Dr. Google, what can you tell me about homeopathy? Comparative study of the top10 websites in the United States, United Kingdom, France, Mexico and Spain

Lorena Cano-Orón

Lorena Cano-Orón ✉

https://orcid.org/0000-0003-4270-1924

Universidad de Valencia
Facultad de Filología, Traducción y Comunicación
Dpto. de Teoría de los Lenguajes y Ciencias de la Comunicación
Avda. Blasco Ibáñez, 32- 5ª planta
46010 Valencia, Spain
lorena.cano@uv.es

Abstract

Users access to *Google* to find out about health issues is frequent among citizens. This research analyzes the best results of three generic searches on homeopathy, collected in four waves in five countries: Spain, France, Mexico, the United Kingdom, and the United States. Specifically, the fluctuation of the corpus ranking is studied, and a sample of the ten best-positioned pages in each country is taken to analyze their content (the authorship of the website, the stance of the effectiveness of homeopathy, the presence of controversy and the type of content). The results show that the ranking is stable; that the stance of homeopathy is linked to the state of public opinion in the country; and that the majority of websites that appear better-positioned are from media.

Keywords

Search engines; Information search; Algorithms; SERP; Rankings; Biases; *Google*; Web sites; Health; Health information; Homeopathy.

1. Introduction

One in twenty searches conducted on *Google* focuses on health-related information (**Ramaswami**, 2015). These types of searches are usually anecdotally called "*Dr. Google*" (**Pías-Peleteiro**; **Cortés-Bordoy**; **Martinón-Torres**, 2013; **Van-Riel** *et al.*, 2017), due to the kind of doubts with which the search engine is accessed. The order in which *Google* offers the search results in its results pages (SERP, search engine result pages) is due to a series of hierarchical factors determined by algorithms.

This automation of the evaluation and ordering of the webs, whose exact procedure is secret, makes us consider *Google* as a gatekeeper of the information.

Users tend to focus on the first results of the ranking (**Gonzalo-Penela**, 2015; **Lee**, 2005), so, logically, this ranking of search results is key to solving the user's demands. This order is not usually questioned by users (**Lewandowski**, 2017), who trust the relevance of the results (**Noble**, 2018), so that the selection of webs that appear first can have an important influence on them (**Pogacar** *et al.*, 2017; **Arif** *et al.*, 2018; **Allam**; **Schulz**; **Nakamoto**, 2014; **Pan** *et al.*, 2007).

> One in twenty searches conducted on *Google* focuses on health-related information

When searching a controversial health issue, whether at the scientific or social level, the type of content and the position on the topic of the best positioned websites have a determining potential to form the user's opinion (**Pogacar** *et al.*, 2017; **Germano**; **Sobbrio**, 2017). The variety of points of view in the ranking seems to be related to the popularity of the topic in the public opinion (**Gerhart**, 2004).

This research takes as a case study the access to information on homeopathy, an unconventional therapy that has captured the attention of public opinion in Spain in the last two years and that in the media field is being increasingly treated with greater skepticism (**Cano-Orón**; **Mendoza-Poudereux**; **Moreno-Castro**, 2019). Based on the fact that in Spain 75% of the adult population (16-49 years old) gets information about health on the Internet (*Ontsi*, 2017) and that this medium is the second main source of information for homeopathy consumers (**Cano-Orón**; **Mendoza-Poudereux**; **Moreno-Castro**, 2018), we wonder:

(Q1) What resources does *Google* offer about homeopathy through SERPs? Does the ranking vary over time? What type of content does *Google* index as more relevant?

(Q2) What vision does *Google* generate from its SERPs? Are there differences in the discourse on the effectiveness of homeopathy among the best positioned results?

Also, taking into account that algorithm automation and language processing works best in English (**Arif** *et al.*, 2018), one may wonder:

(Q3) Are there similarities between searches carried out in the same language in different countries?

On the other hand, *Google* opts for algorithms that help optimize SERPs that, based on user behavior, seem to better satisfy the queries. Among others, location is a key factor for algorithms that *Google* uses to rank its search results (**Kao**, 2017). For this reason, and also in relation to the indications of other studies (**Ballatore**, 2015; **Gerhart**, 2004), the following question arises when dealing with controversial issues:

(Q4) Is the trend about homeopathy effectiveness that the first search results offer related to the climate of public opinion about this existing in the country?

The hypothesis on which this research is based is that the tendency of the position against homeopathy effectiveness is directly related to the general opinion of the country. So, in countries where homeopathy has a good image and is integrated as one more health option, the search results from the first positions confirm that positive view of homeopathy. Likewise, it is presumed that the best positioned results are stable over time and that they belong to reference pages and specialized health agencies.

> When searching a controversial health issue, the type of content and the position on the topic of the best positioned websites have a determining potential to form the user's opinion

The general objective is to analyze the differences and the type of access to the information that *Google* provides on a subject as controversial as the use of the homeopathy depending on the language and geographical location.

2. *Dr. Google*: Biases and effects

Googling allows access to a series of websites that are selected by the thematic relationship that the user has requested. It also enables to appreciate the infinite extension of the infosphere, offering thousands of websites to consult to satisfy the search. This ordering of results fulfills the function of information gatekeeper (**Haim**; **Arendt**; **Scherr**, 2017, **Germano**; **Sobbrio**, 2017, **Rieder**; **Sire**, 2014) or digital intermediary (**Kleis-Nielsen; Ganter**, 2018), even if it is "algorithmic and virtual" (**Gonzalo-Penela**, 2015, p. 79).

However, as **Rieder** and **Sire** (2014) point out, *Google* must be analysed beyond its *media* work and keeping in mind the economic perspective, since it combines user satisfaction with advertising services. In this sense, the *Google* search engine is a three-sided market, since it has to satisfy users, content providers and advertisers. In this sense, it is necessary to take into account as context data of this research that the pharmaceutical and health sector spends the least in advertising than any other, representing 0.8% (*IAB Spain*, 2017) of investments in advertising in Spain (about € 44.12 million). It should also be understood that the Spanish regulation on the health services and products advertising is more restrictive and that *Google Ads* in Spain does not allow the creation of campaigns that promise specific results.[1] This contrasts with the 2.84 billion dollars that the sector in the US invests in digital advertising, of which 37.1% is dedicated exclusively to search ads (**Del-Gigante**, 2018).

Likewise, and regarding the scope of content providers, one must also take into account their desire to be *algorithmically recognizable* (**Gillespie**, 2014; 2017), applying SEO techniques to please algorithms and be chosen to hold the first ranking positions, which are the ones that receive the most views (**Gonzalo-Penela**, 2015; **Lee**, 2005). Due to the opacity with which Google protects its algorithms (**Pasquale**, 2015; **Gillespie**, 2017), it is not possible to know exactly the formula they use to order the results, but it is known that there is the influence of certain factors that make search results not global, although they may seem so (**Jiang**, 2014a; 2014b).

Elements that influence the ranking are the language, the wording, the popularity of the site, the clicks (**Jiang**, 2014b). As for the popularity factor, which is very important, it also falls into the dynamics that, obviously, if the sites that receive the most visits are the first ones, with those visits they reinforce their popularity, following the rich-get-richer dynamics. In this case, the popularity of the site is rewarded, and not its content (**Rieder**; **Sire**, 2014; **Díaz**, 2008).

Another parameter that also influences the selection and ordering of websites for users is the location from which they perform the search (**Gonzalo-Penela**; **Codina**; **Rovira**, 2015; **Haim**; **Arendt**; **Scherr**, 2017), which is known via the IP address of the computer or the cell phone geolocation. This condition causes the results, far from being cross-border contributions, to be linked to local information and publicity, what **Jiang** (2014a; 2014b) calls search parochialism. In fact, even if searches are performed on *Google.com*, if you are in Spain, for example, they will be performed by default on *Google.es* (**Kao**, 2017).

Any search engine, by ordering the webs and giving priority to some contents over others, already offers a biased view (**Lewandowski**, 2017; **Rieder**; **Sire**, 2014; **Jiang**, 2014b) or one of the multiple visions of the web

> Any search engine, by ordering the webs and giving priority to some contents over others, already offers a biased view

(**Koed-Madsen**, 2016), but the factors taken into account by *Google* to personalize the search results constitute an extra bias that is invisible to the user. **Haim**; **Graefe**; **Brosius** (2018) indicate that this personalization, depending on the user's data, is present but that it does not isolate the subjects in a bubble, nor completely reduces the range of opinions. In the political sphere, a suppression of different points of view has not been found either (**Robertson**; **Lazer**; **Wilson**, 2018, **Puschmann**, 2018). However, it has been detected that *Google*, specifically *Google News*, offers greater prominence to some media and marginalizes others (**Haim**; **Graefe**; **Brosius**, 2018).

Algorithms interpret and reproduce culture (**Roberge**; **Melaçon**, 2017), identify a social tendency and adapt to it, learn to identify and recreate stereotypes (**Baker**; **Potts**, 2013). From machine learning techniques, which are based on the behavior data of many users, algorithms make decisions and create a *we* (**Ananny**, 2016), a *monoculture* (**Bozdag**, 2013). These algorithms not only respond to the users use and behavior, but also reflect the biases of the designers of these algorithms (**Noble**, 2018).

In the case of searches on health, the biases that can occur are determinant for users, as one of the problems detected when consulting *Dr. Google* is that the more you look for the less you trust the doctor (**Van-Riel** *et al.*, 2017). Regarding the effects of search results users find, we must bear in mind that these have a great influence on decision making (**Pogacar** *et al.*, 2017) and that the dominant response can be decisive (**White**, 2014).

Pogacar *et al.* (2017) detect that users are predisposed to find positive information about the treatments on which they seek information, so they are also liable to be influenced by confirmation bias. The fact that users are not aware of the biases derived from the algorithm increases their susceptibility to a cognitive bias (influence from graphic and contextual information), which increases the influence of the source point of view (**Novin**; **Meyers**, 2017).

The specific weight of search results is avoided when the user has prior scientific knowledge of the treatment on which information is sought on the Internet (**Pogacar** *et al.*, 2017). Likewise, it also depends on the level of conviction of this prior knowledge and the reliability that the source that is being consulted suggests to the user (**Kammerer** *et al.*, 2013).

From the studies that have been conducted on SERPs biases in health searches, it can be inferred that, on the one hand, the valence of the words conditions the results (**Ruiz**; **Bell**, 2014; **Pías-Peleteiro**; **Cortés-Bordoy**; **Martinón-Torres**, 2013), so that if the search for a treatment followed by the word "risk" is performed, the first results will show negative information, while if you add "benefits" the best positioned pages will be those that promote the use of that treatment. In the case of not using a specific valence for the search, **White** and **Hassan** (2014, p. 26) detected in *Bing* a tendency of the ranking towards positive information regarding a treatment, although it was not strictly true.

When looking at controversial issues, we find opposing positions. On the one hand, **Gerhart** (2004) warns that the diversity of voices participating in a controversy is visible in *Google* when it is a hot topic, while in controversies that have not received attention from the public opinion, the diversity of opinion does tend to be deleted from the results. However, on the other hand, **Ballatore** (2015) disagrees about the perpetuation of a majority opinion on the part of the search engine, but at the same time does consider the analysis of search results as a mirror to analyze society.

No study has been found that crosses the two ideas derived from the studies of **Gerhart** (2004) and **Ballatore** (2015), in which the diversity of opinion in the ranking is analyzed and if this diversity works as a reflection of society. However, it is public that *Google* strives to provide more accurate results to the citizens' queries. With this objective, based on tools such as the *Knowledge graph*, or *Hummingbird* and *RankBrain* algorithms, *Google* processes users' search behavior regarding specific searches and the quality of the websites to improve the positioning of those results that seem to better satisfy citizens (**Lopezosa**; **Codina**; **Caldera-Serrano**, 2018), determined by their location (**Kao**, 2017). This type of elements that *Google* takes into account could generate that social mirror (**Ballatore**, 2015) representing the diversity of voices that participate in a controversy (**Gerhart**, 2004).

3. Methodology

The corpus used for this research is made up of the best positioned web pages according to the relevance granted by *Google*. The ranking obtained is the closest thing that can be to what a common user would find, since it is understood that this ranking by "relevance" is the application of the factors that *Google* takes into account to establish its ranking; such as, for example,

- the popularity of the website –one of the most determining factors for the web's assessment by the algorithm–,
- the novelty,
- the adequacy with the search and the location (**Lewandowski**, 2017),

except for the customization factor of the user profile.

Starting with the *Google Scraper*[2] tool, used with a browser in incognito mode, the first 20 results of three homeopathy searches were compiled in the main languages of the following countries:

- Spain and Mexico (in Spanish),
- France (in French),
- the United Kingdom and the United States (in English).

In this way results could be compared in the same language in different locations, as well as the difference between Europe and America. The choice of these countries is justified by their different policies towards homeopathy and their cultural differences.

- Spain and the United Kingdom are characterized by having a strong skeptical movement;
- France, both socially and legislatively, has integrated homeopathy into its health system;
- the US and Mexico represent intermediate case studies, in which homeopathy does not have much presence.

Four waves of data collection were carried out during 2018 in order to observe if ranking alterations were frequent. In particular, data were downloaded dated January 1, March 1, May 1 and July 1, thus comprising a period of seven months.

The selection of the keywords to perform the searches was based on the *Google Autocomplete* data with the application *AnswerThePublic*:
https://answerthepublic.com

This tool offers around 200 search proposals derived from the chosen keyword. These proposals come from the *Google Autocomplete* data, which are the suggestions made to users when they start typing their search, according to the number of similar searches previously made. In our case, the general descriptor "homeopathy" was used in the three analyzed languages. In this way, not only are similar searches chosen among the different languages, but formulated in the most widely used way in that language (Table 1). The problem that underlies this type of formulation is that it is not usually grammatically correct. This can be quickly checked by searching with *Google Trends*; the difference in traffic between emphasized and non-emphasized keywords is considerable. However, it is decided to choose this combination of words because it is the most usual way to perform the search, and, therefore, what more users would find.

Table 1. Keywords used for searches

Language	Spanish		English		French
Country	Spain	Mexico	United Kingdom	United States	France
Search terms	homeopatia		homeopathy		homeopathie
	homeopatia que cura		what homeopathy can treat		que soigne homeopathie
	homeopatía como funciona		how homeopathy works		homéopathie comment ça marche

Likewise, in order to discover the existing level of competence to position a web page in the first ranking, the *Google* word search "homeopathy" in the selected languages and countries has been performed. This information is relevant because it reflects the value that a key word has in the market. That is, it allows you to have an idea of whether there are many or few people interested in improving the visibility of your website through advertising techniques.

Of the total of webs collected, 1,200 webs, there are a total of 264 unique URLs. That is to say, that regardless of their ranking positioning over time the most relevant webs do not vary much.

Table 2. Variables and categories used in content analysis

Type of website	Description	Example
Reference works	Dictionaries, encyclopaedias, webs that offer definitions	*wikipedia.org; definicionabc.com*
Specialized health portals	They post information on health in general (thematic forum), or develops specific explanations on doubts and therapies	*topsante.com; saludymedicinas.com.mx*
Government	Belonging to a government entity, such as the Ministry of Health	*nhs.uk; mscbs.gob.es*
Advertising	Its purpose is selling: website of the application center, courses offered, etc.	*boiron.es; homeopathic.com*
Professionals	Belonging to professional organizations	*homeopatia-si.es; sefac.org*
Non-professional organisations	Organizations (mobilized with the theme or not) that are not described as sector professionals. NGOs, associations, societies, foundations, etc.	*queeslahomeopatia.com; 1023.org.uk*
News	Media	*eldiario.es; sante.lefigaro.fr*
Academic paper	Websites / documents on scientific journals	*ncbi.nlm.nih.gov; scielo.org*
Other		
Homeopathy stance	**Description**	
In favour of	Presence of arguments that consider homeopathy as an effective therapy	*https://www.hablandodehomeopatia.com/el-miedo-que-nos-enferma-y-la-homeopatia-que-nos-cura*
Against	Presence of arguments that challenge the effectiveness of homeopathy	*http://queeslahomeopatia.com*
Neutral	Without clear positioning	*http://news.bbc.co.uk/2/hi/talking_point/4187412.stm*
Presence of controversy	**Description**	
Yes	Arguments are used for and against homeopathy making it clear that there is a controversy	*http://www.quo.es/salud/homeopatia-funciona-no*
No	A unique stance is taken on the effectiveness of the homeopathy	*http://www.boiron.es/homeopatia-que-es*
Not applicable		
Content	**Description**	
Information	Data and explanations are provided	*https://www.britishhomeopathic.org/homeopathy/what-is-homeopathy*
Opinion / testimony	It is argued from patient testimonies or used as a resource	*https://www.vice.com/es_latam/article/534kbd/homeopatia-curar-lesbianismo-lgbtq-homofobia*
Hybrid	Presence of explanations and opinions / testimonies	*http://lab.elmundo.es/pseudociencias/homeopatia.html*

With this corpus, the fluctuation of the ranking is analyzed with *RankFlow* (**Rieder**, 2016). This tool displays the web pages position in each ranking, allowing to easily observe how their positioning evolves in the different waves. Likewise, it also allows to calculate the "rank-biased distance" (distance of the positioning of the components among several rankings), that is, how much variation there is between one ranking and another.

A content analysis based on variables adapted from the studies of **León** and **Codina** (2016) [content variable] and **Arif** *et al.* (2018) [the type of web variable], both of them similar to the present study, and others *ad hoc* (Table 2) is applied to a corpus sample.

The sample consists of the first 10 pages of each search belonging to the last wave (July 2018). This is because, on the one hand, they are the most recent, and, on the other, because they are the most visited (**Lee**, 2005). In total, 150 pages are analyzed (5 countries x 3 search terms x 10 first pages). The 3 search terms are "homeopathy", "what homeopathy can treat" and "how homeopathy works".

For coding, a postdoctoral researcher was asked to code 30% (n = 46) of the sample to be able to perform a reliability test. After two meetings to finish defining the categories, the Cronbach's Alpha reliability test reached an optimal result for all the variables:
- "Medium type" = 1
- "Homeopathy stance" = 0.95
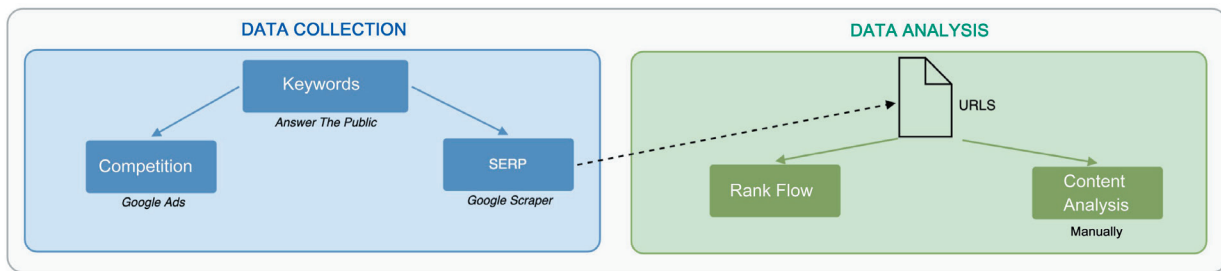- "Presence of controversy" = 0.92
- "Content" = 0.92

Figure 1. Method applied to this study

4. Results

4.1. Competition for keywords positioning (*Google Ads*)

The positioning of websites and / or ads from the economic bidding for the keyword "homeopathy" in different countries and languages shows a low level of competition, in accordance with the data offered by *Google Ads*. That is, despite being an expensive keyword, due to the number of searches performed per month, there are not many entities paying for it. In fact, when the search is performed, ads do not usually appear. However, if we look at data (Table 3), it is anecdotal to note that the highest bid values[3] also correspond to the order of the per capita income value of the countries.[4]

Table 3. *Google Ads* data

Keyword	Country	Min. monthly searches	Max. monthly searches	Competi-tion	Bid (low interval)	Bid (high interval)
homeopatía	Spain	10.000	100.000	Low	0,15 €	0,60 €
homeopatía	Mexico	10.000	100.000	Low	0,02 €	0,15 €
homeopathie	France	10.000	100.000	Low	0,20 €	0,67 €
homeopathy	United Kingdom	10.000	100.000	Low	0,25 €	0,91 €
homeopathy	United States	10.000	100.000	Low	0,05 €	2,04 €

Other keywords, not studied here, do seem to concentrate the investments of stores specializing in homeopathy, such as "homeopathy buy" and "homeopathy products".

4.2. Fluctuation of the websites in the ranking over time (*RankFlow*)

After comparing the fluctuation of the positioning of the web pages in the *Google* ranking in four different waves (Figures 2a and 2b), we can affirm that there is a general stability in the positioning over time: the average distance of the ranking deviation is minimal or null in all cases. The only ranking that changes the most is the one re-

Figure 2a. Fluctuation of the first 20 results in rankings. January-July 2018. Spain, Mexico and France.
The four red bars correspond to the four waves of the study.
avRBD = Average ranking distance of the ranking deviation

lated to the "homeopathie" search results in France, with an average deviation of 0.08. Even so, the distance is still smaller (this metric has a maximum of 1). Also, visually you can also see how the web pages that appear in the first positions remain in place over time.

4.3. What webs are better positioned and what vision do they offer (content analysis)

The most present website type in the first *Google* results belongs to the media (Table 4). News is the most abundant format, by far, in the results of the five countries. The specialized health portals, organizations websites and health professionals are also very present in general, although the proportion of this type of website varies greatly depending on the country, where in some cases it does not even appear in the most prominent results.

It is observed that, in general, there is an almost absolute lack of governmental portals; only in the United Kingdom a single portal appears among the most popular websites. In the case of reference websites the same thing happens: portals such as *Wikipedia* and different dictionaries are not among the first positions.

If we observe the data (Table 4) from a linguistic point of view, there are no common patterns beyond the wide presence of news, a feature shared by all countries. We can make comparisons by linguistic blocks: for example, see how in English (US + GB) websites of non-professional organizations are more common (11 out of 60) than in Spanish-speaking results (ES + MX) (4 out of 60) and than in the results in French, where they are not even present. But if we look at the coherence between the proportions of the same linguistic block, we observe that there is no common pattern.

If we observe the data (Table 4) from a geographic point of view, distinguishing Europe (ES + FR + GB) from America (US + MX), they do not show a similar distribution regarding the website type. So neither the language nor the geographical approach seem to be determining factors.

Regarding the type of content (Table 5) offered by the websites analyzed, the presence of information is the majority (133/150). The number of websites that build their content mixing information and testimo-
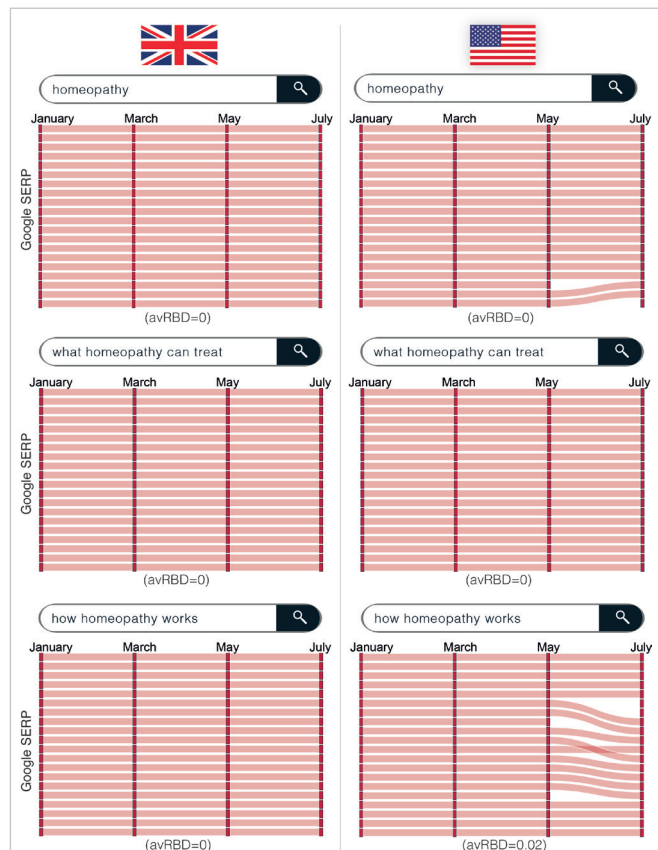

Figure 2b. Fluctuation of the first 20 results in rankings. January-July 2018. United Kingdom and United States.
The four red bars correspond to the four waves of the study.
avRBD = Average ranking distance of the ranking deviation

Table 4. Better positioned website types by country

Media type	ES	US	FR	MX	GB	Total
Academic paper	0	2	0	1	1	4
Government	0	0	0	0	1	1
News	11	10	11	17	14	63
Reference works	0	0	0	1	0	1
Non-professional organizations	4	3	0	0	8	15
Specialized health portals	4	5	9	4	0	22
Health professionals	6	4	1	0	6	17
Advertising	2	4	4	3	0	13
Other	3	2	5	4	0	14
Total	30	30	30	30	30	150

Table 5. Type of content of the best positioned websites by country

Country	Hybrid	Information	Opinion / testimony
Spain	8	22	0
United States	3	26	1
France	0	30	0
Mexico	1	28	1
United Kingdom	3	27	0
Total	15	133	2

Table 6. Presence of controversy in the webs best positioned by country

Country	No	Yes
Spain	24	6
United States	18	12
France	23	7
Mexico	28	2
United Kingdom	24	6
Total	117	33

nies or opinion is anecdotal (15/150); of which, most are news (12/15) and health professionals' portals (3/15). As for those websites that only offer opinions or testimonials, their incidence in the rankings is minimal (2/150).

> Only in the United Kingdom does a government website appear among the most popular

In this work we have also measured the presence of controversy or, in other words, the visibility of the fact that we are dealing with a topic with two antagonistic positions. In this case, most websites (117/150) do not include in their content the existence of a possible controversy regarding the information they are disseminating.

Regarding how homeopathy is shown as an effective therapy, in view of the results (Figure 3), it is still not possible to establish a pattern by language or geographical area, because, although Spain and the United Kingdom have a higher percentage of websites positioned against homeopathy, France does not follow this pattern.

On the other hand, with this variable, the relationship between the country's general positioning towards this therapy and its position in the health system and the perspective adopted by the most popular websites is clearly evident. Both Spain and the United Kingdom are countries in which skepticism is increasing in public opinion, as can be inferred from the information and opinions disseminated in the media and social networks, with very active campaigns against homeopathy. Such opposition is visible with a greater presence of websites with negative content about this alternative therapy. The reverse happens in France, a country where historically there has been a greater acceptance of homeopathy, and therefore presents a majority of websites in favor of it. In fact, if we talk about the probability that a user has of finding one type of stance or another (Table 7), noteworthy is how in France there is an 80% chance of finding a website in favor of homeopathy in the first *Google* results. Similar is the case of the US, where there is also a 73% chance that a user will find content in favor of homeopathy. Less frequently, but more likely to find websites in favor of homeopathy than against it, is the case of Mexico, with 67% of websites in favor of it. The opposite cases, where it is more frequent to find information against homeopathy, are the United Kingdom, with 63%, and Spain with 53%.

5. Discussion and conclusions

In the analyzed case, the most relevant websites and, therefore, better positioned in *Google* do not vary much during the chronological period studied. With a few exceptions, the rankings analyzed from January to July 2018 have hardly changed. This could be due to richer-get-richer dynamics (**Rieder**; **Sire**, 2014; **Díaz**, 2008), which make the most visited websites the best positioned as well.

Figure 3. General stance towards homeopathy by the websites in the rankings. The websites are ordered following the SERP ranking. On the left hand side is Europe and on the right America. Above is the Spanish language, then French and below English.
Green = in favour of homeopathy; **Yellow** = neutral; **Red** = against it.

Table 7. Relative frequencies of the homeopathy stance of the websites analyzed

Country	Favorable	Against	Neutral
Spain	37%	53%	10%
France	80%	10%	10%
United Kingdom	33%	63%	3%
United States	73%	23%	3%
Mexico	67%	23%	10%

The content that has had the most presence in the different analyzed rankings has been the news, as in the studies of **Arif** *et al.* (2018) and **Puschmann** (2018). It could be expected that reference websites such as *Wikipedia* or a dictionary would have been common in the best positions, but surprisingly this is not the case, since of all the websites of the sample (150), only one of them appears among the 10 most relevant pages, in the United Kingdom ranking.

Given this situation, it is logical to think that the position taken by the press also contributes actively to the algorithmic bias that is created with the SERPs. In fact, in the case of Spain, in which the press, increasingly, treats homeopathy with a greater degree of skepticism (**Cano-Orón**; **Mendoza-Poudereux**; **Moreno-Castro**, 2019), 53% of the websites

show a stance against its effectiveness. Spain is the second country analyzed with the highest negative bias, only behind the United Kingdom, where it is more likely to find skeptical information about the effectiveness of homeopathy in the best ranking positions.

> In the selected sample of countries and in the terminological selection there is a relationship between the contemporary social debate and the first webs of *Dr. Google* results

The various stances on the effectiveness of the homeopathy found in the rankings matches the country situation. In this case, there is no full polarization of the results and, therefore, no algorithm attempt to suppress the controversy, although there is a certain bias that simulates the climate of public opinion in each country. Therefore, SERPs biases can be understood as reflecting the favorable or unfavorable position of users (**Ballatore**, 2015), or as the bias derived from user learning and the creation of *monoculture* (**Roberge**; **Melaçon**, 2017; **Baker**; **Potts**, 2013; **Bozdag**, 2013).

This similarity found between the search results and the state of public opinion could also be due to SEO positioning of the media appearing in the first results, but also to the popularity and relevance of each link, judged by algorithms from the reactions of many users performing those queries and choosing some links or the others.

Location is, therefore, a determining factor in the type of results offered by *Google*. On the contrary, different countries with the same language have no similarities between them. That is to say, the search language is a determining factor regarding that the recovered pages will be in that information, but the most determining factor is the origin. This reinforces the concept of "search parochialism" (provincialist search) by **Jiang** (2014a; 2014b), because *a priori* the idea of searching the Internet seems unlimited and then it turns out to respond to factors linked to geographical borders. So, confirming our starting hypothesis, it does not receive the same type of content or stance on homeopathy a person who searches from Spain than one who does it from another country.

One of the limitations of this study is that the analysis material is artificial, that is, it is like a laboratory, because the user experience, with each one's cookies, can not be recreated; it depends on many factors. Therefore, the links studied here represent an artificial ranking that includes the most popular sites classified by *Google*, which is understood to appear among the first results of any user. The image of the results analyzed here is not 100% accurate regarding the one that would be sent to each and every one of the users.

However, it is an exploratory study that shows some interesting indicators for future research, such as the confirmation that both in the selected sample of countries and in the terminological selection there is a relationship between the contemporary social debate and the results thrown by the first pages of *Dr. Google*. Data that are sensitive to the terminological indicators with a value charge, such as when the words "risk" or "benefit" are used, as demonstrated by **Ruiz** and **Bell** (2014) and **Pías-Peleteiro**, **Cortés-Bordoy** and **Martinón-Torres** (2013). The identification of this pattern could be revealing for the design of contents of institutional pages with health information, which currently rank low. In the sample of pages analyzed, the greatest volume of information comes from media pages, and not from institutional pages.

Therefore, the favorable or critical tendency in the media in each of the countries studied has marked, to a large extent, the bias of the pages that the search engine has selected from the searches of the users.

> The favorable or critical tendency in the media in each of the countries studied has marked, to a large extent, the bias of the pages that the search engine has selected from the searches of the users

Likewise, it is necessary to take into account in this specific topic that neither the number of publications in the media nor the searches on *Google* on alternative therapies are directly related to the consumption of these by the population (**Moreno-Castro**; **Lopera-Pareja**, 2016; **Cano-Orón**, 2016; **Cano-Orón**; **Mendoza-Poudereux**; **Moreno-Castro**, 2018). However, the impact of these searches when setting up the opinion is key.

From the data obtained here, many more questions arise that should be addressed in future research. For example, it would be interesting to determine how the public opinion cycle works:

- Are the media the ones that set the *Google* agenda?
- Is the type of regulation that exists in each country the symptom or precursor of public opinion?
- Are the users the ones that determine the *Google* agenda when falling into the confirmation bias?

And in addition to all these questions that could be of a general nature and widely studied by communication and public opinion theorists, it would be interesting to analyze them in a socially controversial topic such as homeopathy, since it is an unknown whether it would follow the same pattern of influences and interactions that the rest of the issues or other factors at stake.

6. Notes

1. To learn more about the *Google Ads* regulation in relation to health care and drugs:
https://support.google.com/adspolicy/answer/176031?hl=es

2. Free web application developed by researchers at the *University of Amsterdam* within the framework of the *Digital Methods Initiative*:
https://tools.digitalmethods.net/beta/scrapeGoogle

3. Bid values fluctuate according to competition. The minimum value refers to the minimum cost that the person responsible will assume for every thousand visible impressions (vCPM) or click (CPC) that your website has. The high interval marks the maximum price of the bid, in relation to the competitors participating in the auction.

4. According to the *World Bank*, 2017:

- United States: $ 59,531.7
- United Kingdom: $ 39,720.4
- France: $ 38,476.7
- Spain: $ 28,156.8
- Mexico: $ 8,902.8

https://data.worldbank.org/indicator/ny.gdp.pcap.cd

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