

MAPPING THE AGENDA-SETTING THEORY, PRIMING AND THE SPIRAL OF SILENCE IN TWITTER ACCOUNTS OF POLITICAL PARTIES

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Abstract

This paper presents the results of a content analysis of the official Twitter accounts of the main Spanish political parties (*Partido Popular*, *Partido Socialista Obrero Español*, *Podemos*, *Ciudadanos* and *Izquierda Unidad*) carried out for the period of the 2015 Spanish general election. Compositional biplots are used for data visualization. Unlike traditional approaches, compositional analysis in general, and the biplot in particular, emphasize the relative salience of issues within the agenda. This analysis sheds light on the agenda-setting theory and closely-related phenomena such as priming (based on associative-activation among a group of issues that are more influential than others) and the spiral of silence (the issues derived from the hierarchy process of agenda-setting that are omitted just after the election day).

Key words: *agenda-setting, biplot, compositional data (CoDa), political communication, priming, spiral of silence.*

1.- Introduction

The study of *agenda-setting* (AS) has mainly been approached from content analysis with the aim of determining the relative or comparative importance of some issues over others. The theory posits that certain means of communication or social actors serve as information mediators in a praxis that involves including or omitting certain issues on the media stage depending on where they are on the hierarchy (McCombs 2004). Existing differences between senders and content categories in AS have traditionally been studied either descriptively, by counting the occurrence of issues, or by means of Spearman correlations, taking only rank order into consideration and leaving out any other information. Recently, compositional analysis (CoDa), the standard statistical methodology when the researcher is interested in the relative importance of the parts of a whole (Aitchison 1986), has started to be applied in AS research (Blasco-Duatis et al. 2018a, 2018b, 2018c). We especially focus on a data visualization tool, the compositional biplot, which allows us to see which issues are prioritized, who their senders are and the relationships between them, while taking into consideration the fact that the relevant information is the relative volume of each issue for each sender.

Lippmann's (1922) seminal work established that the media defines the cognitive map of society based on how people experience the world they live in, generating an informative 'pseudo-environment' derived from the need to simplify the complexity of social events. In the early 1970s, McCombs and Shaw (1972) presented the AS theory based on this conception, concluding that the mass communication media has an enormous influence on the public determining which issues are of informative interest and how much space and emphasis they will be given. This process of creating a hierarchy of issues serves to focus the public's attention, thoughts and actions under the logic that the events that receive most coverage do not need to be the objectively most important ones but invariantly are those with the highest attached importance by the public (McCombs and Shaw 1972). The presence or absence of an issue on the agenda will set the priority of interests and confer a sphere of preferences on what is put forward for public debate and in media news.

From among the conceptualisations that emerge from the AS theory, we can highlight the *priming effect* and the *spiral of silence*. The priming perspective, which has its origins in cognitive psychology, is based on the assumption that the power of the media is such that it is capable of establishing the criteria that will be used by receivers to develop the capacity to judge the social reality (Geers and Bos 2017; Iyengar and Kinder 1987), providing the public with the tools required to shape their ways of thinking based on the most highlighted events, which are directly correlated in the mind with examples and associations (Tversky and Kahneman 1973). At its origin, the concept is defined from the prioritisation or prominence of a set of issues to serve as benchmarks to assess the different questions that concern public life. The importance of the effect resides in the process whereby the media prioritises certain issues for the public, because minority voices are isolated and salient issues reinforced (Iyengar and Kinder 1987). The effect of the spiral of silence (Noelle-Neumann 1993) is based precisely on this principle of isolating minority voices and their link with AS hierarchy practices, paying special attention to the voices that are omitted on certain issues driven by mass opinion, where those who are not in favour of an idea do not speak up out of an unconscious feeling of fear of isolation, serving to reinforce the predominant opinion.

Digital media has shaped a new space that must be considered in the study of AS in general and political campaigns in particular (Åström and Karlsson 2013; Stier et al. 2018). Microblogging web platforms like Twitter have reversed influence processes, taking the message not only from traditional means of communication to the public, but also from political parties themselves to citizens, so much so that over the last decade research in the field of the AS theory has focused on studying digital means of communication as new spaces capable of influencing the public space and so participating in constructing the AS theory (Meraz 2009). In this scenario, social media have become an essential tool for developing political life, especially in election campaign processes (Perlmutter 2008; Towner and Dulio 2012), to become pivotal in some campaigns like president Barack Obama's in 2008, when his social followers transformed into direct participants in his electoral conquest.

Among the diversity of social media, Twitter has been posited as a new political space to disseminate information to a growing audience (Conway et al. 2015) and has become a reference tool for compiling information, connecting better with potential voters and following the actions of sources (Parmelee 2013). Furthermore, this platform has become the most popular of the set of social networks to participate in political persuasion with the capacity to attract traffic through all the platforms, as the issues emphasised in tweets are often commented on later on radio and television talk shows and in the press (Parmelee and Bichard 2013). Twitter has also been postulated as an important global platform in terms of fast dissemination of information among the public (Acar and Muraki 2011; Yousuf Al-Aama 2015). The most prominent political events of the last few years, such as the Egyptian revolution in 2011, the election of Trump, the referendum for peace in Colombia or the Brexit, or even the rumours about the Grexit, constitute recent proof of this. The new relationship dynamics between the media and the public audience and greater pluralism in the media sphere have led to the traditional political communication model being reshaped in a scenario wherein the public and political parties play a more prominent role.

In this article we aim to depict a visual representation of the AS proposed by the main Spanish political parties – Partido (PP), Partido Socialista Obrero Español (PSOE), Podemos, Ciudadanos and Izquierda Unida (IU) – on Twitter during the period leading up to the Spanish general election held on 20th December 2015. Moreover, the study aims to map the priming effects (based on associative-activation among a group of issues that are more influential than others) and the spiral of silence (the issues derived from the hierarchy process of AS that are omitted and/or replaced), by means of CoDa methods.

2.- Methods

2.1.- Traditional approach to the analysis of content categories in the media

The very nature of the AS theory makes analysis of content in the agenda typically focus on the relative or comparative importance of some issues over others (Blasco-Duatis et al. 2018a, 2018b, 2018c). In other words, it is assumed that some media or social actors are busier than others, leading to an overall increase in communication volume, which is void of content-related interest. More often than not, AS hypotheses and research questions are expressed in comparative, relative or competitive terms, examples of which are plentiful: '*Prominent* topics in Twitter messages *compared to*

prominent topics in surveys and television news programs’ (Jungherr et al. 2016); ‘Is there evidence that the *balance* of mass media to citizen media influence *differs among* independent bloggers of diverse political ideologies based on different types of issues?’ (Meraz 2009); ‘Are there similarities between @London2012 and #London2012 in terms of tweet *focus* (i.e., topic)?’ (Frederick et al. 2015); ‘What are the issues *emphasized* in the online public agenda, the media agenda and the policy agenda?’ (Luo 2014); ‘Is Twitter *mainly* rehashing mainstream media content?’ (Rogstad 2016); ‘The assumption that news media *emphasize and highlight* certain events’ (Weimann-Saks et al. 2016); ‘The issue *saliency* of blogs will show a significant positive correlation with issue *saliency* of network television news programs’ (Sweetser et al. 2008); ‘We will provide a *comparison* between the content broadcast online by traditional news media outlets and the attitudes expressed in Twitter conversation to check whether social networking sites reproduce the same frames proposed by traditional media or not’ (Ceron et al. 2016); ‘Analyzing which issues *matter most* to Spanish users is essential to determine if traditional media establishes the topics most discussed by users of Twitter Spain’ (Rubio-García 2014); ‘When quoting tweets, do alternative web-only news outlets use informational quotes *more frequently* than traditional print news outlets?’ (Bane 2017); ‘Topic *saliencies* in messages by candidates and audiences on social media are more similar to each other than to topic *saliency* among a mass audience’ (Stier et al. 2018). The italics are ours.

The focus on relative importance found in research questions is usually not matched by a similar focus when selecting the statistical analysis method. One common way to assess similarity among senders of political information according to the content categories they send and to assess which of these categories contribute to their differences, is to compare the frequencies or rankings of the top contents (e.g., Blasco-Duatis et al. 2017; Cui and Wu 2017; Guo et al. 2015; Jungherr et al. 2016; Lim 2011), with a general lack of focus on how content categories contribute to generating differences among senders, be they relative or absolute. This especially relevant when dealing with the spiral of silence, which deals with issues that constitute a minority of content, whose relative differences are likely high. Such differences (or similarities) among senders are often assessed by means of Spearman’s rank correlations (e.g., Conway et al. 2015; Cui and Wu 2017; Lim 2011; Luo 2014; Stier et al. 2018; Weimann-Saks et al. 2016). This is tantamount to pooling all content categories together while taking neither relative or absolute differences into consideration, but only differences in the rank ordering. Sometimes χ^2 tests for contingency tables are used to reveal differences among senders, but they are even less informative as they say nothing about the extent of these differences (e.g., Frederick et al. 2015; Naudé and Froneman 2003). In the next section we present an analysis framework which overcomes these limitations.

2.2.- Compositional data analysis

Compositional Data analysis (CoDa) is the standard statistical method used when data contain information about the relative importance of parts of a whole. The CoDa tradition started with Aitchison’s seminal work (1982, 1986) on chemical and geological compositions where only the proportion of each part or component is of interest, since absolute amounts are irrelevant and only tell about the size of the chemical or soil sample. Nowadays, CoDa spans almost all the hard sciences and has started to be used in several fields of social science, such as education (Batista-Foguet et

al. 2015), economics (Fry 2011), marketing (Vives-mestres et al. 2016), accounting (Linares-Mustarós et al. 2018), tourism (Ferrer-Rosell and Coenders 2018), values (van Eijnatten et al. 2015), social networks (Kogovšek et al. 2013), time use (Martín-Fernández et al. 2015) and election studies (Egozcue and Pawlowsky-Glahn 2011). Its application to content analysis in political communication (Blasco-Duatis et al. 2018a, 2018b, 2018c) and in other fields of communication (Mariné-Roig and Ferrer Rosell 2018; Wang et al. 2018) is very recent, even though, as argued previously, such analysis poses the same problems in all respects as those faced by chemical and geological analyses. Absolute data are irrelevant and mostly tell about the length of the text, the word count, the popularity of the sender, and so on. Only the proportions of each content category or the relative size of one type of content over another are truly informative. The details and properties of the proposed method have been discussed in Blasco-Duatis et al. (2018b). A summary follows below.

A composition is typically presented as a vector \mathbf{z} with D positive components constrained by a unit sum (Aitchison 1986; Van den Boogaart & Tolosana-Delgado 2013; Pawlowsky-Glahn et al. 2015):

$$\mathbf{z} = (z_1, z_2, \dots, z_D) \tag{1}$$

with $z_j > 0$ for all $j = 1, 2, \dots, D$; $\sum_{j=1}^D z_j = 1$.

In our research, each sender of information with political content would have a composition of each of D content categories, expressed as proportions of the total content.

\mathbf{z} resides in a R_+^{D-1} subspace called the *simplex*, which is constrained by positiveness and fixed sum, with different operations, angles and distances from the real space. This explains why most statistical workhorses, such as mean, correlation and distance, are to a greater or lesser extent meaningless when applied to \mathbf{z} . Since one component can only increase if one or more of the others decrease, negative spurious correlations among the components (content categories) emerge (Pearson 1897). Euclidean distances among individual compositions (senders) are also meaningless (Aitchison et al. 2000). Euclidean distance considers the pair of proportions 0.01 and 0.02 to be as mutually distant as 0.11 and 0.12, while in the first pair the difference is 100% and in the second it is less than 10%.

A proper measure of the centre of a sample of n compositions is the geometric mean closed to unit sum. If g_j is the sample geometric mean of z_j for all n compositions, the centre is expressed as $C(g_1, g_2, \dots, g_D)$.

The most common CoDa approach is to express an original compositional vector of D components in logarithms of ratios among components (Aitchison 1986; Egozcue et al. 2003), which constitute a natural way of distilling the information about the relative size of components and form the basis for defining association and distance in a meaningful way.

Log-ratios may be computed between each component and the geometric mean of all the components, in the so-called *centred log-ratios*:

$$\ln\left(\frac{z_j}{\sqrt[D]{z_1 z_2 \dots z_D}}\right) \quad (2)$$

with $j = 1, 2, \dots, D$.

Aitchison's distance between two senders' content compositions \mathbf{z} and \mathbf{z}^* considers that said logarithms of ratios carry all the required information about the difference between the two compositions. Two senders at zero distance have identical content proportions. When there is a larger difference between the log-ratios of two senders, their distance is likewise larger:

$$d(\mathbf{z}, \mathbf{z}^*) = \sqrt{\sum_{j=1}^D \left(\ln\left(\frac{z_j}{\sqrt[D]{z_1 z_2 \dots z_D}}\right) - \ln\left(\frac{z_j^*}{\sqrt[D]{z_1^* z_2^* \dots z_D^*}}\right) \right)^2} \quad (3)$$

Using log-ratios attaches greater importance to differences in content categories with low proportions in the computed distance.

Proportionality between pairs of content categories in AS is a valid alternative to correlation (Lovell et al. 2015). For this purpose, all possible pairwise log-ratios and their variances are computed:

$$\text{Var}(\ln(z_j/z_k)) = \text{Var}(\ln(z_k/z_j)) \quad (4)$$

These variances can be arranged in a symmetric matrix with components (i.e., content categories) defining both D rows and D columns, with the same layout as a correlation matrix. This is the so-called variation matrix. $\text{Var}(\ln(z_j/z_k))$ is zero when z_j and z_k behave perfectly proportionally (e.g., senders with twice one content category also have twice the other), corresponding to perfect positive association. The further $\text{Var}(\ln(z_j/z_k))$ is from zero, the lower the association.

Computing log-ratios and their variances implies that \mathbf{z} may contain no zero values. If the \mathbf{z} vector contains zeros, they must be replaced beforehand. Among the zero replacement methods discussed in Martín-Fernández et al. (2011) whose discussion is beyond the scope of this article, we use the same method proposed by Blasco-Duatis et al. (2018a, 2018b, 2018c) in the AS research context.

2.3.- The CoDa biplot

Like standard data, compositional data require visualization tools to help researchers interpret large data tables with various senders and many content categories. To this end, Aitchison (1983) extended the well-known *principal component analysis* –PCA– procedure to the compositional case. The extension boils down to submitting centred log-ratios (2) to an otherwise standard PCA based on the covariance matrix. Together with Gabriel's (1971) *biplot*, which jointly represents cases and variables in a PCA, this served as the basis for Aitchison and Greenacre (2002) developing CoDa biplots.

A CoDa biplot can be understood as the most accurate representation of a compositional table in two dimensions. As in standard PCA, overall biplot accuracy can be assessed from the percentage of explained variance of the first two PCA scores. Two types of biplot which provide complementary information are available. In CoDa, the *covariance*

biplot optimises the representation of the variation matrix among content categories, and the *form biplot* optimises the representation of Aitchison's distances among senders. In both types of biplots, content categories appear as rays emanating from a common origin and senders appear as points. The interpretation is as follows (see Aitchison and Greenacre 2002; van den Boogaart and Tolosana-Delgado 2013; Pawlowsky-Glahn et al. 2015, and Blasco-Duatis et al. 2018b for further details):

1. In the form biplot, distances between two points are approximately proportional to Aitchison's distances (3) between the two senders. Senders with similar content compositions appear close together.
2. In the covariance biplot, distances between the vertices of the rays of two content categories are approximately proportional to the square root of the variance of their corresponding pairwise log-ratio (4). Content categories that behave proportionally for all senders appear close together.
3. In the form biplot, the lengths of the content category rays are proportional to the quality of the representation of contents in the two-dimensional space.
4. In both biplots, the orthogonal projection of all senders in the direction defined by a ray shows an approximate ordering of the importance of that content category for all senders and can be used to show how the content category contributes to differentiating senders.
5. The origin of all the rays is both the coordinate centre and the mean. A sender close to this centre in the form biplot behaves approximately like the geometric average of all the senders with regards to its content share.

2.4.- Content analysis of the tweets of the major Spanish political parties

The traditional system of parliamentary representation in Spain inherited from the process of transition to democracy is based on a two-party model with political power alternating between the centre-left (*Partido Socialista Obrero Español* [PSOE]) and the right, *Partido Popular* [PP]). In addition to these two large blocks, the parliamentary spectrum is completed by the green-left (*Izquierda Unida* [IU], with a social democratic ideology, and the nationalist parties (mainly from the historical regions of the Spanish state: Catalonia, the Basque Country, Galicia and Navarra). With the onset of the global economic crisis and the proliferation of serious corruption scandals in the country, 2008 saw an intense representation crisis (Bosch et al. 2017) from which, within the framework of the May 2014 European Election, two antagonistic parties emerged, which shook up the state's traditional representation and political action mechanisms: *Podemos* ('*We can*'), a left formation born of the anti-austerity movement and *Ciudadanos* ('*Citizens*'), who had emerged as an anti-nationalist counter-force in the face of the secessionist challenge in the region of Catalonia, and took the leap into state politics to fill the centre-right space.

The 20th December 2015 election, on which this study focuses, produced a paradigmatic share of parliamentary seats, confirming the demise of bipartisanship and leading to a parliament made up of: PP, the winner, with 123 seats; PSOE with 90; Podemos with 69; Ciudadanos 40 and IU 2, with the other 26 seats distributed among the regional nationalist parties. Even though the traditional parties kept their leading positions, their usual hegemony was diluted by the emergence of the forces that came to be known as *new politics*. The electoral and post-electoral scene was seriously affected by a series of factors, including the Catalan secessionist debate; the proposal of constitutional reform,

in which the demands of the Catalan region found a place; the *new* parties who singularized an electoral campaign asking for media attention and characterised by *politainment*, leading the candidates Pablo Iglesias and Albert Rivera to propose a media debate that would run parallel to the traditional two-party one; and the post-electoral pacts. As a result, forming a viable government would be unprecedentedly complex and the culmination was political stalemate and a new election on 26th June 2016.

To map the main Spanish political parties' AS on Twitter during the period of the Spanish General Election in 2015, we use content analysis (Berelson 1952; Krippendorff 2004; Wimmer and Dominick 2006) adapted to the Twitter environment. We compiled a database with the *stream*¹ of the set of tweets posted on the official Twitter accounts of the parties with a sole constituency in the Spanish state who were later represented in parliament. The total numbers of tweets made during the 32-day period (from 4th December 2015 to 4th January 2016), which included the two weeks prior to the election on 20th December 2015 and the two weeks afterwards, were: PP, 1650 tweets; PSOE, 2825 tweets; Podemos, 7279 tweets; Ciudadanos, 2918 tweets; and IU, 7673 tweets. The information in each parties' *stream* of tweets from which the database was subsequently compiled were: date and time the tweet was posted, the content of the tweet and, last, if it was a re-tweet. We selected 1000 tweets per party (5000 tweets in total) by systematic random sampling, which ensured proportional allocation according to the date the tweets were posted.

The tweets were codified manually. The need to understand the content of each tweet led us to rule out other methods, such as text mining (e.g., Kydros, 2018), because while in some cases a content could be associated with a certain key words or word-pairs easy to detect with this method (e.g., terrorism), in others this was not possible (e.g, constitution, which depending on the context could refer to its compliance – within the framework of the Catalan process – or its reform). A list of 264 issues was compiled drawing from Blasco-Duatis et al. (2017) and the study of the first 1000 tweets, and between one and six topics were allocated to each tweet. The issues were then grouped by conceptual similarity into 34 broad categories, from which only the 15 with sufficient weight were selected, from now on referred to as the top15: (1) *pacts* (the politics of pacts between parties, dialogue, understanding, forming a government, the great coalition pact PP-PSOE, in favour of a national pact PP-PSOE-Ciudadanos, pact Ciudadanos-PSOE governing from the centre, from the presidency of Congress, and so on); (2) *Catalan independence* (against nationalism/separatism, sovereignty of the Spanish nation, in favour of Spanish unity, conservatism and against the right to decide in Catalonia, Catalan cultural policy, difficulties in forming an autonomous government in Catalonia, in favour of an agreed, legal referendum in Catalonia, and so on); (3) *gender* (on sexist comments from certain politicians, proposals for the law on domestic violence, labour conciliation, sexual abuse, violence against women, and so on); (4) *terrorism* (the Syrian war, jihadism, DAESH, ISIS, ETA, and so on); (5) *corruption* (tax amnesty, under indictment, tax fraud, parliamentary immunity, IMF Lagarde case, and so on); (6) *politainment* (candidates' participation in talk shows, political discussions or entertainment shows); (7) *economy/crisis* (the global economy, the Spanish economy, austerity, cutbacks, economic recovery, bailout, at risk of poverty, campaign promises

¹ The *stream* of tweets was provided by the Spanish communications agency DNOISE, by means of the Twitter monitoring tool 'Followthehashtag'.

about Personal Income Tax and taxes, and so on); (8) *unemployment* (job creation; labour reform, scholarship recipients, job insecurity, employment-at-will, and so on); (9) *education* (reform of the Law on Education, vocational training, grant system, academia and science, and so on); (10) *regeneration/change* (old politics, new parties, end of the two-party system, the traditional parties, resistance to change, fragmentation of parties and votes, and so on); (11) *constitutional reform* (national transition, territorial reform of the privileges of the Spanish regions, and so on); (12) *welfare* (freedom of expression, inequality, social justice, privatization, social spending, citizen's rights, class struggle, social emergency plan, and so on); (13) *election campaign* (campaign launch, floating vote, anarchy and not voting in elections, tactical voting, postal voting, reflection forum, electoral commission, and so on); (14) *new technology* (social networks and new technologies, trending topic, campaign tracking by community managers, memes, and so on); (15) *international politics* (Spanish-European relations, European politics, refugees, international politics, and so on). Given the fact that the agenda-setting theory is concerned mainly with the relative presence or absence of issues in the agenda, our codification did not take into account the particular political views about the issues or the language style. See Kydros (2018) for alternative approaches using semantic networks of word co-occurrence including topics, views and language.

3.- Results

In what follows we show how the CoDa biplot can be used for visualising the phenomena associated with the AS theory, priming and the spiral of silence in the specific case study of the campaign and post-campaign information posted on the official Twitter accounts of the main Spanish political parties.

Figure 1 presents the AS theory mapping using the form biplot, made up of the top15 contents and their senders (political parties), showing –as do the AS theories priming and the spiral of silence– that the interest lies in the relative/comparative volume of the contents and not in the absolute volume, something which the usual statistical techniques do not allow for. In addition, as typically done in AS studies, the mapping is dynamic and two periods of time are compared: 1) the first two weeks of the electoral campaign; and 2) the two-week post-campaign period. According to the form biplot, the most reliably mapped top15 issues in the first two dimensions of the PCA are: *pacts*, *new technology*, *gender*, *election campaign*, *Catalan independence* and last *unemployment*; while the least reliably mapped issues are: *regeneration/change*, *international politics*, *education*, *constitutional reform* and last *politainment*. Reliability is acceptable in general, given that the first two PCA scores together explain 73% of the total variance. Apart from the biplot, the closed geometric means in the 15 issues in Table 1 (which in turn define the centre of coordinates in the biplot) indicate that the most prominent of the top15 issues across the set of parties are, in this order: *economy/crisis*, *election campaign*, *regeneration/change* and *corruption*.

Considering both periods analysed, two groups of parties that behave similarly with respect to the composition of the content tweeted can be deduced from the form biplot. In the first period, the parties PSOE and Podemos sent similar content compositions, which were different from PP's and Ciudadanos, whose content compositions were similar to each others'. This last pairing is even more accentuated in the second analysis period, with the diagram showing a tendency towards superposition (content

compositions that are almost identical). IU's distance from the other four parties in the two periods must be highlighted, which emphasizes the distinct differences in their content composition.

On another level, the information provided by this mapping is particularly interesting for interpreting the level of proportionality in each sender's issues. If we take the centre of the diagram as the paradigm of proportionality (in other words, the point that corresponds to the parties that cover the set of top15 issues in the same proportion as the overall proportion of all the parties), and we look at each parties' distance from the centre, we can order the parties that most closely to least closely follow this proportionality when dealing with the set of issues analysed, as follows: a) in the first period, Ciudadanos is the party that covers the issues in a proportion most similar to the overall proportion, followed at a certain distance by PP, Podemos, PSOE and, at a substantial distance, by IU; b) in the second period, it is Podemos that covers the issues most similar to the overall proportions, followed closely by PSOE, at a certain distance by Ciudadanos and PP and, again at a substantial distance, by IU. Thus, the set of data in the first period indicates that from Ciudadanos to IU there is a scale of inequality in the treatment of the issues established in the agenda; and the same from Podemos to IU in the second period analysed. In other words, this scale corresponds to a party talking 'a little about a lot of issues' or 'a lot about few topics'. There are notable differences between the electoral campaign period (where the parties are mapped more dispersedly) and the post-electoral period (where there is more concentration). The greater the dispersion between parties, the greater too are the differences in the composition of issues tweeted by parties.

The biplot takes on a special significance when the mapping of the AS is dynamic, as it is here. As mentioned earlier, to configure this dynamic representation a practice applied to the AS theory that is widely used among academics, consists in comparing the same sender's agendas in two different periods. Following this structure, the dynamics of the relative presence/absence or omission/signification of the issues in AS can be visualised. This mapping enables us to visualise the phenomenon known as the spiral of silence, because such dynamics established by the hierarchy of issues and AS result in a process of signification of certain issues at the expense of others, which are relegated or omitted. In Figure 1 we can appreciate that in the transition from one period to the other (represented by the broken line), a first level of the spiral of silence is constructed, as we go from a first electoral campaign period where there are four outstanding issues (*gender, unemployment, economy/crisis and corruption*) to a second post-electoral period characterized by four totally different issues (*pacts, new technology, election campaign and Catalan independence*). It is important to contextualise that in the first period there is a focus on seeking electoral support, where the issues are at the centre of the confrontation between the parties' electoral campaigns to win electoral support; whereas in the second period, it is the support from the party bases and seeking common ground that dictates what issues are preeminent now that the need to make post-electoral pacts to form a government is uppermost.

Figures 2 and 3 are the covariance biplots for the first two weeks (the electoral campaign) and the second two weeks (the post-campaign), respectively. According to the covariance biplots, the contents *pacts* and *Catalan independence*, whose extremes are close together in both periods, tend to maintain a proportional relationship: If one of the parties sends relatively more tweets about *pacts* than another, it also sends relatively

more tweets about *Catalan independence*. Contrarily, the contents *unemployment* and *new technology*, whose extremes are far from each other in both periods, maintain a mutual ratio that is very different between parties. In some parties, the content *unemployment/economy-crisis* is much higher than *new technology* while for some it is the other way around. Within periods, in Figure 2 the contents *education*, and *unemployment* and *economy/crisis* are near each other, but are far from the contents *welfare*, *international politics* and *terrorism*. On the other hand, in Figure 3 the contents *constitutional reform*, *education* and *unemployment* are the ones that are close together and *new technology*, *election campaign*, *welfare*, *regeneration/change* and *terrorism* are the furthest from the contents *pacts* and *Catalan independence*.

In the covariance biplot in Figure 2 (first two weeks' analysis, the electoral campaign), if we project the parties orthogonally in the direction of the contents *corruption* and *regeneration/change*, it can be seen that the parties with the greatest proportion of both contents are Podemos and PSOE and those with the least, relatively speaking, are IU, PP and Ciudadanos. Similarly, if we take the same case in Figure 3, (second two weeks' data, post-campaign), it can be seen that there are substantial changes: regarding the content *corruption*, it is IU who covers this issue most, followed by PP and Ciudadanos, and at a significantly greater distance by Podemos and PSOE; while for *regeneration/change*, it is Podemos and PSOE who cover this issue most and Ciudadanos and PP least.

The relationships established between senders and contents describe the issues that seem to be more closely associated with each party, as well as those that are furthest from defining the composition of the parties' agendas. What derives from this reading of the compositional biplot could be considered as a depiction of the priming effect of each party and on the set of contents of the AS. If we understand that each vector (issue) is represented with varying emphasis by the different senders, we can map that certain issues do not only recur globally, but also appear to be associated with a particular party, in the sense of their relative presence or even absence.

Figure 2 shows how the contents *corruption* and *regeneration/change* are narrowly associated, but beyond how these issues recur more frequently than others in the cases of Podemos and PSOE (i.e., agenda-setting in the true sense of the word), it allows us to visualize that within a context of rationality their affiliation for each party leads both of them to a priming effect described by the logic that the more often the content *corruption* recurs, the more often the content *regeneration/change* appears. The contents *pacts* and *Catalan Independence* in Figure 2 are also examples of this priming effect, especially in relation to the parties PP and Ciudadanos. Similarly, in Figure 3 the issues *politainment* and *unemployment* stand out, again in relation to PP and Ciudadanos. Furthermore, these last two examples, which manifestly define the priming effect for the most recurring contents for PP and Ciudadanos, are also in turn the contents that in both cases opposingly denote this effect for the parties Podemos and PSOE.

4.- Conclusions and discussion

By applying the CoDa biplot to the content of political communication, in this case via the Twitter accounts of political parties, we were able to visualise their agendas in an intuitive manner. The biplot also allowed us to focus the analysis on the relative

importance of each type of content to see which parties emphasise which contents, which parties are similar or different to one another, which contents parties treat in similar or dissimilar ways (priming) and which contents tend to be left out (spiral of silence).

The analysis of priming allowed us to see, for instance, how parties aiming at replacing PP in the government focused on corruption and regeneration/change prior to the election, when attracting voters was of utmost importance. When it comes to justify pacts to the party bases, when such pacts may involve parties with lawsuits for corruption, priming immediately focused on other issues, such as the need for the pacts themselves and Catalan independence, issues on which there was general agreement. Corruption is not the only topic which was relegated in a spiral of silence in the second period. Welfare and gender were also uncomfortable topics on which parties which were seeking pacts had profound disagreements, so that for the sake of the pacts the better option was to relegate them.

In a more global conception of the results achieved in this article, the application of CoDa as a tool to map the political agenda opens up new opportunities for studying the relationships between political parties and the topics that are subject to public debate (AS policy). In this sense, the comparative study between electoral time periods (pre-campaign, campaign, election day and post-campaign), the links that are established between the different political senders (visualized as the distances between the senders in the biplot), as well as the relationships between these senders and the issues presented in the public-media discourse scenario (propitiating priming or spiral of silence effects), not only allow a dynamic advancement in the establishment of the political agenda, but can also be a framework for the analysis of political discourse in the digital media sphere.

As regards limitations, the CoDa-biplot admittedly conveys an incomplete portrait of the spiral of silence. In a follow-up analysis, the group of issues discarded because of their small volume when the top15 were constructed should be considered. Furthermore, the issues upon which none of the parties focus in their AS on Twitter are not even codified during the content analysis phase, although this would pose similar problems for the commonest statistical methods based on frequencies, rankings and correlations.

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Table 1.- Closed geometric means of the top15 issues

Top15 issues	Closed geometric means
pacts	0.063
Catalan independence	0.064
gender	0.067
terrorism	0.010
corruption	0.109
politainment	0.066
economy/crisis	0.126
unemployment	0.092
education	0.043
regeneration/change	0.110
constitutional reform	0.057
welfare	0.056
election campaign	0.113
new technology	0.010
international politics	0.014

Figure 1.- Form biplot of the top15 issues in the electoral campaign period and the post-electoral campaign period

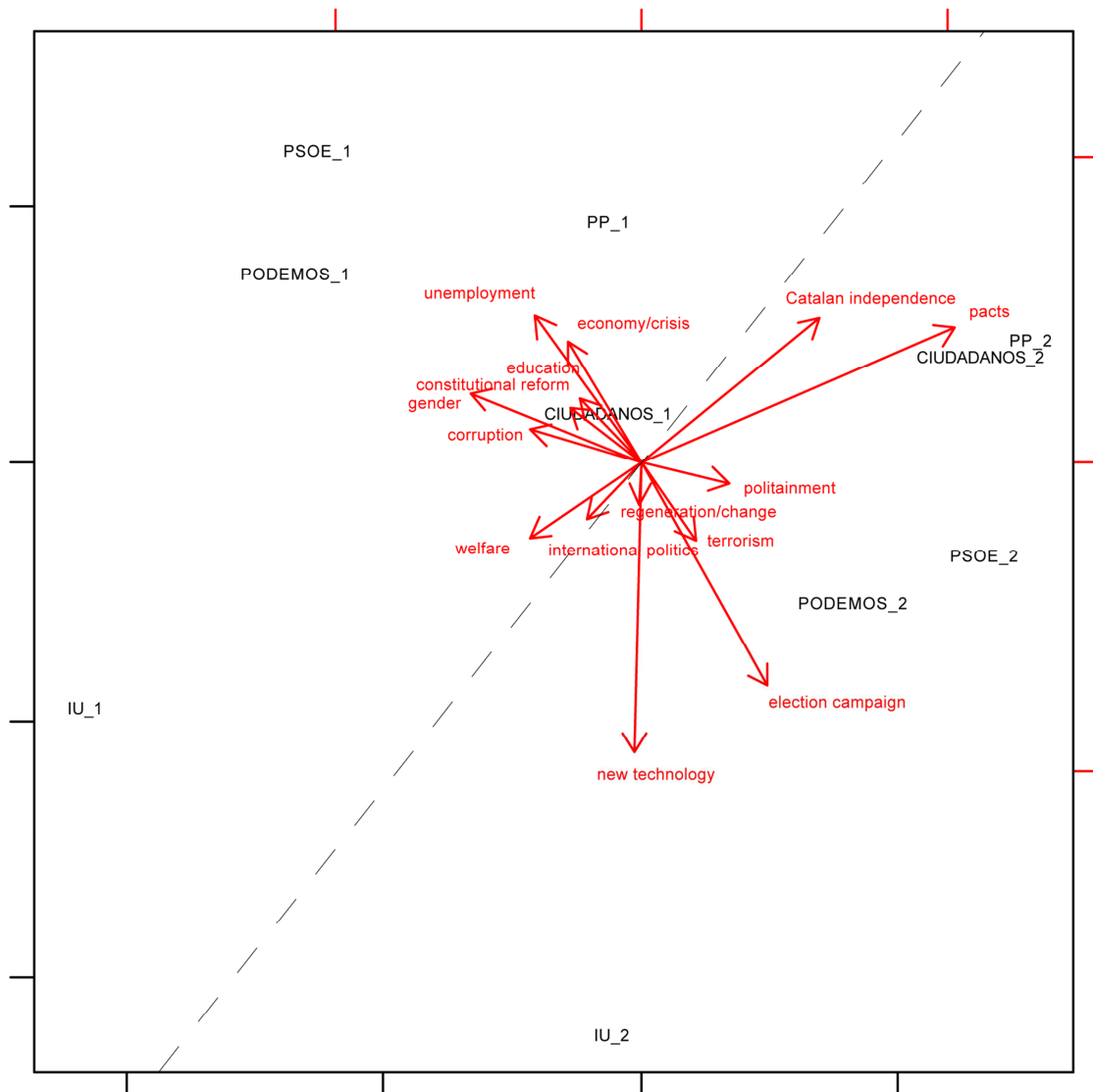


Figure 2.- Covariance biplot of the top issues in the electoral campaign period

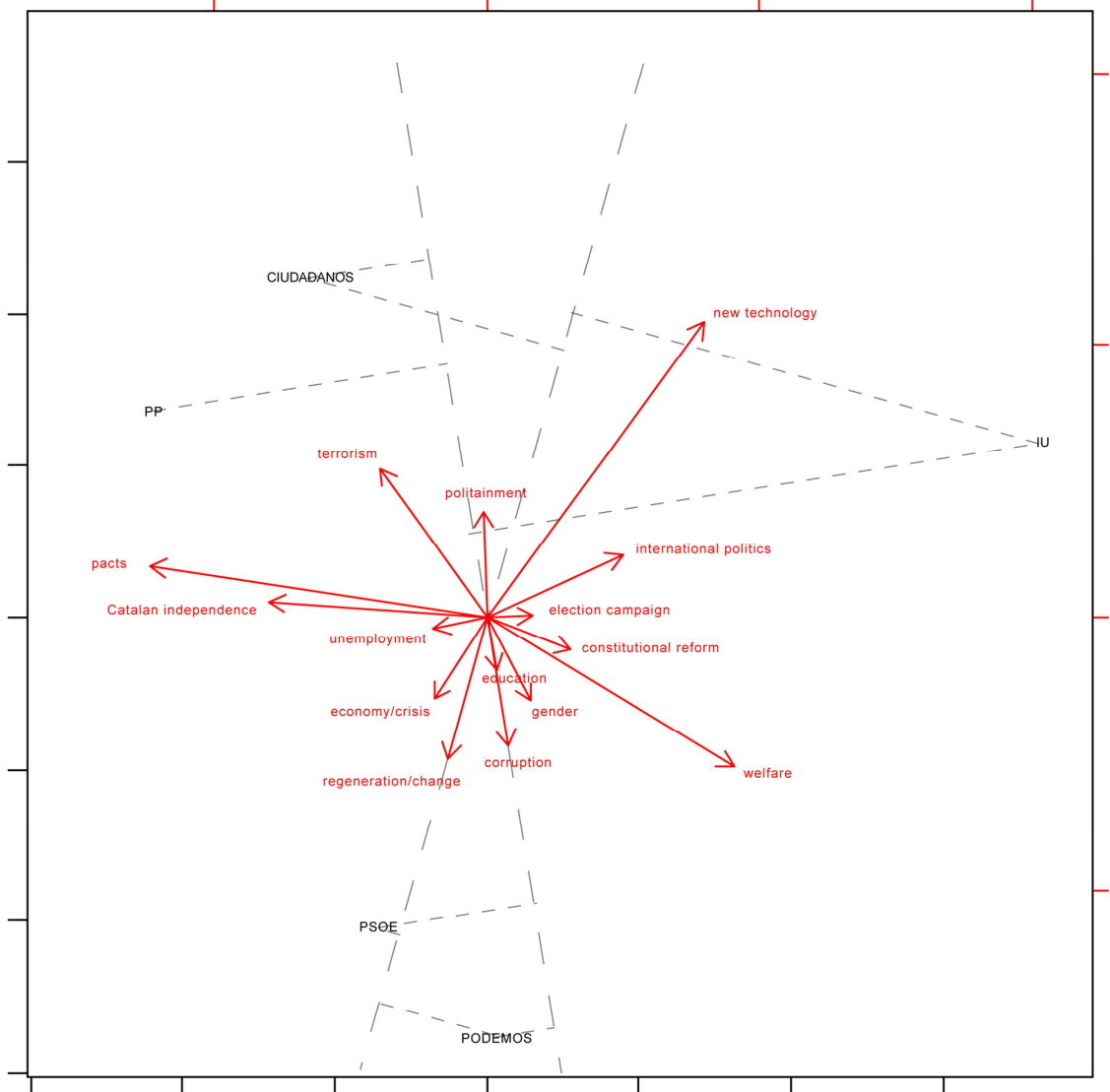


Figure 3.- Covariance biplot of the top issues in the post-electoral campaign period

