilized to apply the *Google Vision API*. Among the various data provided by the *Google Vision API*, only the 'web-entity-description' was used in this study. This feature offers a list of image descriptors enriched with *Google's Knowledge Graph*, expanding the references associated with an image beyond its content and providing enriched descriptors (**Omena** *et al.*, 2021). Additionally, a

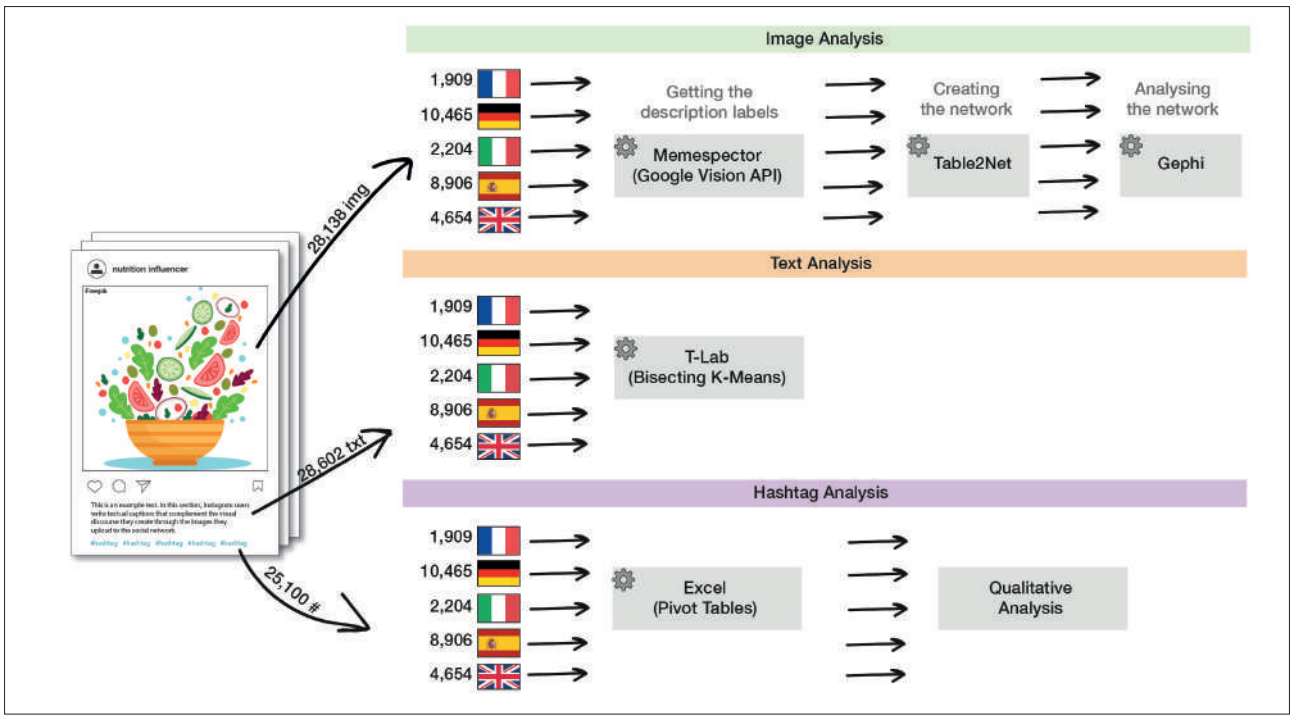


Figure 1. Research protocol

confidence score is assigned to each descriptor, and for this analysis, the descriptor with the highest confidence score was selected for each image.

To establish connections between images based on their descriptors, the Table 2 Net tool (**Jacomy**, 2013) was utilized to generate a network file. This tool simplifies the extraction of a network from a comma-separated values file and converts it into a graph representation. In this study, a bipartite network was created, where the nodes represented the images and their corresponding descriptions. This approach facilitated the grouping of images based on their content characteristics.

For the graphical visualization and analysis of the network from each country, *Gephi* (**Bastian**; **Heymann**; **Jacomy**, 2009) was employed. In computer vision networks, nodes are positioned in relation to their association (or lack thereof) with specific visual features of an image (**Omena** *et al*., 2021, p. 14). To achieve this, the *ForceAtlas2* algorithm (**Jacomy** *et al.*, 2014) was applied. This algorithm arranges each node based on its relationships with other nodes, relying solely on the connections between them, without considering the attributes of the nodes for the spatialization of the network. Moreover, the implementation of adaptive velocities in *ForceAtlas2* ensures efficient performance in networks with fewer than 100,000 nodes, which is applicable to the networks analysed in this study. This feature contributes to a continuous design and smooth operation of the algorithm (**Jacomy** *et al.*, 2014).

To enhance the readability and analysis of the network, several configuration decisions were made. The *ImagePreview* add-on for *Gephi* (*Yale Computer Graphics Group*, 2022) was utilized to incorporate the image of each node in the network, providing visual context. Additionally, to improve network readability, nodes with descriptors lacking concrete meaning and those with occurrence equal to or less than nine were removed from the visualization. These steps were taken to optimize the interpretability and clarity of the network representation.

### 3.2.2. Discourse analysis of texts using computerized linguistic analysis software

To analyse the discourse generated by the text published in the posts by influencers, we employed *T-LAB*, a software equipped with linguistic, statistical, and graphical tools that facilitates automated text analysis. Specifically, we conducted the analysis on a country-by-country basis to identify the thematic clusters formed by the discourse disseminated by opinion leaders and compare it afterwards.

The analysis we conducted involved a *Thematic Analysis of Elementary Contexts (Bisecting K-Means)* to explore a representation of the corpus contents through a few meaningful thematic clusters. To accomplish this, *T-LAB* employs two fundamental components: lemmas, which are categorized registers consisting of keywords, and elementary contexts, which represent proportions of text within the corpus that correspond to syntagmatic units comprising one or more sentences characterized by the same patterns of key words. By utilizing these elementary contexts and lemmas derived from the initial automation process and subsequent lemmatization, clusters or significant thematic groups are classified to identify the main areas encompassed in discussions on the topic of healthy eating. For this analysis, the method employed is unsupervised clustering using the k-means bisecting algorithm, which *T-LAB* presents as a default and automatically developed alternative.

### 3.2.3. Analysis of hashtags

Through a straightforward quantitative analysis, we generated a list of hashtag usage frequencies for each country. This enabled us to observe the hypertextual elements that were most associated with this type of content, as they could generate conversations on social networks. Subsequently, we conducted a qualitative analysis of the contexts in which the most frequently used hashtags appeared and examined the type of discourse that these hashtags conveyed

## 4. Results

### 4.1. Visual discourse analysis through computer vision networks

From a formal perspective, the networks are presented in a highly comprehensive and segmented manner, giving rise to distinct clusters. Annex 2 contains the depiction of the five networks. While the majority of the images are photographs, text-based images and infographics are also prevalent across all countries, thereby exemplifying the informative nature of the examined accounts. Upon closer examination of the clusters within each country, two prominent themes emerge, occupying separate and discernible thematic clusters: meals (C1) and sport (C2). Figure 2 presents detailed visual insights into these categories, including the number of nodes comprising each thematic network within the country.

**(C1): Meals.** This cluster primarily encompasses images related to various types of dishes, eating styles (e.g., vegetarianism), meals (fast food, snacks, desserts, appetizers), and even the food itself. Across all countries, it is generally evident that the culinary varieties unique to each country's gastronomic culture are observable. France stands out for showcasing primarily sweet treats such as pancakes, crêpes, muffins, or cakes, most of which are homemade. Additio-

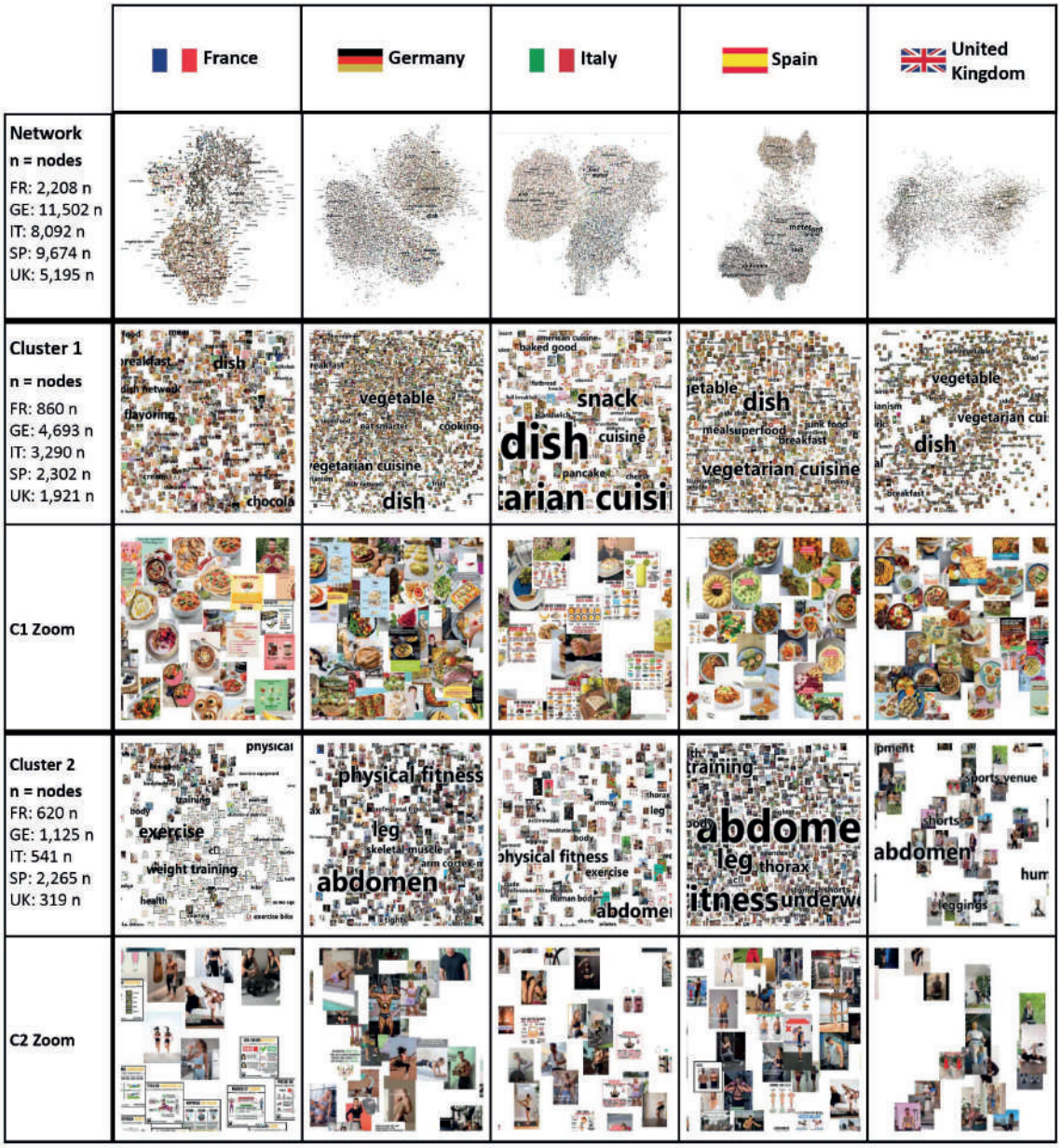


Figure 2. Networks and clusters by country.

nally, there are images of savoury pancakes, tacos, mueslis, and porridge. Fruit and vegetable juices are also present, with bananas being the most frequently depicted fruit. On certain occasions, photographs of hamburgers associated with vegetarianism and carbohydrate dishes like potatoes and salads can be found. It is worth noting that images with text and infographics related to diet recommendations, food types, or healthy tips prevail. Conversely, images featuring people with food dishes are scarce, although there are instances where the same influencer appears, holding a different food product in each hand.

In the case of Germany, there is a diverse range of food published, including vegetables, carbohydrates, sweets, and fruits, albeit to a lesser extent. Additionally, images of fruit and vegetable juices are also present. Most of the images consist of dish photographs, with a scarcity of images featuring text or people. As for Italy, the most prominent images primarily showcase carbohydrate-rich foods, particularly pasta and pancakes. While vegetable and fruit dishes are also published, they are less common. It is important to highlight the abundance of infographics and photographs with explanatory texts, which can often be attributed to the same influencer, given the striking similarities in their publications.

Regarding Spain, a similar variety of dishes is observed, with a focus on carbohydrates, vegetables, and homemade sweets, but with limited inclusion of juices. Occasionally, there are photographs depicting individuals eating or showcasing a plate of food or a particular product. Furthermore, Spain exhibits a greater number of images accompanied by text, icons, and infographics. Moving on to the UK, the dishes encompass a wide range, including vegetables, carbohydrates, salads, fruits, homemade sweets, and juices. Additionally, there is a notable sub-category dedicated to Indian and Chinese cuisine, where Oriental and Asian meals are predominant. These publications mainly consist of images featuring ready-made dishes, similar in presentation style to the German cluster. Notably, this cluster features a substantial number of photographs of soups, a characteristic less prevalent in the other clusters. Similarly to Italy, France, and Germany, images of people in food-related contexts are scarce in the UK cluster, although there are some accompanied by text or infographics.

In summary, the analysis reveals a prevailing emphasis on traditional foods from each country, with a presence of global food trends as well. This indicates that nutritionists and influential figures in the food industry promote the autochthonous food culture of each region, while occasionally acknowledging other internationalized food movements. The primary food trend observed in the analysis involves the consumption of bowls consisting of natural and unprocessed cereals, nuts, and fruits, accompanied by various vegetable and fruit juices.

**(C2): Sport.** The subsequent cluster encompasses images that represent exercise, fitness, and general training. Some of these images allude to weight loss or weight gain goals. This theme exhibits more similarities than differences across countries. However, it is important to note that countries such as the UK and Italy do not exhibit this cluster to a significant or representative degree compared to the others. In the case of the UK, there is a small, isolated cluster that is minimally connected to the rest, primarily focusing on slimming.

Except for Spain, the other countries are mostly characterized by images, primarily featuring women in sportswear engaged in physical exercise or yoga poses. These images may promote food or sports products or serve as inspiration for their audience. In Spain, however, the dominant images revolve around physical transformations, often depicted through before-and-after images, mostly featuring women. While Germany, Italy, and the UK occasionally include such photographs, they do so to a lesser extent. Regarding the presence of infographics or texts providing dietary recommendations specifically focused on sports, France, Spain, and Italy exhibit the highest number of publications. In contrast, the United Kingdom notably possesses the fewest images in this category and primarily focuses its discourse on weight loss or weight gain.

Furthermore, it is worth mentioning that there are other clusters present in all countries, but their incidence is anecdotal, and they do not pertain to the food discourse (e.g., photographs of hairstyles). As they are not considered significant or representative for this study, they have been excluded from the analysis. These clusters reflect a more personalized style adopted by each influencer.

### 4.2. Discourse analysis of texts using computerised linguistic analysis software (*TLAB*)

*The elementary contexts* were analysed for each country, and in all cases, three primary contexts or themes were observed. Figure 3 displays the different graphs generated for each country as part of the elementary context analysis. Annex 3 provides examples of the texts referred to in the analysis.

As a result of this analysis, in France we can see three contexts in which sport is present in all of them. Specifically, these clusters refer to the intake of foods beneficial to physical health (e.g., “preparation physique”; “vitamine”; “calcium”; “crossfitfrance”), physical exercise (e.g., “entrainement”, “séance musculaire”, “prendre”, “corps”) and diet culture (e.g., “pertedepoids”; “reequilibrage_alimentaire”; “mangermieux”; “nutrition”).

Germany, on the other hand, has three different clusters, one of them encompassing sport and ingredients in general (e.g., “schalotte”; “training”; “gemüsebrühe”; “körper”). On the other hand, there is a cluster on healthy lifestyle and recipes (e.g., “gesundleben”; “tagesrezept”; “einfacherezepte”; “healthylifestyle”) and a cluster on kitchen utensils and appliances (e.g., “thermomix”; “pfanne”; “zaubertopf-club”; “schneidernpr”).

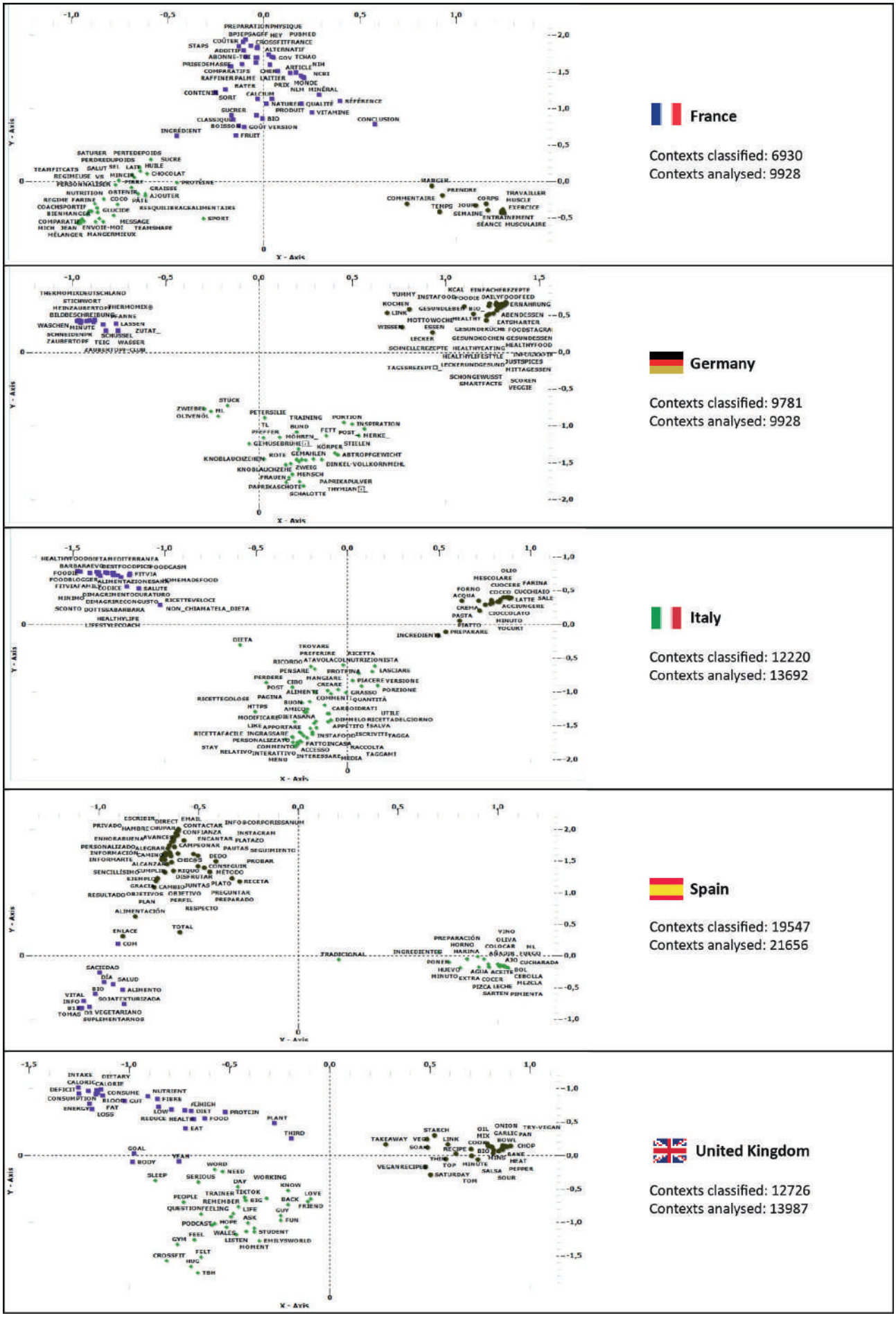


Figure 3. Analysis of elementary contexts by country

Italy presents similarities to France, with food as a common link in the three clusters it offers, which are recipes (e.g., "ricettanutrizionista"; "ricettafacile"; "ricettegolose"; "dieta"), healthy eating styles (e.g., "healthyfooddietamediterranea"; "alimentazionesana"; "healthylife"; "salute") and food ingredients and products (e.g., "yogurt"; "pasta"; "crema"; "ingrediente").

In Spain, we differentiate between a predominant cluster associated with goals and results with regard to food, challenges and overcoming (e.g., "seguimiento"; "cumplir"; "resultado"; "objetivo"). Relative to the second and least recurrent theme, there is a cluster focused on ingredients (e.g., "cebolla"; "oliva"; "agua"; "huevo") and another of diets (e.g., "salud"; "vegetariano"; "alimento"; "saciedad").

Lastly in the UK the three contexts are closer to each other, although there is more proximity between the cluster whose discourse is about food focused on weight loss or weight gain (e.g., "fat loss"; "dietary"; "nutrient"; "intake caloric") and the one carried on a discourse about sport in general and healthy habits (e.g., "crossfit"; "trainer"; "sleep"; "gym"). The most distant cluster, in a more generic way, focuses its discourse on food and ingredients related to recipes mostly (e.g., "oil"; "salsa"; "pepper"; "onion"). These results show together how sport and food nourish each other and are not in isolation.

### 4.3. Hashtags analysis: The most promoted labels

The top 10 used hashtags (Table 2) reveal different trends across countries, although they all fall into four overarching categories. Most used labels in each country can be classified into four conversational groups related to healthy eating: weight loss, diet culture, sports, and healthy eating.

Table 2. Top 10 used hashtags.

| France | Germany | Italy | Spain | UK |
|---|---|---|---|---|
| #pertedepoids (weight loss) | #sat1 (*TV channel*) | #dieta (diet) | #fit | #veganuary |
| #perdredupoids (lose weight) | #gesundessen (eating healthy) | #alimentazionesana (healthy nutrition) | #fitness | #weightloss |
| #reequilibragealimentaire (food balancing) | #lecker (tasty food) | #nutrizionista (nutritionist) | #nutrideporte(sport nutrition) | #slimmingworld |
| #regimeuse (dieting) | #ernährung (nutrition) | #mangiaresano (eating health) | #vida (life) | #nutrition |
| #maigrir (lose weight) | #abnehmen (weight loss) | #dimagrire (lose weight) | #healthyfood | #healthyeating |
| #mincir (slim down) | #gesund (health) | #dietasana (healthy diet) | #noexcuses | #slimmingworlduk |
| #regime (diet) | #gesundheit (wellness) | #sano (healthy) | #healthy | #health |
| #musculation (body-building) | #gesundabnehmen (healthy weight loss) | #perderepeso (lose weight) | #motivation | #diet |
| #mangermieux (eating better) | #eatsmarter | #cibosano (healthy food) | #eatclean | #healthy |
| #teamshape | #meinzaubertopf (Thermomix magazine) | #palestra (exercise) | #food | #emilysworld |
| Colouring: Yellow = Weight loss; Blue = Diet culture; Pink = Sports; Green = Healthy eating; Grey = Brands | | | | |

In the case of France, conversations predominantly revolve around weight loss and diet culture with some scientific background, mostly by the hashtag #pertedepoids. Hashtags in this country primarily focus on physical transformation and the consumption of specific foods associated with muscle gain and weight loss diets. Occasionally, influencers mention hashtags related to explaining the benefits of certain foods. Interestingly, the notion of eating better also appears, albeit anecdotally. In addition, there is a particular case related to the hashtag "Teamshape", which is a brand launched by an influencer that focuses on sport and which also promotes certain products like proteins. This hashtag is only used by the account @teamshape.

In Germany, the discussions surrounding the top 10 hashtags, except for the first one, largely centre around healthy recipes, balanced diets, nutritional recommendations, and diets aimed at muscle gain or weight loss. It should be noted that these topics often appear together in the same posts and, interestingly, there are also posts recommending healthy products as substitutes for processed ones. Regarding the first hashtag, #sat1, it represents the German *SAT1* TV channel and has only been used by an account affiliated with one of its programs (@frühstuckfernsehen). Moreover, #eatsmarter corresponds to the brand 'Eatsmarter' which promotes and sells nutrition courses and books, and #meinzaubertopf alluded to the brand 'Thermomix' boosting recipes. These hashtags were used only by these two accounts.

In Spain, the main conversations revolve around sports, exercise, and diets tailored to specific physical fitness goals. Healthy eating is also an important topic. Although there are no hashtags specifically dedicated to weight loss or diet

culture, they are encompassed within the broader context covered by these hashtags. Other themes that can be observed throughout the different hashtags include the promotion of products and discourses that encourage motivation and inspiration for healthy eating challenges. It is noteworthy that Spain is the only country where the primary discussions are not focused exclusively on diet. In this country there is also one hashtag, #nutrideporte, which is related to a brand, 'Nutrideporte'. This one is only utilized by @nutrideporte and has been in tune with the promotion of nutrition plans mostly.

Turning to Italy, the primary hashtag is related to dieting, but the most used ones are focused on healthy eating. However, there is also a presence of hashtags related to weight loss and sports. Additionally, it is worth mentioning that in general, many hashtags are used to enhance content visibility, although not all of them carry the same meaning or reference the same topics. Furthermore, Italy is the one and only country which has no hashtags related to a certain brand or to a specifically influencer. All the hashtags analysed were used by more than one opinion leader, but one account is the one that promotes them the most. Concerning the meanings of the hashtags, it is enthralling that half of them contain the word 'sano' (healthy) and which context refers to recipes and nutrition tips overall.

Lastly, in the UK, the first hashtag used is "veganuary," which refers to a trend promoting veganism at the start of the year (vegan + January). While there is a specific account associated with this hashtag, it is commonly used by a wider community and is no longer exclusively linked to that influencer. Despite its name, this hashtag is used throughout the year. There are other cases that refer to brands. The hashtag #slimmingworld corresponds to the blog and community 'Slimming World,' where people can participate in healthy activities and read about different exercises, recipes, and healthy habits. Also, #emilysworld, which is used only by the influencer @emilysworld, who is a health professional nutritionist and promotes nutritional and fitness plans. In general, the most popular hashtags in the UK revolve around weight loss and healthy eating, with the hashtag "diet" being the only one within this ranking. The content related to them tackles nutritional tips and recipes.

Furthermore, after checking who in the corpus was posting the most with that hashtag, we discovered that, regardless of the hashtag-branding discussed above, many of them were being used by only a third of the country's influencers, and in some cases, by one or two accounts. Such has been their publishing capacity that their hashtags have ended up being among the most used in general.

Finally, it is important to note that in the case of the analysed Instagram users and posts, the use of hashtags has been widely used. Not only in terms of frequency, but also in terms of quantity per post. Although it falls within the logic of the search for content visibility, it is surprising to find large chains of hashtags (average between 10 and 20) that are not necessarily related to the content of the post, but rather to the main topic and the values that the specific account wants to highlight.

## 5. Discussion and conclusions

Society also uses *Instagram* as a means of accessing information about nutrition (**Casino**; **Rabassa**, 2021; **Moreno-Castro** *et al.*, 2021). This study has provided a better understanding of the discourse that opinion leaders on nutrition and food issues disseminate on the platform. Specifically, influencers from five different European language communities (France, Germany, Italy, Spain, and the United Kingdom) have been analysed. Overall, it has been observed that these opinion leaders promote dietary habits focused on a specific physical transformation, which consequently involves the consumption of certain products and foods. The intrinsic thread of the discourse is the appeal to motivation, support, and inspiration to achieve specific goals related to food and physical health (muscle gain, weight loss, immune system reinforcement, etc.), which has been observed prior to the pandemic (**Chung** *et al.*, 2017; **Saboia** *et al.*, 2018). Thus, influencers act simultaneously as endorsers of products related to these dietary practices and as motivators encouraging other users to become "prosumers" by posting images of their eating habits (**Mota** *et al.*, 2019; **Zappavigna**, 2016), without considering the obsession they convey and the potential impact it may have (**Riesmeyer**; **Hauswald**; **Mergen**, 2019; **Kent**, 2020).

In their visual discourse, influencers from the five countries showcase traditional food from their respective cultures, despite promoting global trends (such as vegetable juices or bowls made with natural and unprocessed cereals, nuts and fruits) to a lesser extent. An example of this is France, where both savoury and sweet crepes prevail, or the United Kingdom, where images of hot dishes like soups and consommés are appreciated. Additionally, the UK features a cluster of images referring to Oriental cuisine, specifically Indian food. In this discourse, sports also play a significant role, with a predominance of photographs depicting physical transformations and the promotion of food products and sports brands through inspiring images. In this regard, Spain stands out with the highest number of photographs showcasing physical changes, especially among women. Furthermore, along with Italy and France, Spain is among the countries providing the most infographic resources in the publications of this cluster. Another noteworthy finding is the scarcity of people in the images related to the food cluster, with the focus being aesthetically presented dishes, a result also found by **Walsh** and **Baker** (2020).

The captions accompanying this visual discourse, including text and hashtags, primarily promote healthy eating for physical purposes, similar to what other studies have found on *Twitter* (**Pilař** *et al.*, 2021). Sports and fitness are present in

the discourse of influencers from these five countries, with a predominant emphasis on weight loss, muscle gain, and sports training with specific diets. Specifically, the discourse is not solely centred around achieving a particular physique and dietary routine but also emphasizes the motivation and self-esteem of individuals to attain those goals, as mentioned earlier.

Opinion leaders have the power to influence the dietary and health habits of their followers through visual discourse (**Turner**; **Lefevre**, 2017; **Gil-Quintana**; **Santoveña-Casal**; **Romero-Riaño**, 2021). This is why concerns have been raised about the health risks associated with pursuing certain dietary behaviours and consuming specific products via *Instagram*, as well as concerns about the training and background of influencers (**Schneider** *et al*., 2013; **Dickinson**; **Watson**; **Prichard**, 2018; **García-Puertas**, 2020; **Boepple**; **Thompson**, 2014; **Romero-Cantero**; **González-Díaz**; **Quintas-Froufe**, 2019).

The discourse adopted by influencers plays a fundamental role in audience persuasion (**Qutteina** *et al.*, 2019; 2022; **Ellison**; **Truman**; **Elliot**, 2023; **Pinto** *et al*., 2021). The prevalence of a substantial emphasis on weight loss across most countries suggests the potential for fostering an obsession with body image, potentially contributing to the emergence of associated disorders. In our research, we have noted a lack of discourse focused on health and well-being, instead finding a predominance of content related to physical exercise. In this sense, the results consider the widespread trend of an imperative need for a physical transformation that directly leads to a change in the diet of users interested in nutrition and healthy eating on *Instagram*.

Spain is the country where this trend is most reflected, followed by Italy, Germany, France, and the UK, respectively. France places greater emphasis on weight loss for achieving a good physical state and the consumption of specific foods to achieve it. Germany focuses on healthy eating for a physical change that does not necessarily involve weight loss. In Italy and the UK, both weight loss and nutrition-based eating styles are reflected. Although motivational discourse, support, advice, and nutritional recommendations are present in all countries, Spain stands out among the rest.

The results conclude with the widespread promotion of products and foods for diets, although no evidence has been found to suggest that the sponsorship of unhealthy foods affects preferences for them. It is worth mentioning that the real food movement was not highlighted in this massive data analysis, neither through images, text, nor hashtags, despite being one of the most studied movements by the scientific community (**González-Oñate**; **Martínez-Sánchez**, 2020; **Marti-del-Moral**; **Arrúe-Ishiyama**, 2021; **Stano**, 2022; **Gil-Quintana**; **Santoveña-Casal**; **Romero-Riaño**, 2021).

Regarding the study limitations, it is important to note that a generalized view of the discourse on healthy eating and nutrition on *Instagram* is considered, giving more prominence to opinion leaders who have published more. Similarly, the details of each community could not be covered in-depth. Additionally, only the content of the published posts has been studied, but there are other methods of content publication on *Instagram*, such as stories, videos, or live streams, which may have been used by these influencers.

Future lines of research could address the reception of influencer messages on *Instagram* regarding food and health, exploring the audience's trust in these discourses and the implications for decision-making and behaviours related to health. Such research could inform regulation and education in the digital realm.

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## 7. Annexes

### Annex 1. Accounts analyzed by country

**France**: @santeplusmag; @foodspring_fr; @healthy.stud; @truefitnessknowledge; @davfit_coach_sportif; @tnicetrainer; @nu3_fr; @lesecretdupoids.

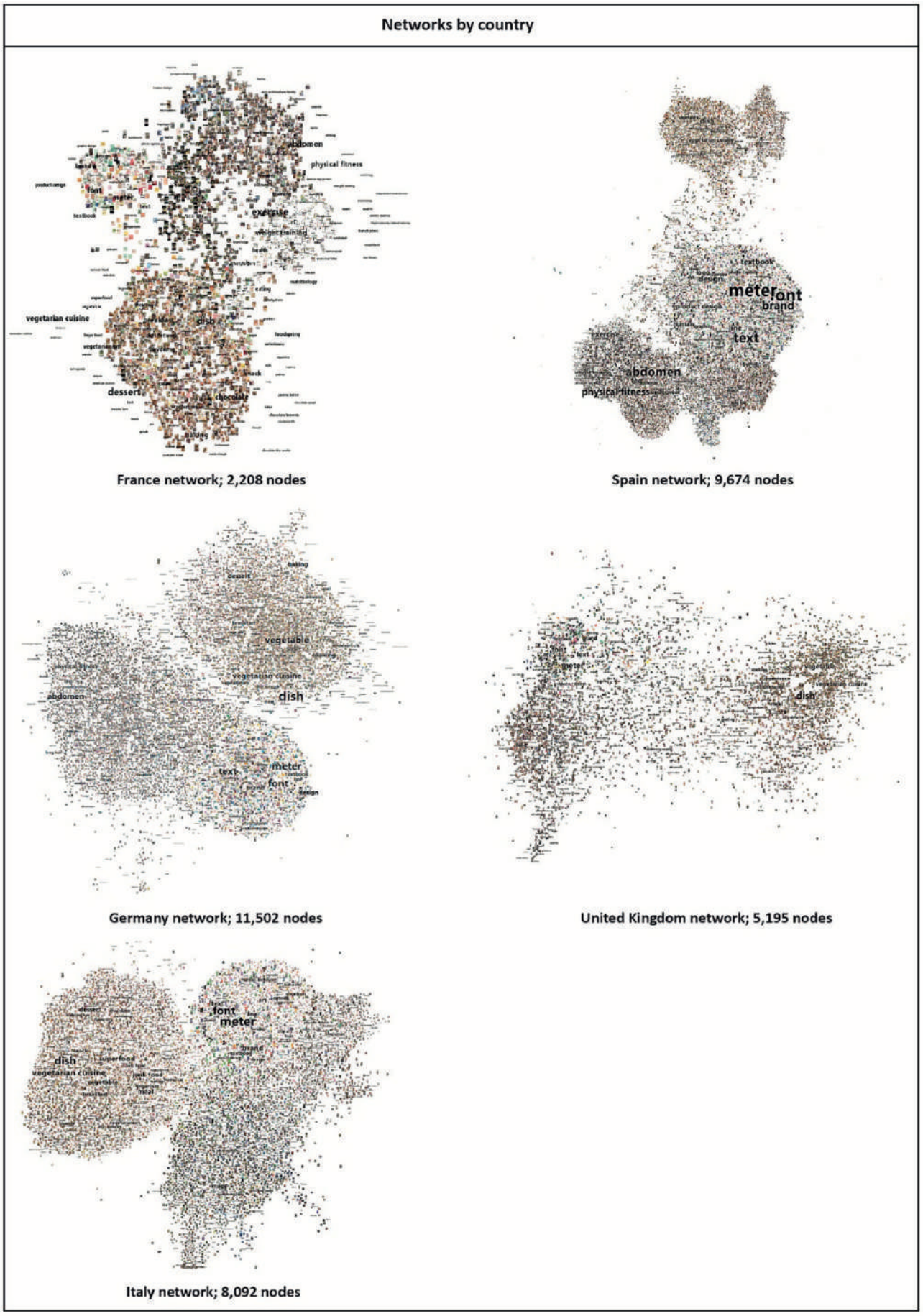
**Germany**: @louisadellert; @justspices; @thermomix_de; @eatsmarter_de; @foodspring; @kraut_kopf; @zaubertopf.de; @milenasrezept; @gesundheitsfakten; @yazio; @esncom; @simon.hirschmann; @lizzi1402; @mirjam_rodrigues.da.silva; @veganistungesund; @rockanutrition; @abnehm.fakten; @lealoveslifting_official; @coach_cecil; @hellofreshde; @myproteinde; @gesund.ernaehren; @diet_training_by_ann.

**Italy**: @giuseppe_healthy; @foodspring_it; @barbaraevg; @atavolacolnutrizionista; @sarafarnetti; @sofiabronzato; @non_chiamatela_dieta; @ilgolosomangiarsano; @fitvia.it; @dott_lurgo; @greenme_it; @fitness.secrets.italia.

**Spain**: @carlosriosq; @futurlife21; @Juanllorca; @Nutritionisthenewblac; @Blancanutri; @Corporissanum; @gu_nutricion; @foodspring_es; @stefyactiva; @alvarovargas80; @marian.alamo; @dimequecomes; @edgar.barrionuevo; @endika_montiel; @fitvia.es; @giangosfit; @inakygarcia; @langelarrieta; @mundoenforma_oficial; @myproteines; @nutricionista_gratuito; @nutrideporte; @proviotico; @recetasfitnessana; @sergio.espinar; @tasneem_tahir_fitness; @themacrowizard; @verotraining; @truefitnessknowledge; @davfit_coach_sportif; @tnicetrainer; @nu3_fr; @lesecretdupoids; @ww_france; @healthfit_challenge.

**United Kingdom**: @thefoodmedic; @cheftomkerridge; @amandafinniee; @weareveganuary; @drjoshuawolrich; @lucymountain; @theguthealthdoctor; @noorishbynoor; @doctors_kitchen; @april_laugh; @mindfulchefuk; @laurathomasphd; @_emilysworld; @themedicinalchef; @thefitnesschef_; @slimmingworld; @martinnutrition; @pixienutrition; @scottbaptie; @theleanmachinesofficial.

## Annex 2. Networks by country



## Anexn 3. Samples of the elementary contexts per country

| Country | Word | Context |
|---|---|---|
| France | Physical health | Conclusion: Les petits pois s'en sortent mieux sur les macro mais les pois chiches ont un bon avantage sur les protéines et les fibres. De très bonnes sources de **vitamines** et minéraux différents, les deux sont vos alliés. 🤗 ♻️Alternatives: Légumineuses Bio & surgelés ou frais. |
| | Physical exercise | Conseil: pour cet **entraînement**, essaye d'ajouter des poids aux chevilles, Rebs utilise des poids de 2, 5 kg, mais si tu n'en as pas à_la maison, pas de soucis! Fais simplement 35 répétitions au_lieu de 20 par exercice. |
| | Diet culture | Tu as besoin d'un surplus de calories pour développer tes muscles et d'un déficit calorique pour éliminer les graisses. La bonne nouvelle, c_est que les muscles peuvent aider à_la **pertedepoids** puisqu'ils brûlent plus_de calories que les graisses. |
| Germany | Sport and ingredients | Trainingserfolge mithilfe von Lebensmitteln zu verbessern, ist der Zeitpunkt des Verzehrs ausschlaggebend. Im besten Fall solltest du zwei bis drei Stunden vor dem **Training** eine Mahlzeit essen, die Kohlenhydrate, Proteine und Fett enthält. 💪 👉 Unseren Artikel mit detaillierten Infos zur Ernährung vor dem Training findest du über den Link in Bio |
| | Healthy lifestyle and recipes | **TAGESREZEPT** 🧡Dieses Rezept für gebackene Süßkartoffeln mit Bohnen-Rotkohl-Feta-Topping lässt sich so einfach variieren – Ihr könnt euch nach Lust und Laune austoben! 😋 🧡 gesunder Feierabend 🍏Health Score: 9, 1/10 ✓551 kcal Das Rezept gibt's in der Story, Bio und auf 👉 www. Eatsmarter. |
| | Kitchen utensils and appliances | Super schnelle und einfache Silvester Snacks zauberst du ab jetzt mit deinem **Thermomix®**! 😍😱So wie diese köstlichen Party Snack Raketen! |
| Italy | Recipes | Questi dolci li ho testati personalmente tutti prima di trascriverli in questo volume, anche in compagnia della mia famiglia che, come me, può confermare la deliziosità delle ricette trascritte. Ho pensato a questo libro perché ho sempre insistito molto sull'importanza di mangiare i dolci anche quando si è a **dieta** e, questo posso sottoscriverlo. |
| | Healthy eating | La nutrizione funzionale, infatti, non ha nulla_a_che vedere con la conta delle calorie! al_contrario, è una vera_e_propria strategia per guadagnare **salute** sfruttando la sinergia tra le proprietà degli alimenti che attivano, o inibiscono, specifici processi ormonali. |
| | Food ingredients | Io vi lascio la rocwtta di questi piccoli burger a_base_di zucchine, patate e farina di ceci, che vi ricordo mantiene tutte le proprietà nutrizionali di questo meraviflioso **ingrediente**. |
| Spain | Challenges | Nuestra crema tiene una mínima cantidad de dátil, pero es que esto no es ningún problema, adjunto varios estudios sobre la incorporación de dátiles en una variedad de productos dando muy buenos **resultados** en el control de glucosa, perfil de lípidos y estado antioxidante. |
| | Ingredients | Distintos estudios han demostrado que el aceite de **oliva** tiene el mayor potencial antioxidante sobre los lípidos del pescado. Esto es importante ya que la oxidación de las grasas tiene implicaciones sobre la calidad final del producto. |
| | Diets | Añadirlo en nuestra dieta nos proporcionará proteínas de excelente calidad, grasas saludables, vitaminas, minerales y oligoelementos, además aportarnos una elevada **saciedad**. |
| United Kingdom | Weight loss and/or gain | There is no_one size fits all when it comes to eating 👉 We all have different calorie and **nutrient** requirements. One day is not representative of someone's overall diet 👉 It can trigger unhealthy comparisons and disordered eating patterns |
| | Sports and healthy habits | his is called habit stacking. So for_example, after your morning coffee, I will write my to-do list for the day, after I write my to-do list, I will put_on my **gym** kit |
| | Ingredients and recipes | Add the tomatoes, olives, cucumber, 2 of the sliced spring **onions**, chopped spinach, and basil leaves 4. Once the orzo is cooked, drain and rinse it with cold water and then add it to the bowl with the rest of the ingredients |