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The relationship between views and the evaluation of an ad. A structural analysis of unpaid advertising in YouTube

La relación entre el visionado y la evaluación del anuncio. Un análisis estructural de la publicidad no pagada en YouTube

A relação entre a visualização e a avaliação do anúncio. Uma análise estrutural da publicidade não paga no YouTube

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ABSTRACT
Social networks have been widely studied regarding advertising behavior. However, there is no relevant research to analyze the digital social structure of ads and their implications. We analyzed this topic using 387 advertising campaigns and 14.612 YouTube users ratings. The results show that commercials with a high number of views not always get positive evaluations. Moreover, the social structure formed by the advertisements follows an organized pattern around specific subjects. The analysis of this kind of social structures could be a starting point for other contributions focused on ads or users' typologies, and potentially very useful to better understand the online advertising planning process.

Keywords: online advertising, social networks, YouTube, eWom.

RESUMEN
Las redes sociales están siendo ampliamente estudiadas en el entorno publicitario. Sin embargo, escasean las investigaciones relevantes que analizan la estructura social digital formada por los anuncios y sus implicaciones. Para analizar este tópico se han seleccionado 387 campañas emitidas en la red social YouTube, junto con los votos y comentarios de 14.612 individuos. Los resultados muestran que anuncios con un número alto de visionados no tienen por qué ser los mejor valorados y que la estructura de los anuncios sigue un patrón organizado en función de temas específicos. Tal estudio podría ser el punto de partida para trabajos centrados en tipologías concretas de anuncios o usuarios, y de utilidad para comprender mejor el proceso de planificación publicitaria online.

***Palabras clave**: publicidad online, redes sociales, YouTube, eWom.*

RESUMO
As redes sociais estão sendo estudadas amplamente pela publicidade. No entanto, não há até o momento nenhuma pesquisa relevante que analise a estrutura social digital formada pelos anúncios digitais e suas implicações. Para analisar este tema foram selecionadas 387 campanhas publicitárias veiculadas na rede social YouTube junto com votos e comentários de 14.612 indivíduos. Os resultados mostram que os anúncios com um elevado número de visualizações não têm porquê ser mais valorizados que outros, e que a estrutura dos anúncios seguem um padrão organizado em função de temas específicos. Este estudo poderia ser o ponto de partidao para trabalhos enfocados em anúncios ou tipologias de usuários, além de contribuir para a melhor compreensão do processo de planejamento da publicidade *online*.

Palavras-chave: publicidade *on-line*, redes sociais, YouTube, eWom.

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INTRODUCTION

Nowadays, social networks are inevitable in personal and business communication; in general, their study is based on the grouping of people, and it is unusual to find works based on other types of networks or groups. Each month more than 6000 million hours of video are viewed on YouTube, so it is of great interest, from an academic and practical point of view, to know if there is any type of relationship or structure between them; specifically, among companies' ads.

In the existent literature, several topics have been studied from the marketing perspective: the influence of social networks on the launching of products (Choi, Kim & Lee, 2010; Yoganarasimhan, 2012), connections between communities (Zhao, Wu & Xu, 2010), nodes as elements of influence in the network (Chu & Kim, 2011; Gladwell, 2002; Mohr, 2014), as well as advertising communication and eWOM (Pornpitakpan, 2004, Lee, Cheung, Lim & Sia, 2006). These works show the great relevance that social networks have in advertising communication and viral campaigns. Based on them, the contribution of this study is the use of a structural analysis to generate networks different from individuals' ones, with a specific application in the advertising field.

The goal, therefore, is to generate a digital social structure created by viewing ads on YouTube, based on the users' votes and comments of. Specifically, we will study: (i) the correspondence between the attraction and valuation of advertisements in social networks, and (ii) the digital social structure formed by the commercials, that is, the generated ad groups, as well as the nodes that can act as influential ads in the network. To this end, 387 advertising campaigns issued in Spain have been randomly selected and viewed, at least once, by a sample of more than 14,000 individuals, who have generated some kind of social activity around them (votes, ratings, comments, etc.). The work includes, firstly, a review of literature and established hypotheses, then the methodology and data analysis, to conclude with the results and a discussion about its limitations and future possibilities.

LITERATURE REVIEW

Social networks are currently one of the most used tools to enhance communication with target audiences. There are many aspects that need to be considered in order for a social network campaign to be successful; one of them is the size and structure of the network and its association with the popularity of the videos distributed in it. Social networks should also be considered as a common form of communication between users and as a source of fundamental information at the personal level, as well as fundamental for sharing information (Nardi, Whitaker & Heirich, 2000). On the other hand, the motivations to use these social networks focus on the need to build social relationships (Pikas & Sorrentino, 2014).

THE STRUCTURE OF THE SOCIAL NETWORK IN COMMUNICATION PROCESSES

The structure of a social network can be very relevant in its ability to influence. Abrahamson and Rosenkpof (1997) showed that the structure of social networks (density of links in the network, weak internal borders, for example) could influence whether an innovation spreads quickly or not. Thus, it is different if a node has a series of connections in a closely connected community, if another node has the same connections, but in a very dispersed community; one can be located very close to the rest of the network, while the other cannot, which can affect the dispersion of information (Yoganarasimhan, 2012). In several studies on the influence of the "network effect" and network structure (Choi et al., 2010), we observe that in the launch of a new product it is more likely that full diffusion occurs in networks with highly interrelated connections than in networks with weak and random connections (Wang, Yu & Wei, 2012). On the other hand, Mengze (2003) describes the structure of the social network as based on two basic aspects: on the one hand, the strength of the interpersonal link, which depends on the frequency of social contact and the importance of the relationship; for example, with relatives. And, on the other, the relational density of an individual's network, which refers

to the distribution of strong links within a personal network, being denser if the number of strong links is greater than that of weak links, and scattered if it is in the opposite direction. Thus, it has been detected that the first and second connections from a node have a positive impact on video distribution (Yoganarasimhan, 2012). However, in studies with simulated networks, it has been concluded that a node has no influence on the amplitude of the comments generated (Watts & Dodds, 2007). The impact of the network is changing over time, so that the first degree of the network of friends is essential, but the second degree is the one responsible for enhancing the subsequent viewing of videos (Yoganarasimhan, 2012).

Regarding weak connections, they play a subtle role in disseminating information through online social networks (Zhao et al., 2010), since, on the one hand, they act as bridges that allow to connect communities that, otherwise, would be isolated; but, on the other, are not the best ways to obtain a wide dissemination of the information in the network. In addition, the individuals who are part of very closed social networks show in their behavior a great commitment within the network, although they are not very likely to interact with people from abroad, and do not usually inform on the videos viewed (Yoganarasimhan, 2012). In general, the studies do not focus on the causal relationship between the point of origin of the information and its cumulative diffusion –that is, the position of the node in a network– and the total adoption of the products disseminated in it. One of the first is that of Yoganarasimhan (2012), which examines these relationships precisely in the field of YouTube videos, reaching the following contributions: (i) it is empirically demonstrated that the network structure of a specific node affects the dissemination of the videos it distributes; in addition, the properties of the network that initially diffuses a video, are different to the properties of those that diffuse it later; (ii) it is important to identify which nodes provide a better return (ROI), since a random selection of nodes does not achieve a good ROI, and (iii) it is one of the first works to analyze the factors affecting video consumption on YouTube.

KEY NODES OR INDIVIDUALS, AND THEIR RELATIONSHIPS IN THE DIFFUSION OF COMMUNICATION

In many communication campaigns, it is common to provide information to selected people for distribution through their social networks. The identification of these people is one of the keys to the success of the campaigns, since they must be capable of both influencing and distributing information effectively (Mohr, 2014). This efficacy can be related to their experience, if they are experts, their personalities, etc., although the most important is their position in the social network (Chu & Kim, 2011). This is why the network of fans is important, since the more connected, in principle, disseminate information better than those who are not (Hinz, Skiera, Barrot & Becker, 2011).

In the reviewed literature, two trends have been detected on the relations that affect the decisions of users, that have subsequently been transferred to the current viral communication.

On a first trend, there are studies on the effects of peers, which try to understand how personal links affect recommendations among users; for example, how doctors were influenced to adopt tetracycline (first study that refers to this peer effect (Coleman, Katz & Menzel, 1966), recommendations and comments related to well-being (Bertrand, Luttmer & Mullainathan, 2000), with obesity (Trogdon, Nonnemaker & Pais, 2008) and work performance (Bandiera, Barankay & Rasul, 2009). However, identifying the underlying effects is often problematic due to endogenous problems, such as groups formation or the difficult observation of the environment factors (Manski, 1993; Hartmann et al., 2008), thus part of the studies focus on addressing these endogeneity problems (Sacerdote, 2001; Brock & Durlauf, 2007; Bramoullé, Djebbari & Fortin, 2009; Nair, Manchanda & Bhatia, 2010) These studies have generally focused on the influence between interpersonal networks (how network A affects network B and vice versa).

The second trend studied refers to the relevance of opinion leaders, traditionally regarded as a small minority that exerts a strong influence on the opinions and decisions of the majority (Katz & Lazarsfeld, 1955; Rogers, 2003). However, it is difficult to agree on who are leaders and how to identify them (Valente & Pumpuang, 2007). The fundamental problem is that there are many qualities that can make someone an opinion leader: their knowledge, the high use of a product, their personality, demographic aspects, etc. However, their position in the network has also been analyzed, in order to explain how the network structure around the node (the opinion leader) affects its leadership (Yoganarasimhan, 2012). Goldenberg, Han, Lehmann & Hong (2009) analyzed the role that nodes have in the adoption and diffusion of new products (videos, in

this case), concluding that many nodes adopt novelties before, not because they are innovative, but because, by having multiple connections, they are close to innovation before the rest.

ADVERTISING COMMUNICATION AND EWOM IN SOCIAL NETWORKS

Regarding communication, it has been found that the quality of the information and the source's credibility have a great relevance, so that the messages distributed by sources perceived as useful and credible are transferred more easily (Ko, Kirsch & King, 2005; Hong, 2006; Cheung & Lee, 2008). In addition, some characteristics of the content, such as the rigor, clarity of the message or its characteristics, can influence the credibility of the message (Pornpitakpan, 2004). Also, the usefulness of the information, related to the trust that the source enjoys, can have an important impact on the consumer's adoption of information in online social networks (Cheung & Lee, 2008).

These online social networks represent one of the most relevant current exponents of electronic Word of Mouth (eWOM) communication, which allows users to obtain and share information about products and services (videos, in this case), both with people they know as with a large number of unknown and geographically dispersed people (Lee et al., 2006). So much so, that virality in online video is now considered a fundamental tool to develop the identity of organizations and as a concrete form of communication (Waters & Jones, 2011). In short, viral marketing propagates messages with the help of individual consumers, through WOM (Word of Mouth), rather than through mass media. Compared with traditional advertising, viral communication is cheaper, has more credibility, diffuses more rapidly and can better reach the selected target (Dobele, Toleman & Beverland, 2005; Bampo, Ewing, Mather, Stewart & Wallace, 2008).

However, it is not yet fully known how a successful viral communication campaign is conducted (Kalyanam, McIntyre & Masonis, 2007; Ferguson, 2008). In this regard, different factors have been identified that affect the success of a viral campaign.

First, the characteristics of the message, referring to the content and creative design of a viral message, are under the control of the advertiser (Kalyanam et al., 2007; Ho & Dempsey, 2010). An effective viral message should avoid consumer indifference in order to spread the message. In this regard, research has come to the conclusion that humor and appeal to sex are popular tactics in viral messages (Golan & Zaidner, 2008), which also lead to greater diffusion (Salganik, Dodds & Watts, 2006; Susarla, Oh & Tan, 2012).

Second, the characteristics of both the individual sending the message and the recipient, play a fundamental role in the viral process. Research has focused mainly on the study of consumers' characteristics, focusing on personality (Sun, You, Wu & Kuntaraporn, 2006; Chiu, Hsieh, Kao & Lee, 2007), demographic characteristics (Trusov, Bodapati & Bucklin, 2010), use characteristics (Niederhoffer, Mooth, Wiesenfeld & Gordon, 2007), as well as motivations to share content, all of which can affect the success of the viral message (Phelps, Lewis, Mobilio, Perry & Raman, 2004; Eccleston & Griseri, 2008).

Thirdly, the characteristics of the social network, in reference to the existing connection between users, also play a key role. In this case, studies have focused on the fact that the structure of the social network can affect the scope and influence of the message (Bampo et al., 2008; De Bruyn an& Lilien, 2008), so that the position of a consumer in the network –that is, the relationship that he has with other members of the network– can affect the role it plays in spreading the content (Kiss & Bichler, 2008; Goldenberg et al., 2009; Susarla et al. al., 2012).

HYPOTHESIS

Even in the case of a descriptive study, we have sought a formal approach to the subject, in order to contrast some hypotheses that may be relevant to the objectives of this study. Based on literature review, there are two areas that can contribute to the knowledge of the attitude of individuals towards advertising, using social networks as context. The first one refers to the possible relationship between the interest in advertising and the valuation that is made of it. Some studies (Pikas & Sorrentino, 2014) have shown that users are not receptive to social media advertising, and their impact is less than that of traditional ads. Others (Dehghani, Niaki, Ramezani & Sali, 2016) confirm that entertainment,

information and personalization are relevant dimensions of advertising on YouTube, although, however, the latter causes malaise and, therefore, it is necessary to better understand the factors that affect advertising in this network. In this regard, our hypotheses are defined as follows:

- H1: The interest of individuals, understood as the attraction of the ad to be viewed, is not directly related to its favorable assessment.

- H2: The interest of individuals, understood as the attraction of the ad to be viewed, is not inversely related to its favorable assessment.

On the other hand, in this work, it is expected that the self-organizing properties of social networks give rise to a segmented structure, in which individuals manifest their viewing tendencies on the basis of categories. In this vein, Feroz Khan and Vong (2014) constructed an empirical model to analyze the relationship between users, the characteristics of videos on YouTube (duration, category...), links and virality (likes, dislikes, comments...), noting that the popularity of the videos was not only due to the operation of YouTube itself, but also to the dynamics of the social network (generated links, visits, reproductions), which had a fundamental role in the viral phenomenon, a determining factor in marketing campaigns. This proposition is descriptive in nature, and therefore it is not presented as a formal hypothesis. Nevertheless, we consider the analysis of this aspect interesting, closely linked to the study of digital social structures.

METHODOLOGY

To contrast the hypotheses and to study the structure of the digital social network, we chose the YouTube video network for three fundamental reasons: (i) it is the preferred network in Spain (Cocktail Report, 2016); (ii) it allows the insertion of audiovisual commercial ads, as they appear in other traditional media (i.e. television); and (iii) not only it allows the insertion of commercial ads, but also the interaction between users in the form of comments or other related videos. In addition, the network provides information about the viewing of videos and their acceptance by the individual, through the codes "like" or "dislike", which allows to establish a measure of the positive or negative attraction of the advertisement. According to Google, which owns YouTube, more than 6 billion hours of video are viewed each month, with more than 1 billion unique users every 30 days, most of them between 18 and 36 years old.

The data collection was conducted during the first week of January 2015, selecting 387 advertising campaigns issued in Spain over six years. These campaigns were chosen randomly, so the probability of choosing one very followed by users is greater than choosing one with a residual impact. In addition to the advertising campaigns, a sample of 14,612 users who had watched, at least once, one of the 387 commercials was collected; also, the description of the advertisement, the number of individuals who had expressed their positive or negative appreciation of the ad (positive vote or negative vote), rating (valuation of the advertisement that the individual makes, on a rating scale of 1 to 5), the date the ad was created, the number of views received and the number of comments.

In short, the descriptive statistics of the collected data are collected in table 1. It can be observed that the announcement that had more visualizations reached almost 23 million. However, the average of visualizations is at 391,010, although with a very large dispersion (the standard deviation is 1,558,407.57), which is already an indicator of the structure that can be found, with some ads that focus the interest of many individuals, compared to others that go almost unnoticed. As for the comments made by those who watch the ads, the pattern is very similar, although with magnitudes much smaller than the number of views. Thus, many individuals can view an ad, but relatively few leave personal comments about it.

The variables related to positive or negative votes are indicators that are close to the general attitude of the individual towards the announcement. From the descriptive statistics, it can be observed that the average of negative votes is much lower than the positive votes, indicating a clear tendency of the individuals to reward the ads that they like, rather than to punish those that they dislike. In general, these magnitudes are expected, since the ads that obtained the most visualizations are

	Minimum	Maximum	Average	Standard deviation
Views	1.00	22.730.619.00	391.010.15	1.558.407.57
Comments	0.00	16.187.00	309.90	1.078.84
Negative votes	0.00	3.055.00	72.52	258.59
Positive votes	0.00	53.316.00	1.137.82	4.524.44
Rating	1.00	5.00	4.68	0.49

Table 1. Descriptive statistics of the commercials ads of the sample

Source: Own elaboration.

those that have spread precisely because of the positive attitudes they arouse. Although some cases have been found that do not follow this norm, in general terms this tendency has been clearly observed in the sample. In this regard, the rating variable shows a similar behavior, with an average close to 5 (4.68) and a relatively small deviation (0.49), again reflecting the general tendency of individuals to record their positive appreciation towards the advertisement, with a very asymmetrical distribution.

RESULTS

After the analysis of the main variables, which showed a very large dispersion in relation to the calculated average values, it is interesting to begin the examination of the results with a brief list of the advertisements that stood out individually, that is to say, without considering the structural and social variables of the relations of the ads of the sample. Table 2 shows the list of the ten most viewed ads, in descending order. Another aspect of greater interest, from the point of view of descriptive results, is the study of the possible correlation between the number of views and the rating of the advertisement. Some of the ads can be controversial, which would mean that ads with a high number of views do not necessarily have to be the best rated.

Likewise, there may be ads with high ratings that, however, have obtained a relatively low number of views. Table 3 shows the bilateral correlation index between the variable "number of views" of the ad, and the variable "rating" of the advertisement. As can be seen from the results, there is no relationship between both variables (r=0.033), and the significance is very far from the acceptable rejection values of the null hypothesis (p=0.475; p>0.1). Thus, we can either accept H1, or formally, reject the null hypothesis $H1_0$.

Also, depending on these same results we can either accept H2 or, formally, reject its null hypothesis $H2_0$. That is, the interest of individuals is not inversely related to the favorable valuation of the ads.

The results show that a high number of views of an advertisement does not necessarily imply a positive valuation by the individuals. Likewise, a reduced number of views does not imply a negative evaluation of the advertising message. The implications of this result are tremendously interesting because they place the number of views as a collateral circumstance that, being desirable in terms of reach or coverage of the target audience, does not necessarily indicate that their effects are positive.

As for the descriptive analysis of the structure of digital social relationships created around commercial advertisements in this social network, figure 1 shows the basic structure of the commercial digital social network on YouTube. In the sociogram that constitutes figure 1, the 387 commercials of the sample used appear, represented as points (or nodes, according to the terminology most used in the analysis of social networks), and the relations between them, indicated by lines.

In addition, the size of the nodes represents the intermediation property or, in other words, the capacity of a node to become a central or influential element of the network. The larger the node's size, the greater the

Ad	Brand	Number of viewings	Category
Dior Homme	Christian Dior	13,992,369	Cosmética
Beyoncé "Mirrors"	Pepsi	12,452,455	Bebidas
Invictus	Paco Rabanne	6,871,465	Cosmética
Hermanos	Asoc, Cáncer Niños	5,882,711	ONG
San Juan 2010	Estrella Damn	5,140,330	Bebidas
Formentera 2009	Estrella Damn	4,159,104	Bebidas
Bouncy Balls	Sony (Bravia)	3,833,539	Electrónica
Volvámonos Locos	Coca Cola	3,274,453	Bebidas
Serra de Tramuntana	Estrella Damn	3,207,625	Bebidas
Empieza algo nuevo	Ikea	2,863,490	Muebles

Table 2: Ads with the highest number of viewings

Source: Own elaboration,

		Viewing	Rating
Viewing	Pearson's correlation	1.000	0.033
	Sig. (bilateral)		0.475
Rating	Pearson's correlation	0.033	1.000
	Sig. (bilateral)	0.475	

Table 3: Pearson's bivariate correlation between the number of viewings and rating

Source: Own elaboration.

ad's ability to be more prominent in the digital social structure (for example, to connect to other ad groups, or to serve as a bridge between ads that would otherwise be disconnected and, therefore, with less possibilities of being visualized). In short, it can be said that these ads have a greater influence on the structure.

Also, the sign of each node represents the preference of the individual, calculated from the quotient between the number of positive ratings and the number of negative valuations. When the ratio approaches zero, indicating that there are more negative than positive comments, the sign of the node is negative and when there are more positive than negative comments, the node is represented by the positive sign. For example, Loewe's announcement, titled "Madrid Oro Collection", obtained 1032 negative and 122 positive ratings, resulting in a preference ratio of 0.12, the worst value of the entire sample. A simple graphical inspection of the structure of the network reveals some interesting facts.

First, there is a clear picture of how there is a central grouping of videos, and a set of peripheral communities, linked together by ads with high rates of influence. These groups will be subject to a more detailed inspection later, to try to infer what are the characteristics or attributes that have caused them to be organized this way. On the other hand, it is easy to distinguish between ads with a higher preference ratio, such as Red Bull's announcement, the Darth Vader campaign of Volkswagen, or the Calvo tuna "*Ellas lo saben*." At the opposite end, in addition to the aforementioned Loewe announcement, are the announcement of Seat Leon SC, or the Advertising Academy campaign, "RAE's 300 years". From the metric point of view, the analysis of the properties of the network is summarized in table 4.

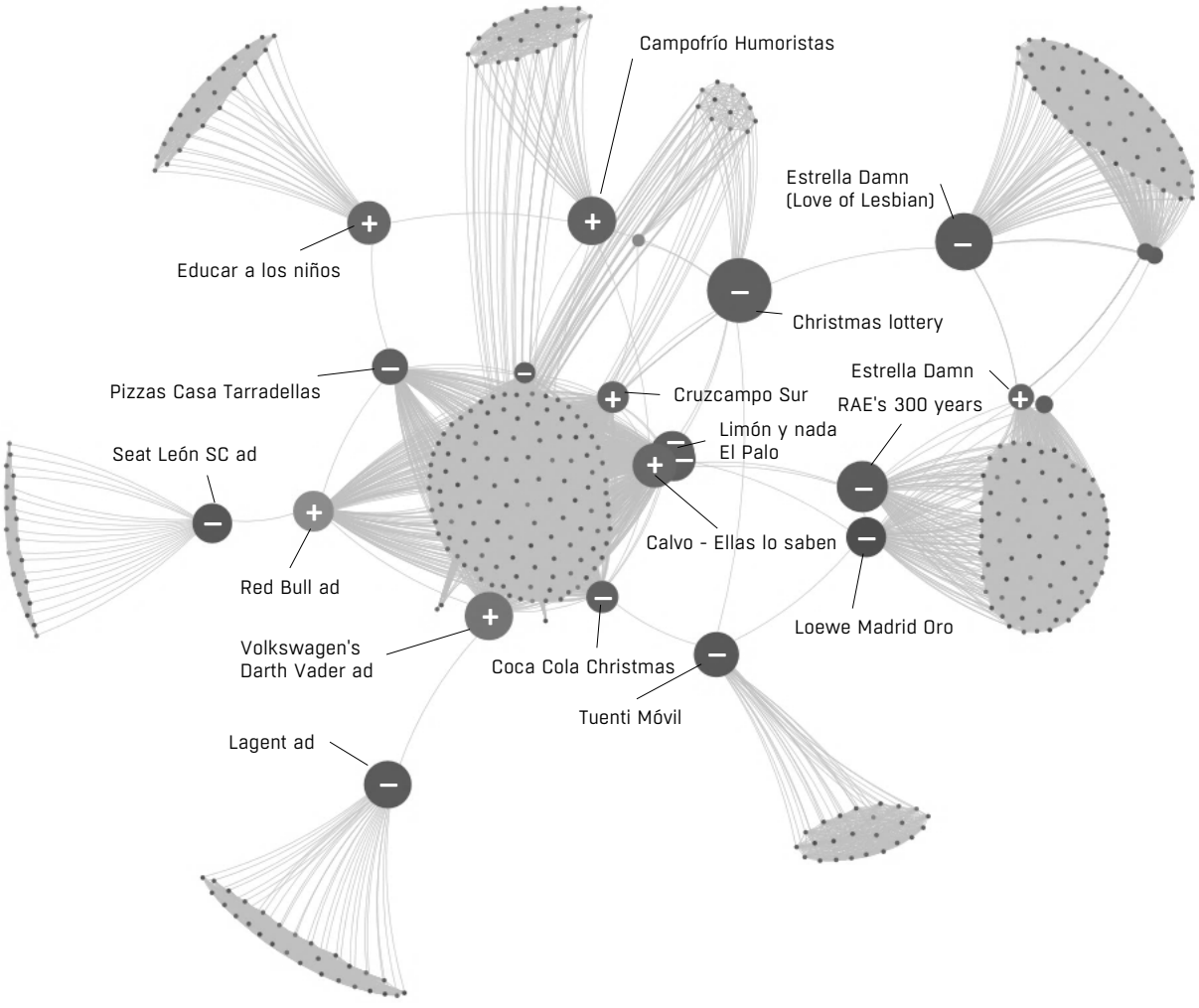

Figure 1: Sociogram of commercial ad son YouTube

Source: Own elaboration.

Maximum geodetic distance	6.00
Average geodetic distance	3.19
Network's density	0.17
Modularity	0.61

Table 4: Structural parameters of the network

Source: Own elaboration.

According to the values obtained for the analysis of the digital social structure, it can be concluded that the maximum geodesic distance, or sum of the minimum distance between two nodes, is relatively high (DGM=6.00). In other words, there is at least one ad in the sample that would need to go through six different ads (nodes), in order to have a connection with some other ad in the sample.

As this measure can reflect the isolated situation of a specific case, the average geodesic distance, which in this case is 3.19, has been calculated and indicates a significant degree of separation between the set of average distances in the total the sample. In short, it is a network with a rather dispersed structure, in which the connections between ads are not direct, and tend to need other ads that operate as intermediaries to be able to relate to other ads. This data is confirmed by the density value of the network, which is equal to 0.17, i.e.,

Group	Ads	Connections	Average geodetic distance	Basic feature of the group
Group 1	123	7498	0.99	Entertainment/Show business
Group 2	74	2701	0.98	Sports/Polemic
Group 3	52	1325	0.98	Musical/Celebrities
Group 4	29	406	0.96	Awarded/Curious
Group 5	25	300	0.96	Telephony
Group 6	24	276	0.95	TV Series /Cinema
Group 7	23	253	0.95	Food/Humor
Group 8	20	190	0.95	Cars/Transportation
Group 9	17	136	0.94	Videogames/games

Table 5. Metric characteristics and profile of each group

Source: Own elaboration

only 17% of possible network connections are present in the structure. This data makes the spread of advertisements in general very limited; therefore, it denotes a weak structure, in which few commercials have much power of cohesion and intermediation in the network.

However, although the network has low density, the groups that conform it are considerably dense. Using Newman-Girvan's algorithm (Newman & Girvan, 2004), nine different groups are detected, with different relative sizes, easily observable in the sociogram of figure 1. The metric characteristics of each group are shown in table 5.

The characteristics of the ads that conform each group have been established by analyzing the category of products, or any other type of attribute that they could have in common. Thus, for example, the ads of group 9, all belong to the product category "videogames", except for two: the announcement of the Christmas Lottery, and the announcement of Euromillion.

DISCUSSION OF RESULTS

The lack of correlation between the number of views of an advertisement and its positive evaluation shows that users not only see what they value positively, but also those advertising contents that generate controversy or are simply the reflection of wrong or ridiculous strategies from their point of view. Therefore, managers should be more concerned with the adequacy of content than the setting of indiscriminate objectives based on the number of visits and/or viewing of the message.

In fact, a message with the wrong content will not simply be ignored by the consumer, but could be spread throughout the digital social structure accompanied by negative ratings, enhancing all kinds of attitudes contrary to the interests of the brand. On the other hand, the results derived from the study of the structure of the digital social network highlight the users' viewing patterns regarding audiovisual advertising content and their preferences. As we have seen in this study, the structure of the digital social network can affect a rapid diffusion, as shown by Abrahamson and Rosenkpof (1997) in the case of innovations. It has also been found, by Choi et al. (2010) and Yoganarasimhan (2012), that the ads need other intermediary ads to relate, affecting the diffusion and giving rise to a more or less dispersed community. Also, it has been verified that the first and second connection from a node (advertisement) have a very relevant impact on the broadcast, as Yoganarasimhan (2012) verified in the case of video distribution.

It is interesting to see how, in our work, a node does influence the amplitude of the comments generated, as opposed to the study by Watts and Dodds (2007), whose results differed in the case of simulated networks. In addition, and as in the work of Zhao et al. (2010), we

have verified –as already did Yoganarasimhan (2012)– that the connections, although weak, are relevant for the diffusion of the ads, giving rise to dense groups, and that the structure of the network of a specific node affects the diffusion of the announcements.

On the other hand, it has been verified that the key advertisings are relevant in the effective diffusion; that they have, therefore, a greater influence on the structure of the digital social network, as Mohr (2014) has already shown in the case of individuals; and that their position in the social network (Chu & Kim, 2011) and their connections is of great relevance (Hinz et al., 2011). As in the literature review the relevance of opinion leaders and their influence on the decisions of the majority (Katz & Lazarsfeld, 1955; Rogers, 2003) has been stated, in our study we have verified that there is a small number of ads with a great power of cohesion and intermediation in the network, in the same sense as the above mentioned leaders of opinion. However, in our work we have been able to verify which are the leading nodes, differently from the Valente and Pumpuang (2007) study, in which there was some difficulty in identifying opinion leaders (individuals).

Regarding the virality of the messages, we have not been able to verify if their quality or credibility have been relevant for their dissemination, as Pornpitakpan (2004), Ko et al. (2005), Hong (2006), Cheung and Lee (2008), basically because our study focuses on advertisements that have characteristics different from those of previous studies. However, given the great virality identified in our work, we maintain –as Dobele et al. (2005), Bampo et al. (2008) and Waters and Jones (2011)– that it should be used as an instrument to develop the identity of organizations, in this case through advertising. We have also been able to confirm that the characteristics of the message may be relevant to enhance the viral message, in line with the work of Kalyanam et al. (2007), Golan and Zaidner (2008), Ho and Dempsey (2010) and Susarla et al. (2012), generating different ratings depending on whether the comments were positive or negative.

We have also verified how the characteristics of the digital social network can affect the scope and influence of the message, as Bampo et al. (2008), De Bruyn and Lilien (2008) and Susarla et al. (2012). These authors confirmed in their works that the position of a consumer in the network could affect their role in the moment of disseminating contents. As we have verified, it also happens in the case of ads.

Perhaps one of the most interesting results is the verification of the active role of the user in the search, viewing and participation in advertisements; a role remote from passive reception or the alleged elusive behavior of consumers with commercial messages. Similarly, it could be argued that brands are not only struggling to have a presence in the networks in terms of volume, but also do so because to be relevant in terms of advertising communication. In other words, users now select which ads they want to see, displaying their preferences in terms of categories (sports, cars, etc.). This creates an additional level of rivalry between brands, which compete for the advertising relevance between extremely heterogeneous product categories.

LIMITATIONS, FUTURE LINES OF RESEARCH AND CONCLUSIONS

One of the main limitations of this type of work is the impossibility of linking users' viewing preferences and the ratings they make of advertising campaigns with their actual consumption behavior. Based on the analyzes conducted in the field of social networks, therefore, it does not seem easy to relate the advertising impact to the purchase, consumption or prescription decision of the advertised product. Undoubtedly, this is one of the most active fields from the point of view of research, and an extremely interesting future line of study for advertisers and agencies. However, the understanding of the operation of this type of social networks, from a merely descriptive point of view, is a necessary step before being able to establish models of causal relationship, based on data that allows their estimation. However, it would be very interesting to incorporate the content analysis of the messages of the users. Therefore, a semantic analysis that allows the identification of the most relevant categories and

concepts in the evaluation of the advertising messages would help understanding which mechanisms explain the evaluation. Thus, professionals could not only understand the structure of digital relations of their messages, but which factors of the advertisement are the ones that provoke positive or negative reactions. Given the increasing investments in the field of digital commercial communication, understanding these processes will be one of the most interesting lines of research in the immediate future.

REFERENCES

Abrahamson, E. & Rosenkopf, L. (1997). Social network effects on the extent of diffusion: A computer simulation. *Organizational Science, 8*(3), 289-309. https://doi.org/10.1287/orsc.8.3.289

Bampo, M., Ewing, M. T., Mather, D. R., Stewart, D. & Wallace, M. (2008). The effects of the social structure of digital networks on viral marketing performance. *Information Systems Research, 19*(3), 273-290. https://doi.org/10.1287/isre.1070.0152

Bandiera, O., Barankay, I. & Rasul, I. (2009). Social connections and incentives in the workplace: evidence from personnel data. *Econometrica, 77*(4), 1047-1094. https://doi.org/10.3982/ECTA6496

Bertrand, M., Luttmer, E. F. P. & Mullainathan, S. (2000). Network effects and welfare cultures. *Quarterly Journal of Economics, 115*(3), 1019-1056. https://doi.org/10.1162/003355300554971

Bramoullé, Y., Djebbari, H. & Fortin, B. (2009). Identification of peer effects through social networks. *Journal of Econometrics, 150*(1), 41-55. https://doi.org/10.1016/j.jeconom.2008.12.021

Brock, W. A. & Durlauf, S. N. (2007). Identification of binary choice models with social interactions. *Journal of Econometrics, 140*(1), 52-75. https://doi.org/10.1016/j.jeconom.2006.09.002

Cheung, C. M. K. & Lee, M. K. O. (2008). Information adoption in an online discussion forum, *Proceedings of the International Joint Conference on e-Business and Telecommunications*, Barcelona, Spain, 28-31 July.

Chiu, H. C., Hsieh, Y. C., Kao, Y. H. & Lee, M. (2007). The determinants of email receivers' disseminating behaviors on the Internet. *Journal of Advertising Research, 47*(4), 524-534. https://doi.org/10.2501/S0021849907070547

Choi, H., Kim, S. H. & Lee, J. (2010). Role of network structure and network effects in diffusion of innovations. *Industrial Marketing Management, 39*(1), 170-177. https://doi.org/10.1016/j.indmarman.2008.08.006

Chu, S. C. & Kim, Y. (2011). Determinants of consumer engagement in electronic word-of-mouth (eWOM) in social networking sites. *International Journal of Advertising, 30*(1), 47-75. https://doi.org/10.2501/IJA-30-1-047-075

Cocktail Report (2016). *VIII Observatorio de Redes Sociales* [VIII Social Network Observatory]. The Cocktail Analysis. Retrieved from http://tcanalysis.com/blog/posts/viii-observatorio-de-redes-sociales

Coleman, J. S., Katz, E. & Menzel, H. (1966). *Medical innovation: A diffusion study.* Indianapolis, IN: Bobbs-Merrill.

De Bruyn, A., & Lilien, G. L. (2008). A multi-stage model of word-of-mouth influence through viral marketing. *International Journal of Research in Marketing, 25*(3), 151-163. https://doi.org/10.1016/j.ijresmar.2008.03.004

Dehghani, M., Niaki, M. K., Ramezani, I. & Sali, R. (2016). Evaluating the influence of YouTube advertising for attraction of young customers. *Computers in Human Behavior, 59*(June), 165-172. https://doi.org/10.1016/j.chb.2016.01.037

Dobele, A., Toleman, D. & Beverland, M. (2005). Controlled infection! Spreading the brand message through viral marketing. *Business Horizons, 48*(2), 143-149. https://doi.org/10.1016/j.bushor.2004.10.011

Eccleston, D. & Griseri, L. (2008). How does Web 2.0 stretch traditional influencing patterns. *International Journal of Market Research, 50*(5), 591-161. https://doi.org/10.2501/S1470785308200055

Ferguson, R. (2008). Word of mouth and viral marketing: taking the temperature of the hottest trends in marketing. *Journal of Consumer Marketing, 25*(3), 179-182. https://doi.org/10.1108/07363760810870671

Feroz Khan, G. & Vong, S. (2014). Virality over YouTube: an empirical analysis. *Internet Research, 24*(5), 629-647. https://doi.org/10.1108/IntR-05-2013-0085

Gladwell, M. (2002). *The tipping point: How little things can make a big difference*. Boston: Little, Brown and Company.

Golan, G. J. & Zaidner, L. (2008). Creative Strategies in Viral Advertising: An Application of Taylor's Six-Segment Message Strategy Wheel. *Journal of Computer-Mediated Communication, 13*(4), 959-972. https://doi.org/10.1111/j.1083-6101.2008.00426.x

Goldenberg, J., Han, S., Lehmann, D. R., & Hong, J. W. (2009). The role of hubs in the adoption process. *Journal of Marketing, 73*(2), 1-13. https://doi.org/10.1509/jmkg.73.2.1

Hartmann, W. R., Manchanda, P., Nair, H., Bothner, M., Dodds, P., Godes, D., Hosanaga, K. & Tucker, C. (2008). Modeling social interactions: identification, empirical methods and policy implications. *Marketing Letters, 19*(3). https://doi.org/10.1007/s11002-008-9048-z

Hinz, O., Skiera, B., Barrot, C. & Becker, J. U. (2011). Seeding strategies for viral marketing: An empirical comparison. *Journal of Marketing, 75*(6), 55-71. https://doi.org/10.1509/jm.10.0088

Ho, J. Y., & Dempsey, M. (2010). Viral marketing: Motivations to forward online content. *Journal of Business Research, 63*(9), 1000-1006. https://doi.org/10.1016/j.jbusres.2008.08.010

Hong, T. (2006). The influence of structural and message features on web site credibility. *Journal of the American Society for Information Science and Technology, 57*(1), 114-127. https://doi.org/10.1002/asi.20258

Hutcheon, L. (2000). *A theory of parody: The teachings of twentieth-century art forms*. Champaign, IL: University of Illinois Press.

Kalyanam, D., McIntyre, S. y Masonis, J. T. (2007). Behind the scenes of a viral marketing campaign: How Plaxo Crossed the Tipping Point and Avoided the Fate of the Ebola Virus. Document: Plaxo JIM.

Katz, E. & Lazarsfeld, P. F. (1955). *Personal influence: The part played by people in the flow of mass communications*. Glencoe, IL: Free Press.

Kiss, C. & Bichler, M. (2008). Identification of influencers — Measuring influence in customer networks. *Decision Support Systems, 46*(1), 233-253. https://doi.org/10.1016/j.dss.2008.06.007

Ko, D. G., Kirsch, L. J. & King, W.R. (2005). Antecedents of knowledge transfer from consultants to clients in enterprise system implementations. *MIS Quarterly, 29*(1), 59-85.

Lee, J. & Hong, I. B. (2016). Predicting positive user responses to social media advertising: The roles of emotional appeal, informativeness, and creativity. *International Journal of Information Management, 36*(3), 360-373. https://doi.org/10.1016/j.ijinfomgt.2016.01.001

Lee, M. K. O., Cheung, C. M. K., Lim, K.H. & Sia, C. L. (2006). Understanding customer knowledge sharing in web-based discussion boards: an exploratory study. *Internet Research, 16*(3), 289-303. https://doi.org/10.1108/10662240610673709

Manski, C. F. (1993). Identification of endogenous social effects: the reflection problem. *The Review of Economic Studies, 60*(3), 531-542. https://doi.org/10.2307/2298123

Mengze, S. (2003). Social network- based discriminatory pricing strategy. *Marketing Letters, 14*(4), 239-56. https://doi.org/10.1023/B:MARK.0000012470.94220.db

Mohr, I. (2014). Going Viral: An Analysis of YouTube Videos. *Journal of Marketing Development and Competitiveness, 8*(3), 43. Retrieved from http://search.proquest.com/docview/1647066428?pq-origsite=gscholar

Nair, H., Manchanda, P. & Bhatia, T. (2010). Asymmetric social interactions in physician prescription behavior: The role of opinion leaders. *Journal of Marketing Research, 47*(5), 883-895. https://doi.org/10.1509/jmkr.47.5.883

Nardi, B. A., Whitaker, S. & Heirich, S. (2000). It's not what you know, it's who you know: work in the information age. *First Monday*. Retrieved from http://www.firstmonday.org/issues/issues5_5/nardi/. https://doi.org/10.5210/fm.v5i5.741

Newman, M. E. & Girvan, M. (2004). Finding and evaluating community structure in networks. *Physical Review E, 69*(2), 026113. APS. https://doi.org/10.1103/physreve.69.026113

Niederhoffer, K., Mooth, R., Wiesenfeld, D. & Gordon, J. (2007). The origin and impact of CPG new-product buzz: Emerging trends and implications. *Journal of Advertising Research, 47*(4), 420-426. https://doi.org/10.2501/S0021849907070432

Paek, H., Kyongseok, K. & Hove, T. (2010). Content analysis of antismoking videos on YouTube: message sensation value, message appeals, and their relationships with viewer responses. *Health Education Research, 25*(6), 1085-1099. https://doi.org/10.1093/her/cyq063

Phelps, J. E., Lewis, R., Mobilio, L., Perry, D. & Raman, N. (2004). Viral marketing or electronic word-of-mouth advertising: Examining consumer responses and motivations to pass along email. *Journal of Advertising Research,* 44(4), 333-348. https://doi.org/10.1017/S0021849904040371

Pikas, B., Sorrentino, G. (2014). The Effectiveness of Online Advertising: Consumer's Perceptions of Ads on Facebook, Twitter and YouTube. *The Journal of Applied Business and Economics, 16*(4), 70. Retrieved from http://m.www.na-businesspress.com/JABE/PikasB_Web16_4_.pdf

Pornpitakpan, C (2004). The persuasiveness of source credibility. A critical review of five decades'evidence. *Journal of Applied Social Phsycology, 34*(2), 243-281. https://doi.org/10.1111/j.1559-1816.2004.tb02547.x

Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). New York: Free Press.

Sacerdote, B. (2001). Peer effects with random assignment: results for Dartmouth roommates. *Quarterly Journal of Economics, 116*, 681-704. https://doi.org/10.1162/00335530151144131

Salganik, M. J., Dodds, P. S. & Watts, D. J. (2006). Experimental study of inequality and unpredictability in an artificial cultural market. *Science, 311*(5762), 854-856. https://doi.org/10.1126/science.1121066

Sun, T., Youn, S., Wu, G. & Kuntaraporn, M. (2006). Online word-of-mouth (or mouse): An exploration of its antecedents and consequences. *Journal of Computer-Mediated Communication, 11*(4), 1104-1127. https://doi.org/10.1111/j.1083-6101.2006.00310.x

Susarla, A., Oh, J. H. & Tan, Y. (2012). Social networks and the diffusion of user-generated content: Evidence from YouTube. *Information Systems Research, 23*(1), 23-41. https://doi.org/10.1287/isre.1100.0339

Trogdon, J., Nonnemaker, J. & Pais, J. (2008). Peer effects in adolescent overweight. *Journal of Health Economics, 27*(5), 1388-1399. https://doi.org/10.1016/j.jhealeco.2008.05.003

Trusov, M., Bodapati, A. V. & Bucklin, R. E. (2010). Determining influential users in internet social networks. *Journal of Marketing Research, 47*(4), 643-658. https://doi.org/10.1509/jmkr.47.4.643

Valente, T. W. & Pumpuang, P. (2007). Identifying opinion leaders to promote behavior changes. *Health Education & Behavior, 34*, 881-896. https://doi.org/10.1177/1090198106297855

Wang, X., Yu, C. & Wei, Y. (2012). Social media peer communication and impacts on purchase intentions: A consumer socialization framework. *Journal of Interactive Marketing, 26*(4), 198-208. https://doi.org/10.1016/j.intmar.2011.11.004

Waters, R. D. & Jones, P. M. (2011). Using video to build an organization's identity and brand: A content analysis of nonprofit organizations' YouTube videos. *Journal of Nonprofit & Public Sector Marketing, 23*(3), 248-268. https://doi.org/10.1080/10495142.2011.594779

Watts, D. J., & Dodds, P. S. (2007). Influentials, networks, and public opinion formation. *Journal of Consumer Research, 34*(4), 441-458. https://doi.org/10.1086/518527

Yoganarasimhan, H. (2012). Impact of social network structure on content propagation: a study using YouTube data. *Quantitative Marketing and Economics, 10*, 111-150. https://doi.org/10.1007/s11129-011-9105-4

Zhao, J. Wu, J. & Xu, K. (2010). Weak ties: Subtle role in the information diffusion of online social networks. *Physical Review E, 82*(1). https://doi.org/10.1103/PhysRevE.82.016105

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