Analysis of networks of academic output on television programming

Análisis de redes sociales de la producción científica sobre programación televisiva

Análise de redes sociais de produção científica em programação televisiva

Alicia Moreno-Delgado
Doctoral Researcher
(Universidad Internacional de La Rioja, UNIR)
https://orcid.org/0000-0002-3425-061X
Spain

Dr. Rafael Repiso
Associate Professor
(Universidad Internacional de La Rioja, UNIR)
https://orcid.org/0000-0002-2803-7505
Spain

Dr. Julio Montero-Díaz
Full Professor
(Universidad Internacional de La Rioja, UNIR)
https://orcid.org/0000-0002-4145-7424
Spain

Abstract

We analyse WoS-indexed academic output on television programming. We perform a diachronic analysis that examines the evolution of the terms used in each stage and the clustering of those terms, to offer an initial picture of the concerns of academic researchers about television programming and its effects. We focus on the networks identified in academic papers. We set the following objectives: determining the areas of knowledge where papers are published on television programming; identifying the most important literature; identifying the predominant themes. We used an original methodology, based on a set of data from the Web of Science (WoS) and, using a snowball data collection technique, we recorded the most significant papers, including those from outside the WoS. We used two types of content analysis, with a significant automated element: bibliometric analysis and social network analysis of scientific literature, based on the records of the WoS Core Collection. *The results show that the areas of Communication and Film, Radio and Television make up over 50 percent of all scientific output. Furthermore, we found that the most significant article belongs to the area of Communication, while the documents with the second and third highest numbers of citations were publications from the field of Medicine. As regards the subject matter, there are two areas: the first provides a direct analysis of television programming: history and evolution, competition, content and advertising; the second focuses on analysing the impact of programming on other aspects: obesity, violence, racism and stereotypes.*

Key Words: *Programming; Television; Television programming; Scientific output; Bibliometrics; Social network*

Resumen

Se analiza la producción académica indexada en WoS sobre la programación televisiva. Se lleva a cabo un análisis diacrónico que estudia la evolución de los términos empleados en cada etapa y su clusterización para ofrecer una primera base de las preocupaciones de los investigadores académicos sobre la programación televisiva y sus efectos. Se atiende a las redes identificadas entre los trabajos académicos. Los objetivos planteados son: determinar las áreas de conocimiento donde se

publican los trabajos sobre Programación de Televisión; identificar los documentos más relevantes; identificar los temas predominantes. Se utiliza una metodología original partiendo de un conjunto de datos de Web of Science (WoS) y, mediante una técnica de recopilación de bola de nieve, se registran los trabajos más significativos incluyendo aquellos externos a WoS. Se aplican dos tipos de análisis de contenido con un fuerte componente automatizado: Análisis Bibliométricos y Análisis de Redes Sociales a documentos científicos a partir los registros de WoS Core Collection. *Los resultados muestran cómo el área de Comunicación y el de Cine, Radio y Televisión conforman más del 50 por ciento del total de la producción científica. Además, se ha identificado que el artículo más relevante pertenece al área de Comunicación el segundo y tercer documento con más citas son publicaciones del ámbito de la Medicina. En cuanto a la temática, existen dos áreas: la primera estudia la programación televisiva de forma directa: historia y evolución, competencia, contenidos y publicidad; la segunda centrada en el análisis de la influencia de la programación en otras dimensiones: obesidad, violencia, racismo y estereotipos.*

Palabras clave: *Programación; Televisión; Programación televisiva; Producción científica; Bibliometría; Redes sociales*

Resumo

A produção acadêmica indexada na WoS na programação de televisão é analisada. É realizada uma análise diacrónica que estuda a evolução dos termos utilizados em cada etapa e o seu agrupamento para fornecer uma base inicial para as preocupações dos investigadores académicos sobre a programação televisiva e os seus efeitos. A atenção é dada às redes identificadas entre os trabalhos acadêmicos. Os objectivos são: determinar as áreas de conhecimento onde os trabalhos sobre Programação Televisiva são publicados; identificar os documentos mais relevantes; identificar os temas predominantes. Uma metodologia original é utilizada com base num conjunto de dados da Web of Science (WoS) e, através de uma técnica de recolha de bolas de neve, são registados os trabalhos mais significativos, incluindo aqueles externos à WoS. Dois tipos de análise de conteúdo com um forte componente automatizado são aplicados: Análise Bibliométrica e Análise de Redes Sociais a trabalhos científicos dos registros da Coleção WoS Core. Os resultados mostram como a área da Comunica-

ção e a do Cinema, Rádio e Televisão constituem mais de 50% do total da produção científica. Além disso, foi identificado que o artigo mais relevante pertence à área da Comunicação o segundo e terceiro documentos com mais citações são publicações na área da Medicina. Em relação ao tema, há duas áreas: a primeira estuda diretamente a programação televisiva: história e evolução, competição, conteúdo e publicidade; a segunda focaliza a análise da influência da programação em outras dimensões: obesidade, violência, racismo e estereótipos.

Palavras chave: *Programação; Televisão; Programação televisiva; Produção científica; Bibliometria; Redes sociais*

1. Introduction and literature review

The studies conducted on television programming are only one of the possible lines of research on this medium (Bignell, 2012; Brunsdon, 1998; Turner & Tay, 2009). However, programming is the essential element of television prior to the choice provided by on-demand television. Specifically, it constructs the ongoing conversation between each channel and its viewers (Williams, 1992; Corner, 1999; Fiske, 1987; in the case of Spain: Montero-Díaz, 2014; Montero-Díaz, 2018). It takes a closed, complete and coordinated offering to create the characteristic features of each channel's televisual *flow*, in both senses of the word: as a force that pulls the content in a specific direction and the very content of which it is composed (Williams, 1992). Consequently, an analysis of the academic output regarding television programming indicates that it is an essential element in this area and, somehow, it connects all studies on television. Therefore, using it as a key reference point for this analysis was not an arbitrary decision.

To the contrary, disregarding programming in television studies would reduce it to a purely technical element: a medium-sized screen, fixed, which you can enjoy at home, without making modifications to the architectural structure. In short, just another appliance that is undoubtedly useful: a terminal for the immediate consumption of diverse audiovisual products that are requested on-demand from the warehouse where they are stored and are served immediately. It is no surprise that *Amazon* is in its element in this business. Precisely one of the elements that

distinguish audiovisual product platforms from television channels (no matter how thematic and specialised they may be) is the programming of content, distributed in a precise order, on a broadcast schedule. Without programming there can be no television, at least in the way we have understood it since its creation.

Here, we analyse academic studies on television programming. Consequently, in a sense, this article can be considered a snapshot of the current state of television programming. It actually goes further than that. Because it is not our intention to report on the academic models followed to analyse this area (television programming) or on the resources that professionals use to make decisions and then justify them. In this article we analyse the relationships between the contributions made in this field in the body of publications that are discussed. Furthermore, each part of this analysis follows a diachronic approach: among other things, this allows us to reveal the clusters of terms and concepts that comprise the scientific output in this field, since its conception and over time. This is a key aspect because the terms used by researchers to designate areas of interest and the other concepts with which they are associated (clusters) offer a perspective that can give us an insight into the significance of the way it has evolved and the direction of academic research. Put plainly: assessing whether it is ahead of or behind the possibilities of television programming in this case. Undoubtedly, this analysis only provides an academic research perspective and considers its "concerns" about the current situation of television programming and its effects.

And this analysis takes a two-circle approach. The first, which is immediate, focuses on the articles published in the *Web of Science's Core Collection (WoS)* on this topic. Naturally, it does not cover all of the academic contributions to this subject matter, but there is no doubt that it includes a highly significant body of work, since *Web of Science's* aim is to index the main scientific sources across the world (Repiso, Ahedo, & Montero, 2018). We address the following basic subjects on the basis of this data set: articles and authors with the highest number of citations, journals that have accepted the most studies, etc. They show how television –programming in some aspects- serves as a laboratory for the social reality for other areas of knowledge, in particular in relation to health. They also illustrate the prominence given to this medium in other disciplines that focus on social studies.

It is striking that there has been a huge rise in studies on television programming in fields as extraneous as those of analysts of food and eating disorders and psychologists. In this sense, Stice & Shaw (1994) link the pressure placed on women by the media to achieve a perfect body with stress, depression and symptoms of bulimia. Additionally, Mulligan, Altmann et al. (2011) claim that the media clearly plays an important role in the current child and adolescent obesity epidemic. Paradoxically, these studies state that television broadcasts are mimicking society, thus seemingly confirming what has been said for years in the field of communication: the model of reality offered by television is itself, its broadcasts. The media is not the only area affected by the field of television programming, it is also present in other subject areas. In this regard, we could talk - and not only in a metaphorical sense - of television programming as a form of *agenda setting* for everyday life, so prevalent as it seems to be concealed precisely in its "own normality".

The second analysis data set covered in academic output has a far wider scope: from the contributions in the *WoS*, we have obtained the scientific literature in which it is cited (regardless of whether it is included in it) and with a far broader body of work we have been able to approach the term correlation analysis in a more assured (although not exhaustive) manner, to identify the subject correlations. Firstly, in general terms, in relation to the entire output included; then, according to chronological sections, to assess the evolution and diachronic aspects of the analysis: ultimately, the main areas of focus regarding television programming on the television and its social, cultural, political, thematic, general, etc. implications.

From an analysis of this second body of works we found that the cycle of academic studies on television programming is in decline, opening up the possibility of this being reduced to an analysis of its history. It would not represent an immediate end of an era (as occurred in research on pharaonic Egyptology), but it would be a notable decline that could end in practically no further entries in the *WoS*, with all of the trend implications that this would entail.

The decade-on-decade evolution of academic output on television programming provides trend indicators that are worth summarising here. We have already men-

tioned the first of these: the fall in the number of studies on television programming. This correlates with the emergence and consolidation of a new kind of television: on-demand and pay television, versus traditional terrestrial and mainstream television, which can now be said to be in the process of fading out (a process that will be long and makes this form of television no less important today) and whose audiences will be limited to people with the lowest incomes (Turner & Tay, 2009). We will have to see how advertising can resolve this contradiction and what the result will be for free-to-air television. Perhaps it will be reduced to state-wide public service television. We will then have to see the role that entertainment plays in that public service with audiences who are used to entertainment that is often of a very low quality.

The other trend line that emerges from our chronologically-ordered word analysis, is the trend whereby television is considered a simple subject of research into communication, due to its growing influence on social, political and economic (advertising) aspects of our lives and its crucial role in defining standards in popular culture. The widespread recognition of this social importance of television (and its programming, because this is what is broadcast and watched by the viewers) is gradually leading to its not-so-positive role in propagating certain ills. Firstly, eating disorders (Stice, Schupak-Neuberg, et al. 1994) and the decline in physical activity among children and adolescents (Taras, Sallis, et al., 1989; Taras & Gage, 1995). Then, the spreading of harmful stereotypes of minorities: race (Mastro & Greenberg, 2000), immigration (Mastro & Behm-Morawitz, 2005) and gender (Rozario, Masilamani, et al., 2018). As a result, television programming has been viewed as socially damaging. It is significant that most of the studies that focus on these issues (although not all of them) were conducted by researchers from other fields: in particular Medicine, Psychology and Sociology.

2. Material and methods

This paper analyses the results of the research into television programming from a bibliometric perspective, although it is also reflects other considerations on this point. Specifically, we have applied social network analysis techniques to scientific literature. We set the following objectives:

1. Ascertaining the areas of knowledge where papers are published on television programming.

2. Identifying the most important literature on television programming for the researchers.

3. Identifying the predominant themes covered in research on television programming, following the diachronic approach.

This is essentially descriptive research, in which quantitative techniques are used. For the first two objectives, we identified the papers in the Web of Science Core Collection by performing an initial search with the following keywords: *TV programming, Broadcast Schedule, TV guide* and *Broadcast programming*. 345 records were identified. We then analysed those records using *Excel* and *VOSviewer*. This enabled us to prepare a bibliographic description, in which we identified: the authors, most widely-cited papers and journals, and the areas and countries of output. This paper includes literature from outside the *WoS*: they were compiled on a database in RIS format.

After completing this initial search, to achieve our third objective, we analysed the literature cited in the documents that we had obtained, followed by the literature cited from this second group of documents in a "snowball" strategy. When new references stopped appearing due to saturation, we ended the process. We identified a total of 733 documents, which were analysed.

All of the information obtained was stored and organised using *Excel* and *Mendeley* and, subsequently, an RIS file was created which could be used by the *VOSviewer* program (van Eck & Waltman, 2010). We also used *Pajek*, *software* that analyses co-word networks (Batagelj, 2008). To perform the social network analysis of co-words in titles and abstracts, all of the titles and abstracts of the literature that was in other languages were translated into English. The *Deepl* program was used for this task.

When analysing the networks, we took into account the terms used in the title, the abstract and the keywords of the literature in question. The papers were also grouped into decades, across the whole time frame covered. The following stages were established: 1. records published up to 1970 (with 24 documents); 2. 1970-1980 (with 47 documents); 3. 1980-1990 (46 documents); 4. 1990-2000 (97 documents); 5. 2000-2010 (116 documents); 6. 2010-2018 (58 documents). As can be seen, there is an overlap between the years ending in a zero in each period. This ensures that the terms used in the documents from those years continue across two periods. Social network was represented using the *Kamada–Kawai algorithm* (Kamada & Kawai, 1988) and the groups of words are represented by the *Louvain clustering algorithm* (Blondel, Guillaume, Lambiotte, & Lefebvre, 2008). All of the above can be seen in Table 1, which summarises the methodology used to achieve the objectives that were set.

OBJECTIVES	DATA COLLECTION	DATA ANALYSIS TOOLS
Bibliographic description: Identifying the most widely-cited papers Most widely-cited authors Most widely-cited journals Areas of output Countries of output	Web of Science Core Collection	Excel VOSviewer
Social networks Co-word networks Time distribution	Web of Science Core Collection Cited literature	Mendeley VOSviewer Pajek

**Table 1:** : *Methodology used in the study to achieve the set objectives.*
Source: Compiled by author.

Therefore, this study uses two data sets. One is composed of 345 documents for the bibliographic description (*WoS Core Collection*). Then, the second data set of 733 documents, which is used to analyse the networks (*WoS Core Collection* + cited documents). All data was obtained between October and November 2018.

3. Results

The first objective of this paper is to produce a bibliographic description of the articles that cover television programming. If the distribution of the 345 documents from the *WoS* is analysed by area, we can see that the categories of Communication and Film, Radio and Television accounted for most of the academic output on television programming. In fact, they make up over 50 percent of the total (Graph 1).
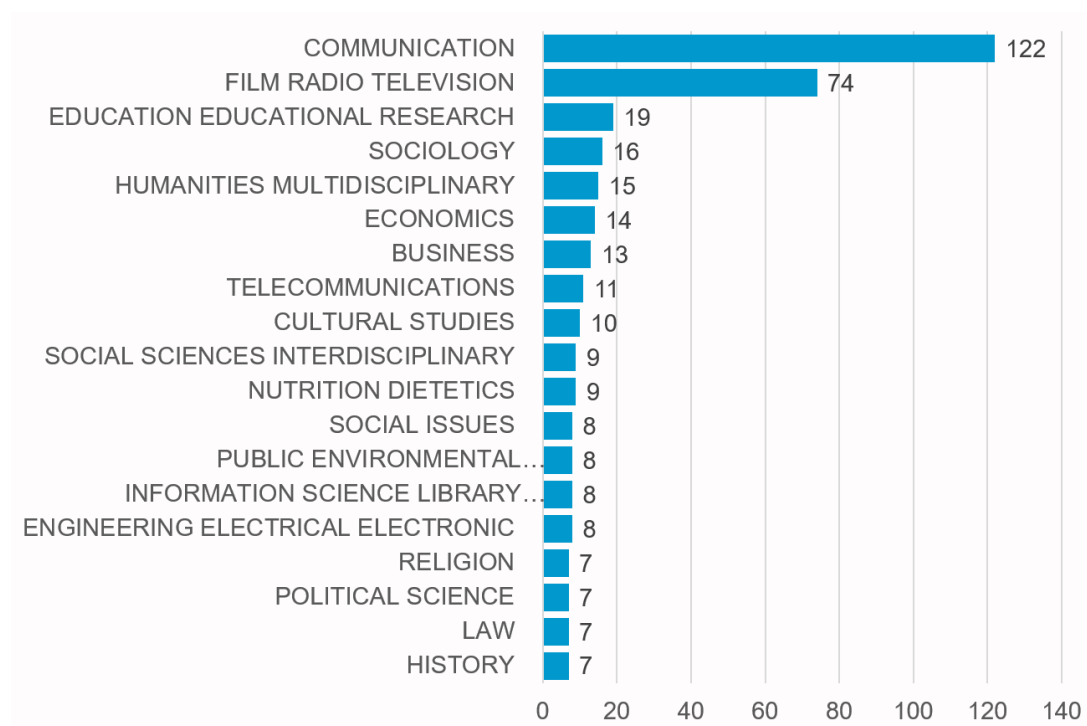
Graph 1: *Distribution of papers by area. Bear in mind that the total number of papers by area is higher than the total number of papers as there are documents that belong to more than one category of the WoS.*
Source: Compiled by author.

Regarding the journals that publish these papers, we identified 11 publications with more than 5 articles: *Journal of Broadcasting & Electronic Media* has the highest output, with 18 documents published. This is followed by *Journal of Communication* with 10 documents (Graph 2).
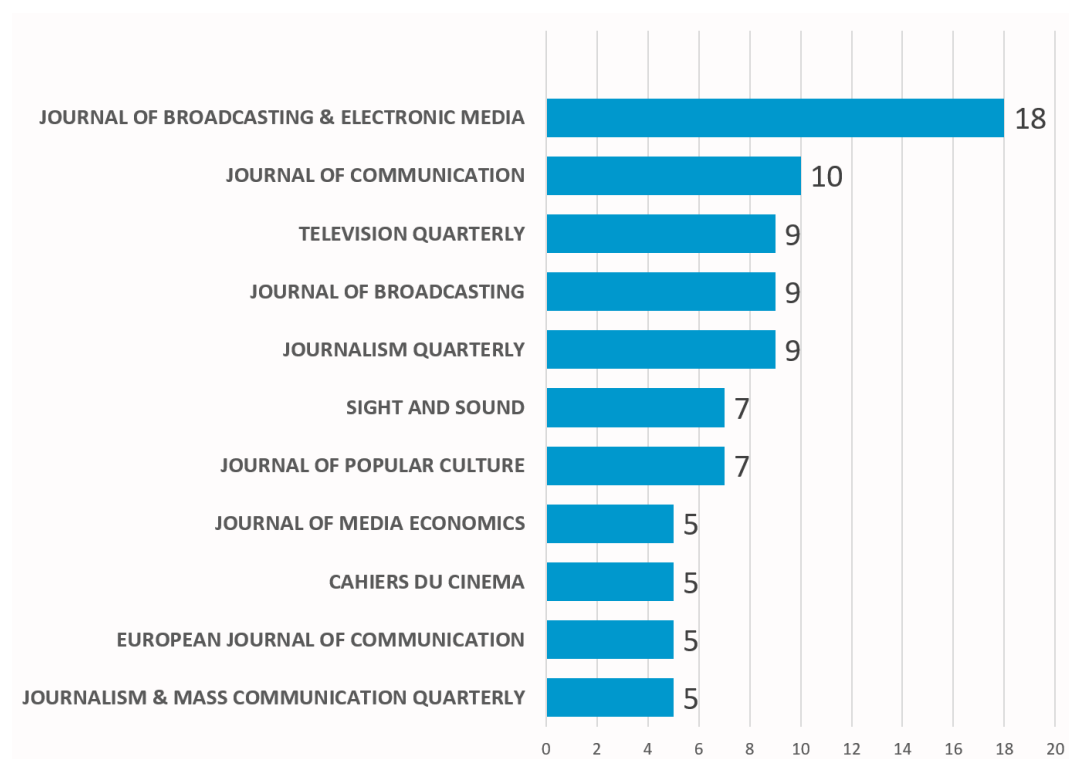
Graph 2: *Most productive journals (more than 5 articles).*
Source: Compiled by author.

Both of these figures (predominant subject matters and areas of knowledge of the journals that publish the most *papers*) are useful. But so is the wide variety of themes associated with other subject matters that are seemingly so far removed from television programming: Environment, Cultural Studies, Nutrition; Social Trends; Religion; Political Science; History… And all of this begs the question, what interest does television programming hold for those fields?

Moreover, an analysis of the documents by country (Graph 3) shows how Spain, with 14 publications, is in third place, behind the USA with 170 papers and Canada, which has a total of 15 documents. The *WoS's* Anglo-Saxon bias and the importance of television in the United States make these figures understandable and helps us to appraise the situation regarding Spain's output, which is at a similar level to that of Great Britain and Canada.
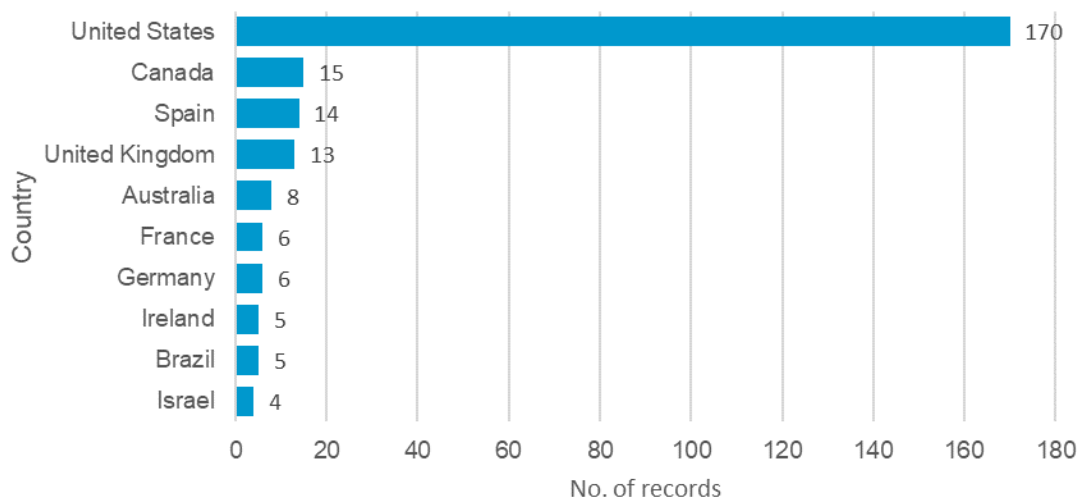
Graph 3: *Distribution of papers by country.*
Source: Compiled by author.

On analysing the literature we found on television programming by each decade, as can be observed in Graph 4, that the papers are distributed as follows: scientific output shows a rising trend up until the 2000-2010 decade but has been in decline in recent years.
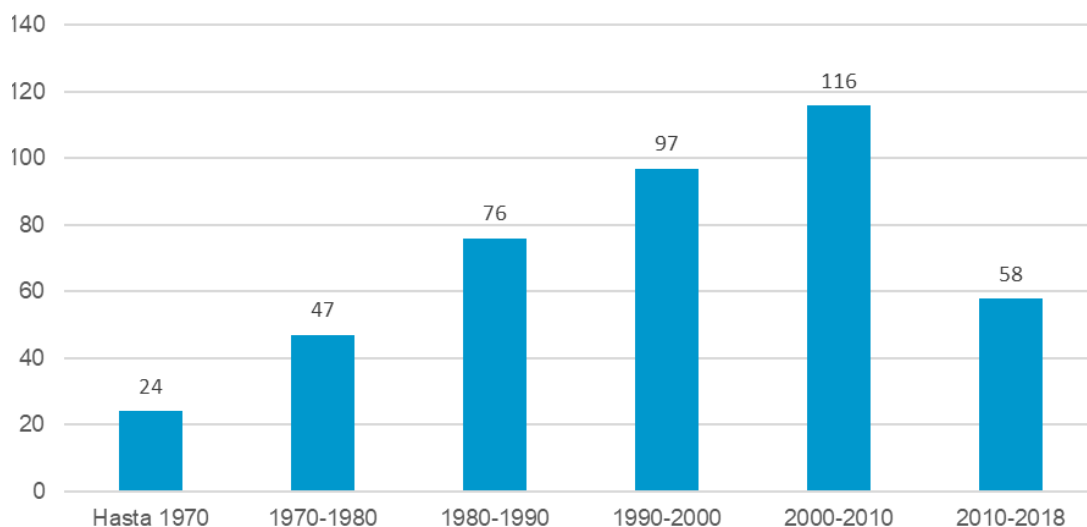
Graph 4: *Scientific output trends by decade.*
Source: Compiled by author.

The most important authors and literature were identified by the researchers (second objective of this paper) through an author co-citation network analysis. In other words, how they cite each other in papers on television programming. There are six groups, centred around six authors, which stand out markedly from the rest (Graph 5). It should be noted that, of these six authors, only two belong to the field of Communication. The other four are from Psychology and Medicine. The top ranking authors most frequently cited are Thomas N. Robinson, who can be identified in the red cluster, with 81 citations; Eric Stice (blue cluster) and Albert Bandura (yellow cluster) with 114 citations; M. E. Goldberg (turquoise cluster) with 40 citations; Dale Kunkel (purple cluster) cited 62 times; and Annie Lang (green cluster) whose papers in this area have received a total of 58 citations.
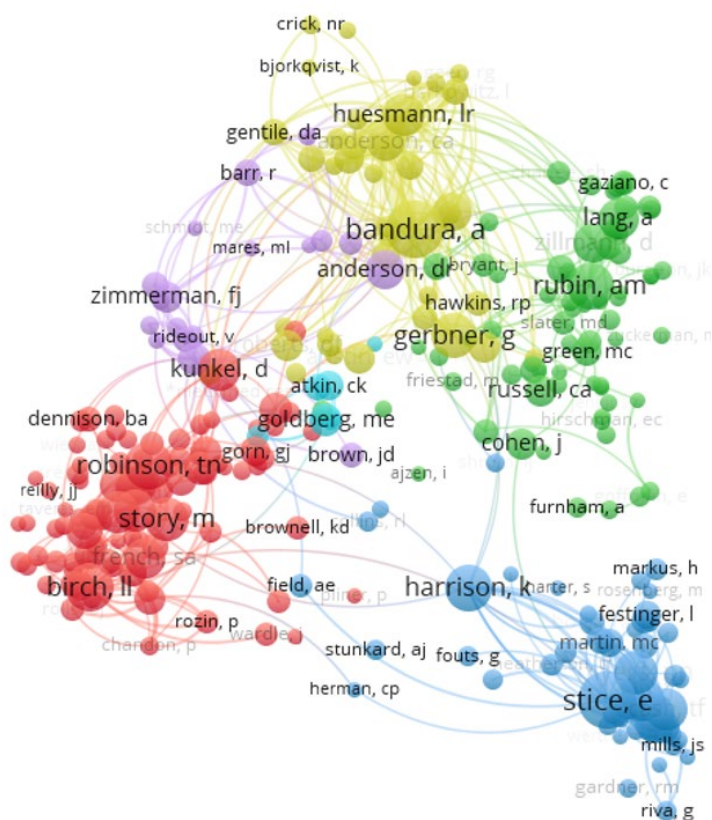
Graph 5: *Red de autores co-citados.*
*Fuente: Elaboración propia.*

In terms of the most cited papers (Table 2), first place is occupied by *The elastic body image: The effect of television advertising and programming on body image distortions in young women*. This was published in a journal in the field of Communication. However, the second and third most cited papers are from the area of Medicine.

Papers	Number of citations
Myers Jr, P. N., & Biocca, F. A. (1992). The elastic body image: The effect of television advertising and programming on body image distortions in young women. *Journal of communication, 42*(3), 108-133.	66
Kotz, K., & Story, M. (1994). Food advertisements during children's Saturday morning television programming: are they consistent with dietary recommendations? Journal of the American Dietetic Association, 94(11), 1296-1300.	63
Taras, H. L., Sallis, J. F., Patterson, T. L., Nader, P. R., & Nelson, J. A. (1989). Television's influence on children's diet and physical activity. *Journal of Developmental and Behavioral Pediatrics.*	30

Table 2: *Most cited articles on television programming in research on this subject. Source: Compiled by author.*

From a bibliometric perspective, those figures illustrate the greater capacity of health areas to generate citations over social sciences in general and communication in particular.

On performing a co-word network analysis to determine the focal points of research conducted on television programming, based on the title and abstract of each paper, we found 9 distinguishable groups (Graph 6), pointing to clear clustering.
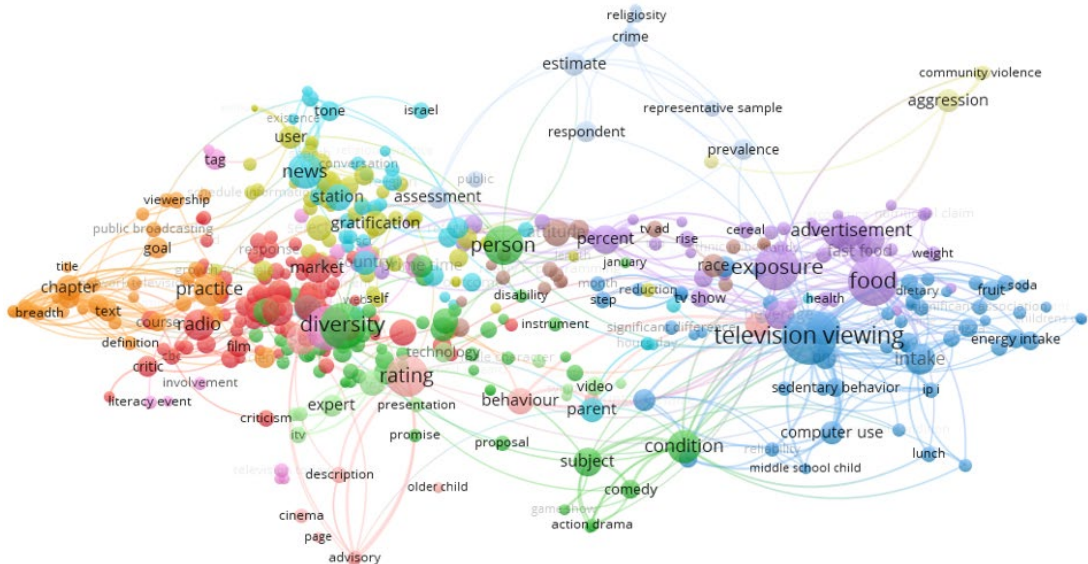
Graph 6: *: Co-word network for papers on television programming.*
Source: Compiled by author..

History and *Competition* are the most important terms in the red cluster. This group is predominantly centred around historical aspects of programming, in which competition is the focus of many of the themes in research on television programming. *Diversity* and *Person* are prominent in the green cluster. This is also clear: diversity and, therefore, centred on the term 'person', a way of referring to that unique being and the interest that this set of terms usually arouses in programmers. In blue, *Television viewing* is the most prominent concept. There is no doubt that television viewing is a subject of interest in research on programming. *Gratification, Channel repertoire, User* and *Consumer* appear as the most important words in the yellow cluster. The terms that link use with consumption, together with the repertoire of programmes on each channel, also forming a set of terms that help us to understand that these types of papers are all interlinked. In the group that is identified as purple *Food, Exposure* and *Advertisement* are the most widely used words. This group of terms, centred around advertising, food and exposure to programming, is also consistent: indeed, it illustrates one of the predominant concerns regard-

ing the (negative) effects of television. *News, Station*, *Tone* and *Country* are most widely used in the turquoise cluster. There is also logic to the interrelationships shown between these terms: in the United States (the country with more than half of the publications analysed), television information is closely linked to local broadcast stations, which in turn forms clear links between tone and territory. The most representative associations in the orange cluster are *Practice*, *Chapter* and *Collection*. While it used to be the news, it is now television fiction that links together the most widely cited terms. *Attitude*, *Race* and *Aggression* stand out in the brown group. Here we return to some of the effects of television programming on society: attitude, race and aggression bring discrimination to the fore. Finally, the cluster in which *TV Guide* is the most important term tells us about one of the sources most frequently used by academics in their research.

The third objective is to identify the subjects that have been discussed in research into television programming throughout history. The decade-by-decade co-word network analysis shows us the most widely used terms and the relationships between them. The first thing we note is the continuous increase in the number of documents (until the decade starting in 2010, and that is yet to end) and also the intensity and complexity of the citation networks. The co-word networks also show us the terms that only appeared in a given decade or whose use in titles or keywords was far more prevalent than in the other periods analysed.

Up until 1970, (Graph 7) we observe a network with a low number of relationships. Lower than in subsequent decades. We detected 5 groups in which the different subject matters of the years analysed are observed. Thus, words such as *television program type* and *audience* are prominent in the red cluster; *effect* and *interest* stand out in the group of blue terms; in the green cluster, where the balls representing the words are similar in size, terms such as *violence*, *danger* and *respect* are identified, among others; in the pink group, the smallest of them all, *medium* and *model* are prominent; and finally, in the yellow cluster we have *programming, area* and *university*.

PERIOD	MOST COMMON TERMS		UNIQUE TERMS	
Hasta 1970	Child television effect time interest broadcasting data year group book	example family impact programming program model viewer audience amount area	broadcasting group area life england initiative television program type university selection loss mass medium personality researcher	tv set adult viewer advent frequent attendee main survey movie nation phd phd dissertation sunday school television newscaster thesis

Graph 7: *Co-word network based on papers published before 1970
and relationship between terms present in the network.
Source: Compiled by author.*

In the seventies, we observe that increase in relationships and terms and there are 4 different groups with prominent words (Graph 8). Red group: *model, show*. Blue group, the smallest, composed of seven concepts: *comedy, condition*. Green group, with a higher number of terms, but many of them with few connections: *broadcasting, station, economic*. Yellow group: *CBC, paper, radio*.

The citation network is still insubstantial and its strength lies in the most general terms: *Medium, Model, Interest, Effect*. The relationships between the others are faint in comparison.

PERIOD	MOST COMMON TERMS		UNIQUE TERMS	
1970-1980	program	broadcasting	station	attitude
	television	cbc	cbc	catv
	percent	condition	economic	criticism
	study	show	viewership	degree
	rating	model	selection	detail
	effect	characteristic	action drama	examination
	station	comedy	application	guide magazine
	data	economic	choice model	individual
	network	paper	corporation	kind
	time	strategy	program complexity	preference data
			public affair	program content
			comedy	

Graph 8: Co-word network based on papers published between 1970 and 1980 and relationship between terms present in the network.
Source: Compiled by author.

In the years between 1980 and 1990, we can observe a clear increase in concepts and the network has become more complex (Graph 9), resulting in a higher number of clusters. 12 groups have been considered. The smallest of these is composed of 3 words (in grey), while the largest has 26 (in yellow). Of all of the words *pattern, child, programme, time, behavior and tv guide* stand out.

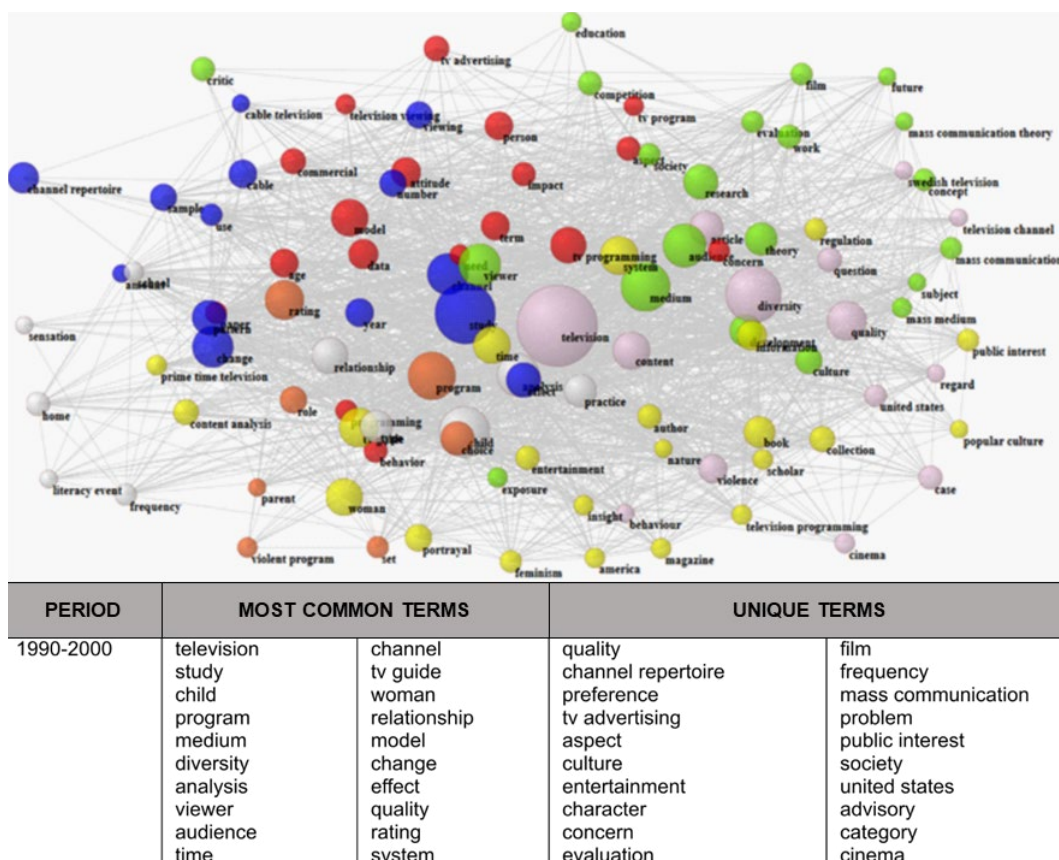| PERIOD	MOST COMMON TERMS		UNIQUE TERMS	
1980-1990	program	analysis	chapter	sample
	television	programming	gratification	television today
	study	factor	motivation	text
	pattern	medium	obesity	vcr
	time	type	system	view
	child	rating	association	zapper
	network	viewer	edition	audience behavior
	audience	behavior	inheritance effect	award
	channel	model	impact	breadth
	programme	tv guide	number	broadcast cable programming
			boy	cable
			concept	coverage
			interaction	data processor
			practice	episode

Graph 9: Co-word network based on papers published between 1980 and
1990 and relationship between terms present in the network.
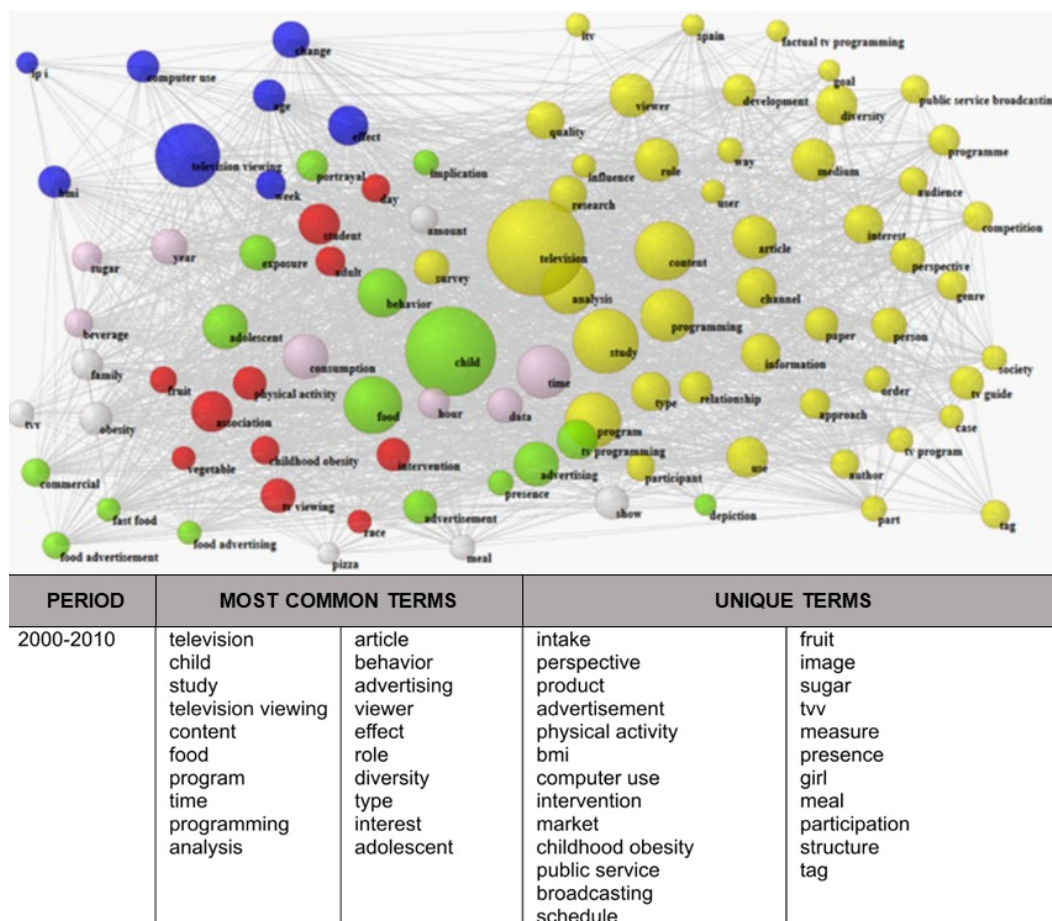*Source: Compiled by author.*

The analysis of the co-word network between 1990 and 2000 (Graph 10), shows 7 different groups. The relationships between the terms have increased and television stands out notably from the rest. *Study* and *diversity, child* and *program* appear after that.

PERIOD	MOST COMMON TERMS		UNIQUE TERMS	
1990-2000	television	channel	quality	film
	study	tv guide	channel repertoire	frequency
	child	woman	preference	mass communication
	program	relationship	tv advertising	problem
	medium	model	aspect	public interest
	diversity	change	culture	society
	analysis	effect	entertainment	united states
	viewer	quality	character	advisory
	audience	rating	concern	category
	time	system	evaluation	cinema

Graph 10: *Co-word network based on papers published between 1990 and 2000 and relationship between terms present in the network.*
Source: Compiled by author.

The last full decade to be studied, 2000-2010, has the highest number of papers on television programming. This is reflected in the network analysis, where the relationships are more complex than in the other periods: highest number of papers, highest number of words, highest number of connections (Graph 11). In this network, composed of 5 groups, the most prominent terms are: *television*, *child*, *study*, *television viewing*, *content* and *food*.

PERIOD	MOST COMMON TERMS		UNIQUE TERMS	
2000-2010	television	article	intake	fruit
	child	behavior	perspective	image
	study	advertising	product	sugar
	television viewing	viewer	advertisement	tvv
	content	effect	physical activity	measure
	food	role	bmi	presence
	program	diversity	computer use	girl
	time	type	intervention	meal
	programming	interest	market	participation
	analysis	adolescent	childhood obesity	structure
			public service	tag
			broadcasting	
			schedule	

Graph 11: *Co-word network based on papers published between 2000 and 2010 and relationship between terms present in the network.*
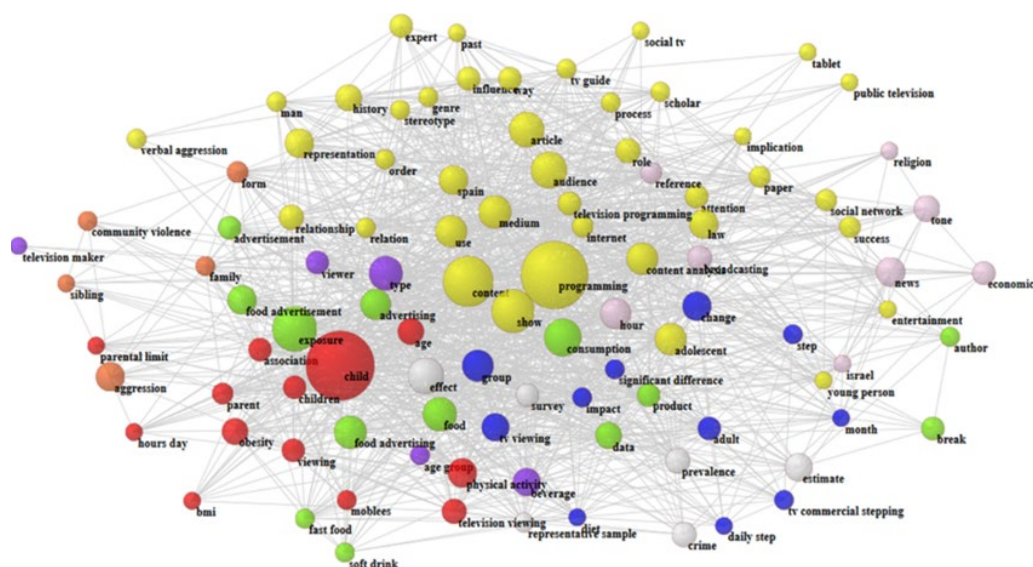*Source: Compiled by author.*

Finally, between 2010 and 2018, for the first time, there are fewer documents than in the previous decade (Graph 12). Although it is true that fewer years are included, there is a clear downward trend.

PERIOD	MOST COMMON TERMS		UNIQUE TERMS	
2010-2018	child	analysis	aggression	conversation
	study	article	tone	economy
	tv programming	program	estimate	level
	television	effect	trend	man
	exposure	type	economic news	moblees
	content	behavior	law	representative sample
	programming	medium	crime	significant difference
	time	consumption	reference	step
	research	adolescent	social network	transformation
	audience	year	age group	tv commercial stepping
			alternative	verbal aggression
			community violence	

Graph 12: *Co-word network based on papers published between 2010 and 2018 and relationship between terms present in the network.*
Source: Compiled by author.

In general terms, the relative loss of importance of this medium has led to a decline in the co-word network generated, which has also become simpler again. 8 groups are observed, with a repeat of the most important terms identified between 2000 and 2010: *Child*, *Study*, *Television*.

4. Conclusions and Discussion

After analysing the scientific output on television programming, this study has reached the following conclusions:

From a bibliometric perspective, we identified 19 fields of research (with at least 7 records) in which works have been published on television programming. Of those, more than 50 percent of all records are found in the categories of *Communication* and *Film, Radio and Television*, so they are the most important areas with regard to publications on television programming (Graph 1). This is logical. Television programming is covered first and foremost in the field of Communication. It is also logical that this is a matter of interest in the field of Film, Radio and Television. There is also some logic to television holding an interest for Education, Sociology, Humanities, etc. The importance of television programming (so closely linked to its broadcasts and the most visually apparent aspects of television) is especially notable.

The same logical pattern is evident from the analysis of publications containing the highest number of contributions regarding television programming: the first relates to Television and the one in second place is about Communication (Graph 2). The following positions with significant numbers follow the same trend: a certain prominence of publications related to Television and Communication. These are followed by others that are more incidental, but always within studies on Image or Communication.

The most prominent papers identified, presented in Table 2, were as follows: Myers & Biocca (1992) cited in the selected papers 66 times; Kotz y Story (1994) with 63 citations; and Taras, Sallis, et al. (1989) which has received 30 citations. The first paper was published in a journal in the field of Communication, while the other two records fall within the area of Medicine.

There is also a concurrent consideration that is of interest: these studies conducted by specialists from areas unrelated to research on television programming focus on it because of its influence on the social and cultural lives of their countries. Specifically, the effects it (television programming) has on eating habits. Therefore, this represents a recognition of its importance. Furthermore, in papers of this kind, television is perceived as a social laboratory, ultimately recognising that there is a connection between the medium and the social reality, which is not so clear among academics in the field of Communication. It is true that this substantive identification of the relationship between the represented reality and actual reality is limited to specific fields and is not widespread, but it is worth highlighting.

Furthermore, the analysis of the author co-citation network, i.e. the way in which the authors in this field cite one another, has enabled us to identify the top-ranked authors (Graph 5). In this regard, Thomas N. Robinson, with 81 citations; Eric Stice and Albert Bandura, each with 114 citations; M. E. Goldberg with 40 citations; Dale Kunkel cited 62 times; and Annie Lang with a total of 58 citations are the most prominent researchers on television programming. It should be noted that the authors from fields other than Communication and Film, Radio and Television are cited by peers from their respective areas, where the number of publications is significantly higher than in the former. This means that, although they obtain more citations, they have little influence among students of television programming and, therefore, their greater prevalence in literature is not a recognition of their intellectual authority among those who develop analyses of television programming in the fields of Communication and Film, Radio and Television. This confirms the above point, because these fields have far more journals than their counterparts in Communication and Film, Radio and Television. Therefore, it is no surprise that they are in the top positions.

Moreover, regarding the matter of the countries from which the published research originates, most of it was conducted in the United States, with 170 papers. Spain is in third place, with a far lower figure than above, with 14 publications, and this is followed by Canada, with a total of 15 papers (Graph 3). In fact, it could be said that the output is overwhelmingly higher in the United States and that there is a group of three countries (Canada, Spain and the United Kingdom) with very similar numbers that are far above all others, but this is also a reflection of two phenomena: the importance and democratisation of television in those countries, their scientific research on it and, something that is also important, the Anglo-Saxon nature of the product used, the Web of Science.

It is worth highlighting that Spanish scientific output in this area is substantial and higher than in countries such as France and Germany. The significance of these figures becomes clearer if we consider that the academic output published in the *WoS* is usually viewed as having the greatest international prominence.

On analysing the literature on television programming by each decade, as can be observed in Graph 4, the distribution of papers shows an upward trend up until the decade 2000-2010. Since then, output has fallen. This begs the question as to why tel-

evision research has started to take a back seat among the subject matters of interest to academics. The decline in academic studies on television over the last decade (in this case we are specifically addressing television programming, covering an essential element of traditional television, not on-demand offerings) can be linked to at least two phenomena. The first, which are studies on the innovative aspects of the Internet and social media is a more appealing area for new generations of researchers. This would be linked to the fact that research into social media attracts younger researchers, who can dispense with any preliminary or background studies, as required by research on television. In addition to this, they are better prepared for the quantitative analyses and data mining required by analyses of social media and the Internet (Hayama, 2018). This is without considering how television itself can be viewed as being more web-integrated than an independent medium (Bondad-Brown, Rice, & Pearce, 2012).

On the other hand, studies on co-word networks have made it possible to identify the topics covered in research into television programming throughout history, in what appears to be a full cycle that is coming to a close. In this regard, we have divided studies on television programming into two large blocks. Firstly, we have identified a general area devoted to directly studying television programming. Thus, it covers the following aspects: Evolution (Wakshlag & Adams, 1985); History (Dow, 1996); Competition (Savage & Wirth, 2005); Comedy content, news (Buckalew, 1969), series, films and programmes; and Advertising (Gabszewicz, Laussel et al., 2004). Secondly, we have identified another block which could be called alternative. In this case, the (almost always negative) influence of television programming is studied, in relation to the following aspects: Obesity, mainly child obesity (Landhuis, Poulton et al., 2008); Violence (Wilson et al., 2002); Racism (Orbe, 2008); and Stereotypes (Espinar Ruiz, 2006).

In this sense, Graph 6 shows how *History* and *Competition* are the most important terms in the red cluster. This relates to a certain predominance of studies on the history of television or its diachronic contextualisation. *Diversity* and *Person* are prominent in the second, green cluster, which is probably related to the diverse effects of the medium. The most prominent concept in the third, blue cluster is *Television viewing*, the act of watching the television. The analysis of this is another of the main subjects of academic studies on television. *Gratification*, *Channel repertoire*, *User* and *Consumer*

appear as the most important words in the yellow cluster. Television consumption and the reasons for and consequences of it are the general underlying themes. In the fifth group that is identified as purple, *Food*, *Exposure* and *Advertisement* are the most widely used words. They focus on advertising and its effects, with an area that examines them from a specific medical and psychological perspective: its effects on the human diet and its problems. Sixthly, the turquoise blue cluster centres around the terms: *News*, *Station*, *Tone* and *Country*. News: an essential element of television programming and its relationship with the specific organisation of channels, stations and territories in the United States. *Practice*, *Chapter* and *Collection* are the predominant words in the eighth, orange cluster. In the ninth cluster; which is brown, there are *Attitude*, *Race* and *Aggression*. These refer to studies that focus on the relationship between television and racial issues and their effects.

Finally, the decade-by-decade co-word network analysis has allowed us to identify the common terms and relationships and those exclusive to each period or which appear to a substantial degree in a given period and only incidentally in the rest. Our interest in this focuses on the links between concepts and the subject matters that have most interested researchers, whether on a continual basis (over the course of several periods), or more specifically for each decade. Of course, each of these only serves as a guide; but this initial step should make it easier to track the topics examined in the increasingly necessary history of television programming and, secondarily, the history of television itself and its relationship with society. The similarity or contrast between what academics considered to be essential in each period and the history of television or the specialised press or reports from each period, is also useful for determining the degree to which high-level research successfully identified the true key issues.

With regard to the relationships between the studies from each period, an analysis of the networks also shows the gradual formation of a group which, first and foremost, specialises in researching television programming and, secondarily, studies on television in general. It also allows us to examine the formation of citation clusters which, indirectly, reveal the centrality of some authors, even making it possible to establish the existence of "schools" of researchers. The data provided here will make it easier to take this second step in the analysis of scientific output in this field.

In the records up to 1970 (Graph 7), the university-based references (the area in which early research was conducted into what could be considered the beginnings of a new medium) are manifested in the use of such exclusively academic terms as *thesis, phd* and *phd dissertation*, which disappear in subsequent chronological periods.

Among the exclusive terms from the 1970-80 period (Graph 8), there are some that relate directly to aspects of television programming and the academic analysis thereof in general: *selection, choice model, program complexity, examination, guide magazine, preference data* and *program content*. Others are of interest because they relate to television programmes, genres or formats - or at least the names thereof - that failed to catch on. They represent a stage in the writing of a true academic paper: giving a name to the new realities offered by the medium by putting it on the air.

There is a very large number of new or exclusive terms from the 1980-1990 period (Graph 9). In fact, this is also the decade in which the number of publications increased significantly from the previous decade (rising from 47 to 76, a 40% increase). By that time, the number of terms becoming firmly established had also grown. Generally, these are indicators of a gradual maturity of the subject field being analysed, insofar as academic research is concerned.

In the years 1990-2000 (Graph 10), the set of most widely used terms that are common with other periods shows that the analyses of television programming are focusing increasingly on the viewers rather than the programming itself: *Child, Audience, Type, Rating, Viewer*, etc. Another group of these established terms presents the units of analysis: *Program, network, Channel, Medium*, with *Programming* remaining. Others relate to analytical tools, be they theoretical (*Model*), or sources of information (*TV Guide*).

The strength of the relationships in the 2000-2010 period (Graph 11) indicates that television programming has become a well-established field of research within studies on television. For the first time, *Article* appears among the most widely repeated terms and then subsequently returns. This is an indirect indicator of this consolidation: references to the previous body of research, usually in the form of articles in academic journals. Then, on a secondary basis, we can also infer that this offers a clue as to the interest in the consolidation of the scientific area of studies on television. This comes as

no surprise, because in the field of television this decade could be considered the time when it reached its zenith, the golden age of mainstream television and, consequently, the period when programming was at its most important in the battle for viewers.

As regards consolidated words, generally speaking, the considerations outlined in the previous point are valid. If we also consider the most frequent terms, the potential audiences continue to be prominent: *Child, television Viewing, Adolescent*. In this case, the new terms included in studies on television programming all point in the same direction. If this is matched against the frequency of problems (*Physical Activity, Childhood Obesity, Sugar, Meal*), the importance of advertising (*Product, Advertisement, Market*) and aspects related to intervention to prevent social ills (*Public Service, Intervention*), it reveals a scenario that signals the proven recognition of the influence of television (of its programmes broadcast) on western societies.

The dangers of uncontrolled television viewing by groups with a lower resilience (children and adolescents) and the major social problems that this brings are highlighted in studies, normally outside the field of Communication, but also in this area. Television seems to be viewed by the scrutinising eyes of academia as a form of cheap entertainment that is available to all, democratic, the best manifestation of popular culture and a potential (and actual) social danger.

For the years 2010-2018 (Graph 12), the first point that should be considered is: there is less academic interest in studies on television programming, at least in terms of high-level output. This is most evident in studies on television, because of all of the journals containing most of this output, there is only one (*Television Quarterly*) devoted entirely to this medium. Indeed, the journals with the greatest coverage of this subject are about communication in general (*Journal of Communication*) or are open to other media (for example, *Journal of Broadcasting and Electronic Media*). The others cover broader subject areas, of which television was a part when this was the dominant medium (for example, *Cultural Studies*). Therefore, paradoxically, the importance of television as a medium has spread beyond the usual channels of scientific publication (the numerous specific journals) and this has also exposed it further to a decline in the social importance of the medium under analysis compared to other, new media that are on the rise (in this case, social media and the Internet), although it remains highly important.

It should also be linked to a second factor, the rise of other media that also require specific analysis methodologies (especially quantitative analyses and data mining). The new generation of researchers in Communication are better able to focus on emerging media that are likely to be more prominent in the future than to analyse television programming, which is now only of interest for the more traditional area of television, which has less of a future: mainstream terrestrial television. The new forms of television are heading in the direction of on-demand content (where programming has almost no importance) and pay content (which reduces its wide social impact).

There is another factor which is of greater importance: television being deemed to be negative. While in the previous decade there were papers on the bad influence of television programming on social groups that were most vulnerable due to their age (children and adolescents), the new terms that are emerging further intensify this negativity: *Aggression, Crime, Community Violence, Verbal Aggression*.

Other conclusions relate to the rise and fall in the importance of academic studies on television programming due to two factors: the strictly academic factor due to the fall in output in *WoS* journals during the most recent period and the decline of mainstream terrestrial television caused by the evolution of television as a medium, due to the broad choice on on-demand and pay television and its decreasing importance given the prominence of social media and the Internet.

Acknowledgements

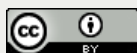# References

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