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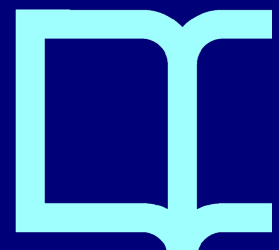
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Media diet and polarisation: Evidence from Spain

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Media diet and polarisation: Evidence from Spain

Does media diet diversity influence affective polarisation of the public? We analyse data from Spain, which like other South European countries has a highly politicised media system. The study operationalises media diet diversity based on web-tracking data. It considers diversity both in terms of the quantity of media consumed and exposure to opposing viewpoints using the two politico-ideological dimensions that conventionally define Spanish politics: left–right and centre–periphery. While some indicators of media diet diversity point towards a reduction of ideological extremism, others show an increase of polarisation when referring to the polarisation produced by territorial identities. The study results illustrate the complex relationship between media diet and polarisation.

Keywords: affective polarisation, ideological extremism, selective exposure, cross-cutting exposure, digital media, media systems, web-tracking data

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This study focuses on the relationship between media diet and polarisation. While most studies have found that exposure to like-minded information increases polarisation, the effect of a more diverse media diet remains disputed. It has been argued that in high-choice media environments, individuals can easily select the type of information to which they are exposed (Arceneaux & Johnson 2010; Prior 2007), resulting in a highly fragmented media landscape with an increasing number of partisan media outlets targeting niche audiences (Prior 2013; Stroud 2010). As such, fears arise that these processes of fragmentation and audience specialisation would inextricably lead towards a more polarised political system.

As a partial challenge to these pessimistic views, this study argues that the rich informative context propitiated by the internet can induce increased exposure to different media and viewpoints despite the natural tendency towards the homophilic consumption of information. In certain cases, this scenario can favour a decrease in ideological and affective polarisation. However, it can also reinforce polarisation, particularly in highly contested conflicts. As demonstrated by the Spanish case, the potentially divisive nature of the centre–periphery issue in Spanish politics, which is typically stimulated by an ‘us-versus-them’ frame, can in fact transform exposure to diverse viewpoints into a source of polarisation.

This argument is based on an analysis of the digital media diet of Spanish citizens, measured in terms of quantity of media outlets and exposure to heterogeneous viewpoints as well as how such a diet contributes to their individual levels of affective and ideological polarisation. For this analysis, we take advantage of the E-DEM dataset that offers survey panel data with tracking information on respondent’s media usage (for information on this dataset, see Torcal et al. 2016). This dataset allows us to connect individual respondents’ change in attitudes with their media diet usage, thus

providing more reliable information than the one obtained by self-reported survey data. Additionally, these data allow us to operationalise the concept of media diet diversity through various measures to capture its different facets. Some measures are derived from the literature on spatial models of party competition, namely, the average ideological distance between the individual and the visited media outlets and the average intensity and directionality of media diet, while others more straightforwardly rely on the quantity of media consumed and the exposure time towards these outlets.

Our study covers a particularly turbulent period in Spain (2018–2019), when polarisation had been at the centre of political debates owing to the emergence of new extreme political forces and the persistence of divisive and controversial identity issues, such as the debate on Catalonia's independence (Simón 2020; Torcal 2021). Additionally, Spain has a highly polarised media system (Hallin & Mancini 2004), making it an interesting case for analysing the impact of media diets on polarisation.

How does media diet affect polarisation?

The concept of media diet refers to the regular set of media sources that individuals use for accessing news and political information (Dubois & Blanck 2018; Wolfsfeld, Yarchi & Samuel-Azran 2016). In a diverse and fragmented media landscape, accelerated by the internet (Blumler & Kavanagh 1999; Van Aelst et al. 2017; Prior 2007), individuals tend to rely on various media outlets. As explained by selective exposure, individuals tend to more frequently consume information from congenial media sources (Stroud 2010; Iyengar & Hahn 2009). However, that does not exclude the possibility of having a diverse and varied media diet and of being exposed to a wider spectrum of viewpoints (Gentzkow & Shapiro 2011; Garrett, Carnahan & Lynch 2013; Garrett 2009).

Recent studies have found that being exposed to non-congenial information is presently more common because online information is highly accessible and individuals are more likely to be unexpectedly exposed to it (Barberá 2015; Brundidge 2010; Dubois & Blank 2018; Dvir-Gvirsman, Tsfati & Menchen-Trevino 2016; Mutz 2006). The two different mechanisms of exposure to non-congenial viewpoints identified by these studies enable distinguishing two dimensions of media diet diversity.

The first simply refers to the quantity of media outlets from which information is obtained. A taste for a type of diet offered by multiple media outlets does not necessarily imply being exposed to different opinions, because in general, one can find similar approaches and content news from a range of other media outlets. The proliferation of media outlets on the internet provides the public with access to a wide variety of media in terms of content and treatment. However, it increases the choice among similar alternatives. Nevertheless, as emphasised by the literature on unintended exposure to the internet, this study infers that consuming more media increases the probability of exposure to non-congenial viewpoints (Garrett, Carnahan & Lynch 2013).

The second dimension is the heterogeneity of the media diet and is related to the genuine taste of individuals in experiencing different viewpoints. Schematically, we can consider two forms of motivation that can drive one's habit to consume information as opposed to one's preference (Garrett & Stroud 2014). The first is the conscious interest in being thoroughly informed about issues of concern, which may be useful for verifying information supplied by sources closer to one's current preferences. However, it may also induce the acquisition of a certain understanding of the viewpoints and rationales of other social groups or political interests (Cappella, Price & Nir 2002; Mutz 2006). The second is the desire to be knowledgeable about the arguments of the adversary not to understand but to better fight against them. This motivation is

characteristic of gladiators, who enjoy confrontation through public debates (Taber & Lodge 2006; Westen et al. 2006).

From this discussion, this study derives several hypotheses on the relationship between media diet and polarisation. The first hypothesis is related to the first dimension of media diet and links the quantity of media consumption with polarisation. We expect that a poorly varied media diet, which comprises only a few outlets, will reduce the opportunities of exposure to different viewpoints. That can exacerbate polarisation because the lack of plurality may overemphasise one-sided information. Conversely, the higher the quantity of media consumed, the more likely the encounter between opposing viewpoints, even unintendedly, which may contribute to the attenuation of polarisation (Barberá 2015; Mutz 2006).

Hence, we formulate the following hypothesis:

H1: The lower the quantity of outlets in an individual's media diet, the higher the individual polarisation.

Nevertheless, both the quantity and heterogeneity of media diet influences polarisation. Consumption of like-minded media is likely to stimulate an individual's polarisation through several mechanisms. The lack of balanced and challenging information leaves one's own opinions and position unquestioned, consequently rendering those arguments that reinforce pre-existing ideas and beliefs more convincing (Sunstein 1999, 2002). Regarding the aforementioned issue, several studies have shown that both interpersonal political discussions in homogeneous networks (Huckfeldt & Sprague 1995) and consuming pro-attitudinal information (Smith & Searles 2013) can strengthen previous attitudes.

Furthermore, consuming identity-supportive information can make one's social identity more visible and salient. Doing so can further encourage identification with one's own group and affect perceptions towards other groups, ultimately leading to polarisation (Kim & Zhou 2020; Levendusky & Malhotra 2016; Post 2019; Price 1989; Slater 2007). Unsurprisingly, consuming supportive information is often connected with affective polarisation (Garrett et al. 2014).

Another mechanism proposed to explain this polarising effect is the emergence of consensus by social comparison, which involves individuals aligning their positions in the direction of the group's perceived dominant position (Doise 1969; Isenberg 1986), as is expected in a spiral of silence process (Noelle-Neumann 1984). Thus, exposure to like-minded environments can exacerbate the perception that one's ideas and beliefs prevail in society and are more socially accepted than in reality. Such thinking would reinforce individual positions alongside the perceived social majority. Given this context, we formulate the following hypothesis:

H2: The more homogeneous the media diet individuals are exposed to, the higher the individual polarisation.

The effect of cross-cutting exposure is less clear, with studies showing mixed findings. The traditional theoretical perspective is that exposure to others' points of view tends to decrease political extremism and polarisation. For most democratic deliberation theorists, exposure to diverse and opinion-challenging information can help moderate one's position and countervail polarisation tendencies as it provides the opportunity to consider alternative viewpoints more carefully (Gutmann & Thompson 1996; Mutz 2006). Several studies have found that exposure to disagreement in media or personal networks exerts significant effects on politically relevant variables. This

exposure increases tolerance towards diversity (Price, Cappella & Nir 2002; Amsalem et al. 2021) and influences political participation (Castro Herrero & Hopmann 2018; Dilliplane 2011) or political knowledge (Kim 2019; Eveland & Hively 2009; Feldman & Price 2008). Furthermore, experimental research suggests that the existence of deliberative norms, including a more careful attention to alternative viewpoints, can also attenuate polarisation, even within like-minded discussion groups (Strandberg, Himmelroos & Grönlund 2019). Following this line of reasoning, we propose the following hypothesis:

H3: The more heterogeneous the media diet individuals are exposed to, the lower the individual polarisation.

However, some scholars found just the opposite result: exposure to information that contradicts one's own opinions or beliefs further reinforced previous opinions and even reinvigorated political activity. These contradictory results can be explained by cognitive biases and personal traits that can lead to individuals processing information differently (Leeper 2014; Taber & Lodge 2006; Zaller 1992). Evidently, this scenario is more likely to occur in terms of societal topics that are individually experienced from a controversial viewpoint, which can prompt a desire for mind closure (Kruglanski 2013). Additionally, media outlets frequently exploit these issues to attract the attention of their public. Consistent with motivated reasoning theories, individuals—especially those who feel strongly about an issue and are more politically sophisticated (Taber & Lodge 2006)—can more easily resist opposing messages and even enjoy spending time consuming information they disagree with and developing arguments to refute such information, which may reinforce their prior attitudes. Although disagreement can enrich the quality of one's opinions (Price, Cappella & Nir 2002) and increase political

knowledge and participation, such benefits can be attained at the cost of reinforcing attitudinal polarisation (Kim 2015, 2019). Simultaneously, informative content, or the way that this information is provided, can reinforce previous information held by individuals or activate social identity frames that trigger affective polarisation (Han & Federico 2018; Kim & Zhou 2020; Robison & Mullinix 2016; Slater 2007).

Alternatively, our third hypothesis can be specified in the following terms:

H3a: In socially controversial issues, the more heterogeneous the media diet individuals are exposed to, the higher the individual polarisation.

Polarisation in a politicised media system

The E-DEM dataset contains the results of an online panel survey covering an intense electoral cycle that starts with the Andalusian Parliament elections held in December 2018, continues with the Spanish general elections held in April 2019 and ends with local, regional and European elections held in May 2019 (Torcal et al. 2020) (for technical information, see the online appendix Table 1A). During this period, there have been many strong tensions and conflicts, thus affecting the bi-dimensional space that has traditionally defined Spanish politics (Simón 2020). On the ideological axis, this period triggered the re-emergence of extreme-right political forces (Vox) in significant representative institutions, which has in turn transformed the Spanish electoral market. The results achieved by this extreme-right-wing party in the Andalusian elections have added pressure to subsequent election campaigns, with the political debate being focused on the rise of extreme-right and new populisms.

On the territorial axis, the debate has continued to be dominated by the issue of Catalonia's independence. Both axes are inextricably connected (Galais & Serrano 2020). The movement for Catalonia's independence unleashed a new wave of Spanish

nationalism that has invigorated extreme-right rhetoric. The right-wing forces—Ciudadanos (Citizens-Cs), Partido Popular (Popular Party-PP) and Vox—have triggered an outbidding competition in terms of being more radical in defence of the Spanish identity; however, other state-wide forces, out of the fear of electoral costs, are not immune to such rhetoric and have attempted to emphasise their commitment to the unity of Spain.

The Spanish media system makes the case even more interesting. Portrayed as a paradigmatic example of the Mediterranean or polarised model (Brüggemann et al. 2014; Hallin & Mancini 2004), Spain is characterised, inter alia, by a highly partisan and politicised media system and practices of political clientelism (Hallin & Papathanassopoulos 2002; Pfetsch 2014). Both the crisis of legacy media and the fragmentation of the media landscape because of the digital revolution have intensified the phenomenon of political parallelism, which is characteristic of southern Europe (Mancini 2013). Recent public opinion survey data (Eurobarometer 90/2018) show that Spain ranks comparatively low in media pluralism, with only 58 per cent of surveyed respondents reporting that media provide diversity of views and opinions. Empirical analyses on media coverage of current events reveal a remarkable level of partisanship among Spanish media outlets (Fletcher, Cornia & Nielsen 2020; Micó & Carbonell 2017).

How to measure polarisation and media diet diversity?

The data used for this analysis are derived from the four-wave E-DEM panel dataset, which was designed particularly to study polarisation in Spain. This rich dataset contains behavioural data capturing the visits to a wide array of categories of websites, including media outlets' websites and the amount of time spent on each website. These

data were captured through a software installed by survey respondents to track their internet activity during a 30-day period for each wave. The web-tracking was limited to a list of the most relevant (up to 30) Spanish media outlets (the list is available in the online appendix Table 2A).

The combination of panel survey data and behavioural data provides a powerful basis for analysing the relationship between polarisation and media consumption, as it allows focussing on actual media diet habits and avoiding the biases usually associated with self-reported media consumption. This approach aligns with an increasing number of studies that focus on the quality of digital trace data (Bosch & Revilla forthcoming, N. D.) and introduces web-tracking data to collect more accurate information on media diets (Cardenal et al. 2019; Dvir-Gvirsman et al. 2016; Flaxman, Goel & Rao 2016; Gentzkow & Shapiro 2011).

The statistical analysis was conducted through ordinary least squares (OLS) regressions. Although the E-DEM dataset includes four waves, analysis is limited to the first and third waves owing to the availability of data, because several variables required for analysis are not included in all waves, and because of the relevance of the time period. Thus, the model covers the span between October 2018 and April 2019, when the elections for the Spanish Parliament were held.

The model takes advantage of the unique ability of the panel data in measuring the individual change in polarisation between the first and third waves. As polarisation is substantively assumed to be the result of the media diet consumed, the model takes the measures of media diet in the first period as explicative of the observed variation in polarisation between the abovementioned waves. Thus, our study focuses on measuring

the influence of the quantity and heterogeneity of media diet in a previous time on posterior polarisation through the extensive operationalisation of six indicators¹.

Given the data limitations (partly as an unintended outcome of the rich operationalisation of the variables of media diet) and the conceptualisation of the substantive relationships between variables, this model is seemingly a reasonable methodological alternative to straightforwardly estimate the effects of consumed media diet on polarisation.

About polarisation

We consider two different measures of polarisation as dependent variables. The first is ideological extremism, which is calculated as the absolute distance between an individual's self-placement in the left–right spectrum and the average position in the sample (for details, see the online appendix Table 3A). The second is territorial affective polarisation, which is based on a feeling thermometer that measures the level of sympathy towards different territorial groups in Spain. The variable is calculated as the mean distance between one's own territorial group and that of others (for detailed discussion, see Torcal & Comellas 2022).

¹ Individual fixed effects models, although considered and estimated, were discarded. Moreover, although suitable for testing the impact of the variation in media diet between waves, they are less suitable when focusing on the effect of previous levels of media consumption. We opted for a reasonably simpler model that connects media diet and polarisation, which enables the inclusion of relevant invariant panel variables, such as those related to the hardness or closeness of individual attitudes when exposed to different viewpoints (e.g. issue extremism, political information or political party closeness). Admittedly, using a structural equation model with lagged media diet to determine its impact on attitude and affective polarisation would help to shed more light on the causality between variables and explore the hypothetical recursivity of this relationship. The novelty of our approach, however, is the proposal of different operationalisations of media diet, which justifies the choice of a simpler model as a first step to assess how media diets can explain individual polarisation.

In the regression model, we calculate both dependent variables as the difference between the first and third waves to capture variations over time. Thus, a negative value means an increasing level of depolarisation, whereas a positive one means an increasing level of polarisation.

Media diet indicators

Media diet measures based on survey questions are particularly problematic because of the issues of recall and endogeneity that plague their validity. Despite drawbacks, behavioural data are more accurate with regards to actual media consumption (Jürgens, Stark & Magin 2020; Prior 2013; Revilla, Ochoa & Loewe 2017; Vraga & Tully 2020). However, this comes at the cost of another kind of inaccuracy in terms of the measurement of the actual informative content and framing of the news to which a respondent is exposed. Experimental research address this problem by assigning individuals to different treatments or news content, but this time at the cost of external validity.

This study responds to this quandary by elaborating on two measures of media diet diversity related to the dimensions discussed in the theoretical introduction. The first is based on the number of media outlets visited and the time spent on them, which assumes that visiting numerous media outlets offers greater exposure to a wide range of political positions and arguments. The second does not focus on the quantity but on the heterogeneity of the composition of media diet. The latter measure is based on the differences between the politico-ideological preferences expressed by the respondents and the positions attributed to the media outlets visited, assuming that these positions reflect their politico-ideological slant, informative content and journalistic style. Therefore, large average differences between the respondents' and the media outlets'

positions imply a greater exposure to dissimilar viewpoints (descriptive statistics of the media diet variables are available in the online appendix: Table 4A).

Total number of media

A raw measure of media diet diversity could involve visiting different media outlets, assuming that the higher the quantity, the wider is the spectrum and the more likely is the possibility to find different perspectives and viewpoints (Dubois & Blank 2018). The total number of media (TNM) is the most parsimonious way of measuring diet variety.

$$TNM = \sum_{i=1}^n \text{Visit Media}_i$$

Effective number of media

A more refined measure of media diet diversity would also include the time spent on each media outlet, assuming that a diversified diet requires a balanced consumption of different media. Thus, it is possible that an individual's diet, despite being mostly focused on a single or a reduced set of media outlets, also contains sporadic visits to a wide range of other media because of, for example, links shared through social networks. However, a high number of visits to different media outlets does not imply actual exposure to other viewpoints. Therefore, we have calculated the effective number of media (ENM) outlets as an alternative indicator of media diversity. This approach is inspired by the effective number of political parties concept (Laakso & Taagepera 1979), computed as the inverse of the Hirsch–Herfindahl measure of industrial concentration. It measures the ‘fragmentation’ of the attention of respondents for all media consumed, considering that some media outlets attract more attention—and

therefore time—than others. ENM equals the number of media visited only when the time spent on each media outlet is distributed equally.

$$ENM = 1 / \sum_{i=1}^n \left(\frac{\text{duration media}_i}{\sum_{i=1}^n \text{duration media}_i} \right)^2$$

Heterogeneity of the media diet: Euclidean distance

Additionally, we have estimated the heterogeneity of the respondents’ media diet in terms of the distance between their political preferences and the political slant of the media outlets they visit. Studies have used different strategies to classify the ideological slant of media outlets and capture the audience’s media diet in terms of ideological diversity. Sometimes, media outlets are simply classified as ‘mainstream’ or ‘neutral’ against ‘proparty and counterparty sites’ (Garrett et al. 2014). Dilliplane (2011) used the results of a representative telephonic survey to obtain the general public’s perceptions and classify TV programmes as slanted towards the Democrats, the Republicans or neither (neutral) to measure the proportion of counter-attitudinal media to which each respondent was exposed.

In this study, we have used an indirect strategy. Combining survey information on respondents’ self-placement on the relevant politico-ideological dimensions and web-tracking data, we calculated the ‘distance travelled’ by individuals in their search for and consumption of digital media; Fletcher et al. (2020) used a similar source of information to measure audience polarisation in different countries. As the two connected politico-ideological scales—that is, the left–right dimension and the centre–periphery conflict—are relevant to convey political and policy preferences in the Spanish political system, we have computed the distance for both political conflict dimensions.

First, we estimated the position of each media outlet along these two dimensions to calculate the distance travelled by each respondent. For this calculation, we considered the average self-placement of the usual consumers of these media outlets; ‘usual’ refers to the fact that respondents visited these media outlets at least in three out of four waves. This assumption is based on the fact that individuals tend to consistently consume media outlets that are ideologically closer to their preferences, considering homophily as the basis of the selective exposure phenomenon (Dvir-Gvirsman 2017). In this way, we avoided the impact of occasional visitors that could disproportionately distort the average score.

We assumed that the number of waves in which a respondent visits a media outlet measures the fidelity towards this media outlet with some accuracy. Respondents who visit a given media outlet in three or more waves are categorised as a typical audience sample of that media outlet (descriptive values are available in the online appendix, Table 2A). To externally validate the locations of the media, we compared the estimated locations of our media outlet samples with the self-placement of the audience on the left–right dimension in the Spanish public opinion survey data (CIS 2019). For the comparison, we selected questions enquiring about the favourite sources of political information during election campaigns (which can be easily understood as a way of stating the political media outlet that is closer to one’s own ideological location) and found a remarkable level of correlation ($r = 0.85$). Altogether, this empirical evidence is consistent with the idea that regular media consumers better reflect the true underlying location of the media outlet.

We calculated several indicators based on the distance travelled by individuals in their media diet and selected two. The first indicator is the sum of the Euclidean distances travelled by the consumers weighted by the time devoted to each media outlet.

This indicator is computed relative to the total number of media (TNM) outlets visited. Therefore, this measure is the average distance travelled by each respondent in each political conflict dimension relevant in Spanish politics (i.e. left–right and centre–periphery) weighted by the time exposure to each media. The more the individual consumes information from distant media outlets and the more the time devoted to them, the higher the value of this indicator will be.

$$Euclidean\ Distance_{LR} = \frac{\left(\sum_{i=1}^n \sqrt{(LR_{resp} - LR_{media_i})^2} \left(\frac{duration\ media_i}{\sum_{i=1}^n duration\ media_i} \right) \right)}{TNM}$$

$$Euclidean\ Distance_{CPC} = \frac{\left(\sum_{i=1}^n \sqrt{(CPC_{resp} - CPC_{media_i})^2} \left(\frac{duration\ media_i}{\sum_{i=1}^n duration\ media_i} \right) \right)}{TNM}$$

Heterogeneity of the media diet: Intensity and direction

The second indicator is inspired by the directional-intensity model of politics. The Euclidean distance indicator reflects the respondents' taste for consuming a distant selection and treatment of political information; however, it does not consider the fact that the politico-ideological space is not homogeneous. Our second indicator does consider that the politico-ideological space represents opposing ways of dealing with problems. In the extreme, each political issue can be reduced to a dichotomy between opposing courses of action—here, the classical reference is Duverger (1987, pp. 242–243). The further away an alternative is from the neutral centre where the two sides of the issue make contact, the more extreme it is. This specific topology of the politico-ideological space—that arouse Stokes's (1963) early criticism of Downs's (1957) spatial models of voting—has been adopted by the directional model of politics

developed by the works of MacDonald and Rabinowitz (1989) which is based on a classic cognitive model in psychology (Coombs 1964). In this symbolic response model, there is a direction to the response and magnitude or intensity of the response. The former depends on which side of the politico-ideological space the evaluated object and the evaluative subject are located, while the latter depends on the distance of the object and the subject from the neutral centre.

We have operationalised the concept of directionality and intensity in media consumption as the product between the media outlet location on the centred political dimension and the respondent's self-location in the same dimension. As in the Euclidean distance, intensity is made relative to the TNM outlets visited. Unlike the distance measure and the ENM outlets visited, the intensity indicator is not weighted by the time spent on each media outlet visited to make it more easily interpretable. As each product can be either positive or negative (depending on whether it is on the same side of the ideological dimension), the result is the net concordance or discordance between each respondent and their media diet. Thus, a positive sign indicates that the respondent tends to consume media outlets that are on their side of the political spectrum, whereas a negative sign indicates that they tend to consume media outlets that are on the opposing side of the political spectrum.

$$Intensity_{LR} = \left(\sum_{i=1}^n (LR_{resp} \cdot LR_{media_i}) \text{visit } media_i \right) / TNM$$

$$Intensity_{CPC} = \left(\sum_{i=1}^n (CPC_{resp} \cdot CPC_{media_i}) \text{visit } media_i \right) / TNM$$

In some way, this operationalisation is a variant of a typical way of measuring the diversity of the media diet in bipartisan political systems (such as the US), wherein each media outlet and each respondent are categorised dichotomically as being conservative or liberal, and the indicator computes the proportion of counter-attitudinal media to which each respondent is exposed (Dilliplane 2011; Garrett et al. 2014). In this study, the difference stems from considering the distances or radicality of both media outlets and respondents, which allows for a more accurate account of exposure to cross-cutting or dissonant information.

Controls

Besides some usual socio-demographic controls (age, gender, education and autonomous region) in the regression models, we include a set of variables related to the level of respondents' political interest and mobilisation. These measures include (i) party closeness and political interest, both of which are four-point ordinal scales; (ii) an additive index of political information that is built upon a battery of questions enquiring the type of media (TV, radio, newspapers and internet) used to obtain information about current political issues and the frequency of its use and (iii) an index of issue extremism positioning, which has been computed by adding the squares of the respondents' position on several zero-centred scales asking for preferences and attitudes on different political issues (such as opinions towards immigration, same-sex marriage or state intervention in the economy). (For details on the exact wording of the questions, indices' construction and descriptive statistics of these variables, see the online appendix and Table 5A).

A complex media diet impact

This section presents the results of the OLS regression models. The descriptive statistics of the dependent variables and the six measures of media diet diversity can be found in the appendix. Although some of these variables are highly correlated (see the online appendix Table 9A), they do not exhibit problems in multicollinearity (as assessed using variance inflation factors in the online appendix (Table 8A), where none of the variables reached a value of 3), which confirms that they are in fact capturing different dimensions of media diet.

Table 1 shows the results using the differences in ideological extremism and territorial affective polarisation between the first and third waves of the panel data as dependent variables. The table includes the standardised coefficients of the focus independent variables: total number of media (TNM), effective number of media (ENM), Euclidean distance and the intensity/direction. The coefficients of the rest of the independent variables are reported in the online appendix (Tables 6A and 7A).

(Table 1)

Overall, the results displayed in Figures 1 and 2 support the idea that there exists a connection between media diet and territorial affective and ideological polarisation. The complexity of the results demands a nuanced interpretation.

The indicators of TNM and ENM tend to show a significant effect on polarisation. Consistently with H1, when considering polarisation in terms of ideological extremism, we find that visiting more media outlets is strongly and statistically significantly related to decrease in ideological extremism of individuals, while there is no significant effect with respect to the ENM outlets visited.

(Figures 1 and 2)

However, when considering the territorial affective polarisation variables, TNM reverses its sign and has a positive impact on polarisation (against H1), whereas ENM has the expected statistically significant depolarising effect. This means that being exposed to numerous sources of information (TNM) exacerbates polarisation; however, when the attention paid to the media consumed is more balanced (ENM), there is depolarisation.

The indicators of media diet heterogeneity based on the Euclidean distance and the intensity of the media diet are relevant in the ideological extremism model. The heterogeneity of the media diet measured on the left–right ideological scale is strongly associated with depolarisation, which is consistent with H3, while the heterogeneity of the media diet measured on the territorial scale is associated with polarisation, as expected in H3a. The variables measuring the direction and intensity of the media diet follow a similar pattern of the Euclidean ones, although over the conventional statistically significant level of 0.05.

In the model of territorial affective polarisation, partially paralleling what happens with ideological extremism, the media diet heterogeneity measured on the Euclidean centre–periphery scale increases polarisation, although at the lowest level of significance (0.10), while the rest of the variables are not statistically significant.

Together, these results add some nuance regarding the relation between media diet and polarisation when considering different sources of conflict. These

results highlight the polarising potential of the territorial dimension in the current Spanish context.

A polarising potential of national identity?

Spain is an interesting case for analysing the relationship between media diet and polarisation in a context characterised by more than one dimension of political conflict and a media system with high levels of political parallelism. The combination of web-tracking and panel survey data has been the basis for generating several measures of media diet diversity based on individuals' actual habits of media consumption. Despite the minimal effects paradigm expectation of finding statistically insignificant results, (Bennett & Iyengar 2008, 2010), we found that our measures of media diet diversity explain changes in polarisation both in terms of territorial affective and ideological extremism, although—of course—explaining only a tiny part of their variance.

The indicators of media diet diversity based on the quantity of media consumed, that is, the total number of media (TNM) and the effective number of media (ENM), exhibit different results in terms of the function of the selected dependent variable. Although these indicators seem to have the expected depolarising effect when considering ideological extremism, they produce an ambivalent result when considering territorial affective polarisation. A possibility is that such ambivalence captures two types of attitude and motivation in accessing information. In other words, TNM is associated with polarisation because it may reflect only superficial attention to any media found while surfing the internet, whereas ENM implies a more balanced distribution of time and attention, which may help in depolarisation.

This finding seems relevant to the current debate on the role played by social media on the increase of polarisation in our societies. It is undisputed that social media—especially Twitter and Facebook—help spread digital news and, consequently, facilitate the exposure of its users to numerous media outlets. Consistent with some recent studies (Boxell et al. 2017), we find that mere exposure to more media outlets can reduce polarisation. However, at other instances, as is the case of the territorial affective polarisation model, it can intensify polarisation. This brings us to the question of how social media is used: whether it stimulates a hectic exposure to a wide amount of information or whether it contributes to a more balanced and diversified consumption of information.

The indicators of media diet heterogeneity, based on the distance between the position of the media and the self-placement of individuals in the left–right and centre–periphery scales, have greater explanatory power when the dependent variable is polarisation in terms of ideological extremism. Remarkably, our findings indicate that a more heterogeneous media diet, when considering the left–right scale, is associated with depolarising effects, which align with other studies that associate exposure to counter-attitudinal information with lower levels of polarisation (Garrett et al. 2014; Stroud 2010). However, when the media diet heterogeneity is measured on the centre–periphery scale, its effect on polarisation is reversed.

This rather unexpected result needs to be understood in the context of recent Spanish politics, where matters of national identity became the central issue in the last cycle of election campaigns. This seems consistent with studies that highlight the sense of identity threat as a trigger of polarisation (Slater 2007). The conventional left–right scale—which according to Sartori (1976, pp. 297-299) is a

contentless overarching container of the traditional existing cleavages, or the ‘net position in this scale is a weighted average of all the particular policies’ that is useful as an information cost-saving tool of the political conflict in a polity as stated by Downs (1957, p. 132)—perhaps is not a good candidate to capture the new-emerging conflicts that are a major cause of polarisation, as it encapsulates the pre-existing cross-cutting structure of polity (McCoy, Rahman & Somer 2018). Instead, the national cleavage, reactivated and made bluntly salient after the emergence of the Catalan pro-independence movement, has the potential to polarise society and influence individuals to increasingly perceive politics in terms of ‘us’ versus ‘them’. Of course, it can be argued that this kind of social mobilisation is how societies achieve fundamental changes in structure, institutions and power relations, as McCoy et al. (2018) argue; however, it also entails the risk of harming democracy with a pernicious polarisation (McCoy & Somer 2019).

Some caveats are required regarding the line of causality. The first pertains to the causal mechanism in effect when dealing with the relationship between media diet and polarisation. The relationship we identified may in fact be spurious because our model is correlational. Moreover, although we used control variables to minimise this issue, such as the level of political interest or party closeness, the potential problem of omitted variables almost always accompanies these models. Further investigation would be required to disentangle whether individuals that prefer to consume counter-attitudinal information have some specific characteristics that make them more or less likely partake in polarisation.

The measurement of media diets is also a source of potential threats over the validity of our results. First, media diet indicators have been built from a limited set of media outlets. Although wide and varied, this list does not cover the entire rich

and fragmented media system in Spain, especially at the sub-state level. Second, although we can identify visits to media outlets, we have no information about what kind of information individuals have been actually exposed to while on the outlets' respective sites. Therefore, our analysis is based on the political slant of media outlets rather than on the content of the news. However, these limitations are relatively outweighed by the access to actual behavioural data on media consumption, which enables exploring more refined measures of media diet.

Another limitation is the model selected to address the relationship between media diet and polarisation. As acknowledged by previous studies, the possibility exists that both variables are linked in a relationship of causal reciprocity, which can trigger a process of mutual reinforcement. The usual way to address this recursivity would be a structural equations model, as conducted by several previous studies (Dahlgren, Shehata & Strömbäch 2019; Hutchens, Hmielo & Beam 2019; Slater 2007). In its current stage, the present study does not aim to solve this question, which we plan to address in future work. Nevertheless, its contribution lies in the design of novel measures of media diet based on the dimensions addressed by previous literature and the exploratory test of their relationship with affective and attitudinal polarisation. Indeed, the results indicated that when different dimensions are distinguished, the impact of media diet can be more complex than that initially expected.

Overall, the findings for the Spanish case provide support for the relationship between media diet diversity and depolarisation and provide additional evidence to critically approach the pessimistic accounts that accuse the internet media environment of being a source of polarisation. This conclusion comes with a

caveat because media diet diversity seems to work differently as far as the territorial dimension is concerned.

References

- Amsalem, E., Merkley, E., & Loewen, P. J. (2021) 'Does talking to the other side reduce inter-party hostility? Evidence from three studies', *Political Communication*, pp. 1–18.
- Arceneaux, K. & Johnson, M. (2010) 'Does media fragmentation produce mass polarization? Selective exposure and a new era of minimal effects', APSA Annual Meeting Paper, Available at *SSRN ELibrary*.
- Barberá, P. (2015) 'How social media reduces mass political polarization. Evidence from Germany, Spain, and the U.S.', Presented at the 2015 APSA Conference.
- Bennett, W. L. & Iyengar, S. (2008) 'A new era of minimal effects? The changing foundations of political communication', *Journal of Communication*, vol. 58, pp. 707–731.
- Bennett, W. L. & Iyengar, S. (2010) 'The Shifting foundations of political communication: Responding to a defense of the media effects paradigm', *Journal of Communication*, vol. 60, no. 1, pp. 35–39.
- Bosch, O. J. & Revilla, M. (forthcoming) 'When survey science met online tracking: presenting an error framework for metered data', RECSM Working Paper.

- (n.d.) ‘Passive Meter: Some methodological discussions.’ Retrieved from <https://www.upf.edu/documents/240921432/0/Passive+Meter/1ff3a9bb-3015-a255-7431-7a9bc1eeaba3>
- Boxell, L., Gentzkow, M. & Shapiro, J. (2017) *Is the Internet causing political polarization? Evidence from demographics*, (No. w23258), National Bureau of Economic Research, Cambridge.
- Brüggemann, M., Engesser, S., Büchel, F., Humprecht, E. & Castro, L. (2014) ‘Hallin and Mancini revisited: Four empirical types of Western Media Systems’, *Journal of Communication*, vol. 64, no 6, pp. 1037–1065.
- Brundidge, J. (2010) ‘Encountering “difference” in the contemporary public sphere: The contribution of the Internet to the heterogeneity of political discussion networks’, *Journal of Communication*, vol. 60, pp. 680–700.
- Cappella, J. N., Price, V. & Nir, L. (2002) ‘Argument repertoire as a reliable and valid measure of opinion quality: Electronic dialogue during campaign 2000’, *Political Communication*, vol. 19, pp. 73–93.
- Cardenal, A. S., Aguilar-Paredes, C., Cristancho, C. & Majó-Vázquez, S. (2019) ‘Echo-chambers in online news consumption: Evidence from survey and navigation data in Spain’, *European Journal of Communication*, vol. 34, no. 4, pp. 360–376.
- Castro Herrero, L., & Hopmann, D. N. (2018) ‘The Virtue of moderation: A cross-national analysis of exposure to cross-cutting information and turnout’, *International Journal of Public Opinion Research*, vol. 30, no. 4, pp. 518–539.
- CIS. (2019) Barómetro diciembre. Postelectoral elecciones generales 2019, 29 de noviembre al 19 de diciembre, *Centro de Investigaciones Sociológicas*, (Estudio 3269).

- Coombs, C. H. (1964) *A Theory of Data*. John Wiley & Sons, New York.
- Dahlgren, P. M., Shehata, A. & Strömbäck, J. (2019) 'Reinforcing spirals at work? Mutual influences between selective news exposure and ideological leaning', *European Journal of Communication*, vol 34, no. 2, pp. 159–174.
- Dilliplane, S. (2011) 'All the news you want to hear: The impact of partisan news exposure on political participation', *Public Opinion Quarterly*, vol. 75, no. 2, pp. 287–316.
- Doise, W. (1969) 'Intergroup relations and polarization of individual and collective judgments', *Journal of Personality and Social Psychology*, vol. 12, no. 2, pp. 136–143.
- Downs, A. (1957) *An Economic Theory of Democracy*, Harper & Row, New York.
- Dubois, E. & Blank, G. (2018) 'The echo chamber is overstated: The moderating effect of political interest and diverse media'. *Information, Communication & Society*, vol. 21, no 5, pp. 729–745.
- Duverger, M. (1987) *Los partidos políticos*. Fondo de Cultura Económica, México.
- Dvir-Gvirsman, S., Tsfati, Y. & Menchen-Trevino, E. (2016) 'The extent and nature of ideological selective exposure online: Combining survey responses with actual web log data from the 2013 Israeli Elections', *New Media & Society*, vol. 18, no. 5, pp. 857–877.
- Eveland, W. P., & Hively, M. H. (2009) 'Political discussion frequency, network size, and "heterogeneity" of discussion as predictors of political knowledge and participation', *Journal of Communication*, vol. 59, no. 2, pp. 205–224.
- Feldman, L., & Price, V. (2008) 'Confusion or enlightenment?: How exposure to disagreement moderates the effects of political discussion and media use on candidate knowledge', *Communication Research*, vol. 35, no. 1, pp. 61–87.

- Ferejohn, J. A. (1995) 'The development of the spatial theory of elections', In *Political Science in History: Research Programs and Political Traditions*, Cambridge University Press, Cambridge; New York, pp 253-275.
- Flaxman, S., Goel, S. & Rao, J. M. (2016) 'Filter bubbles, echo chambers, and online news consumption'. *Public Opinion Quarterly*, vol. 80, no. S1, pp. 298–320.
- Fletcher, R., Cornia, A. & Nielsen, R. K. (2020) 'How polarized are online and offline news audiences? A comparative analysis of twelve countries', *International Journal of Press/Politics*, vol. 25, no 2, pp. 169–195.
- Galais, C. & Serrano, I. (2020) 'The effects of regional attachment on ideological self-placement: A comparative approach', *Comparative European Politics*, vol. 18, no. 4, pp. 487-509.
- Garrett, R. K. (2009) 'Politically motivated reinforcement seeking: Reframing the selective exposure debate'. *Journal of Communication*, vol. 59, no. 4, pp. 676–699.
- Garrett, R. K., Carnahan, D. & Lynch, E. K. (2013) 'A turn toward avoidance? Selective exposure to online political information, 2004–2008'. *Political Behavior*, vol. 35, no 1, pp. 113–134.
- Garrett, R. K., Gvirsman, S. D., Johnson, B. K., Tsfaty, Y., Neo, R. & Dal, A. (2014) 'Implications of pro-and counterattitudinal information exposure for affective polarization'. *Human Communication Research*, vol. 40, no. 3, pp. 309–332.
- Gentzkow, M. & Shapiro, J. M. (2011) 'Ideological segregation online and offline'. *The Quarterly Journal of Economics*, vol. 126, no. 4, pp. 1799–1839.
- Gutmann, A. & Thompson, D. F. (1996) *Democracy and Disagreement*. Harvard University Press, Cambridge.

- Hallin, D. C. & Mancini, P. (2004) *Comparing Media Systems: Three Models of Media and Politics*. Cambridge University Press, Cambridge; New York.
- Hallin, D. C. & Papathanassopoulos, S. (2002) 'Political clientelism and the media: Southern Europe and Latin America in comparative perspective'. *Media, Culture & Society*, vol. 24. No. 2, pp. 175–195.
- Han, J. & Federico, C. M. (2017) 'Conflict-framed news, self-categorization, and partisan polarization'. *Mass Communication & Society*, vol. 20, no. 4, pp. 455–480.
- Huckfeldt, R. & Sprague, J. (1995) *Citizens, Politics, and Social Communication: Information and Influence in an Election Campaign*, Cambridge University Press, Cambridge.
- Hutchens, M. J., Hmielowski, J. D. & Beam, M. A. (2019) 'Reinforcing spirals of political discussion and affective polarization', *Communication Monographs*, vol. 86, no. 3, pp. 357–376.
- Isenberg, D. J. (1986) 'Group polarization: A critical review and meta-analysis', *Journal of Personality and Social Psychology*, vol. 50, no. 6, pp. 1141–1151.
- Jürgens, P., Stark, B. & Magin, M. (2020) 'Two half-truths make a whole? On bias in self-reports and tracking data', *Social Science Computer Review*, vol. 38, no. 5, pp. 600–615.
- Kim, Yonghwan. (2015) 'Does disagreement mitigate polarization? How selective exposure and disagreement affect political polarization', *Journalism & Mass Communication Quarterly*, vol. 92, no. 4, pp. 915–937.
- Kim, Yonghwan. (2019) 'How cross-cutting news exposure relates to candidate issue stance knowledge, political polarization, and participation: The moderating role

- of political sophistication’, *International Journal of Public Opinion Research*, vol. 31, no. 4, pp. 626–648.
- Kim, Youngju & Zhou, S. (2020) ‘The effects of political conflict news frame on political polarization: A social identity approach’, *International Journal of Communication*, vol. 14, pp. 937–958.
- Kruglanski, A. W. (2013) *The Psychology of Closed Mindedness*, Psychology Press, New York & Hove.
- Laakso, M. & Taagepera, R. (1979) ‘“Effective” number of parties: A measure with application to West Europe’. *Comparative Political Studies*, vol. 12, no. 1, pp. 3–27.
- Leeper, T. J. (2014) ‘The informational basis for mass polarization’, *Public Opinion Quarterly*, vol. 78, no. 1, pp. 27–46.
- Levendusky, M. S. & Malhotra, N. (2016) ‘Does media coverage of partisan polarization affect political attitudes?’, *Political Communication*, vol. 33, no. 2, pp. 283–301.
- Mancini, P. (2013) ‘Media fragmentation, party system, and democracy’, *The International Journal of Press/Politics*, vol. 18, no. 1, pp. 43–60.
- McCoy, J., Rahman, T. & Somer, M. (2018) ‘Polarization and the global crisis of democracy: Common patterns, dynamics, and pernicious consequences for democratic polities’, *American Behavioral Scientist*, vol. 62, no. 1, pp. 16–42.
- McCoy, J. & Somer, M. (2019) ‘Toward a theory of pernicious polarization and how it harms democracies: Comparative evidence and possible remedies’, *The ANNALS of the American Academy of Political and Social Science*, vol. 681, no. 1, pp. 234–271.

- Micó, J.-L. & Carbonell, J.-M. (2017) 'The Catalan political process for independence: An example of the partisan media system', *American Behavioral Scientist*, vol. 61, no. 4, pp. 428–440.
- Müller, P., Schemer, C., Wettstein, M., Schulz, A., Wirz, D. S., Engesser, S. & Wirth, W. (2017) 'The polarizing impact of news coverage on populist attitudes in the public: Evidence from a panel study in four European democracies', *Journal of Communication*, vol. 67, no. 6, pp. 968–992.
- Mutz, D. C. (2006) *Hearing the Other Side: Deliberative versus Participatory Democracy*. Cambridge University Press, Cambridge; New York.
- Noelle-Neumann, E. (1984) *The Spiral of Silence: Public opinion—Our Social Skin*. The University of Chicago Press, Chicago.
- Pfetsch, B. (Ed.) (2014) *Political Communication Cultures in Europe. Attitudes of Political Actors and Journalists in Nine Countries*. Palgrave MacMillan, Houndmills.
- Post, S. (2019) 'Polarizing communication as media effects on antagonists. Understanding communication in conflicts in digital media societies' *Communication Theory*, vol. 29, no. 2, pp. 213–235.
- Price, V. (1989) 'Social identification and public opinion: Effects of communicating group conflict', *The Public Opinion Quarterly*, vol. 53, no. 2, pp. 197–224.
- Price, V., Cappella, J. N. & Nir, L. (2002) 'Does Disagreement Contribute to More Deliberative Opinion?', *Political Communication*, vol. 19, no. 1, pp. 95–112.
- Prior, M. (2007) *Post-Broadcast Democracy. How Media Choice Increases Inequality in Political Involvement and Polarizes Elections*, Cambridge University Press, Cambridge.

- Prior, M. (2013) 'Media and political polarization', *Annual Review of Political Science*, vol. 16, no. 1, pp. 101–127.
- Rabinowitz, G. & Macdonald, S. E. (1989) 'A directional theory of issue voting', *The American Political Science Review*, vol. 83, no. 1, pp. 93–121.
- Revilla, M., Ochoa, C. & Loewe, G. (2017) 'Using passive data from a meter to complement survey data in order to study online behavior', *Social Science Computer Review*, vol. 35, no. 4, pp. 521–536.
- Robison, J. & Mullinix, K. J. (2016) 'Elite polarization and public opinion: How polarization is communicated and its effects', *Political Communication*, vol. 33, no. 2, pp. 261–282.
- Sartori, G. (1976) *Parties and Party Systems: A Framework for Analysis*, Cambridge University Press, Cambridge.
- Simón, P. (2020) 'The multiple Spanish elections of April and May 2019: The impact of territorial and left-right polarisation'. *South European Society and Politics*, vol. 25, no. 3–4, pp. 441–474.
- Slater, M. D. (2007) 'Reinforcing spirals: The mutual influence of media selectivity and media effects and their impact on individual behavior and social identity', *Communication Theory*, vol. 17, no. 3, pp. 281–303.
- Smith, G. & Searles, K. (2013) 'Fair and balanced news or a difference of opinion? why opinion shows matter for media effects', *Political Research Quarterly*, vol. 66, no. 3, pp. 671–684.
- Stokes, D. E. (1963) 'Spatial models of party competition', *The American Political Science Review*, vol. 57, no. 2, pp. 368–377.
- Strandberg, K. Himmelroos, S. & Grönlund, K. (2019) 'Do discussions in like-minded groups necessarily lead to more extreme opinions? Deliberative democracy and

- group polarization’, *International Political Science Review*, vol. 40, no. 1, pp. 41–57.
- Stroud, N. J. (2010) ‘Polarization and partisan selective exposure’, *Journal of Communication*, vol. 60, pp. 556–576.
- Sunstein, C. R. (1999) ‘Agreement without Theory’, in *Deliberative Politics: Essays on Democracy and Disagreement*, ed S. Macedo, Oxford University Press, New York & Oxford, pp. 123–150.
- Sunstein, C. R. (2002) ‘The law of group polarization’. *Journal of Political Philosophy*, vol. 10, no. 2, pp. 175–195.
- Taber, C. S. & Lodge, M. (2006) ‘Motivated skepticism in the evaluation of political beliefs’, *American Journal of Political Science*, vol. 50, no. 3, pp. 755–769.
- Torcal, M. (2021) “La polarización política en España”, In: Penadés, A. and Garmendia, A. (Eds.), *Informe sobre la democracia en España 2020*, Fundación Alternativas, Madrid, pp. 49-76.
- Torcal, M. & Comellas, J. M. (2022) ‘Affective polarization in southern Europe and Spain in comparative perspective’. *South European Society and Politics*
- Torcal, M., Santana, A., Carty, E. & Comellas, J. M. (2020) ‘Political and affective polarisation in a democracy in crisis: The E-Dem panel survey dataset (Spain, 2018-2019)’ *Data in Brief*, 106059.
- Vraga, E. K. & Tully, M. (2020) ‘Who is exposed to news? It depends on how you measure: Examining self-reported versus behavioral news exposure measures’, *Social Science Computer Review*, vol. 38, no. 5, pp. 550–566.
- Westen, D., Blagov, P. S., Harenski, K., Kilts, C., & Hamann, S. (2006) ‘Neural bases of motivated reasoning: An fMRI study of emotional constraints on partisan

political judgment in the 2004 U.S. presidential election’, *Journal of Cognitive Neuroscience*, vol. 18, no. 11, pp. 1947–1958.

Wolfsfeld, G., Yarchi, M. & Samuel-Azran, T. (2016) ‘Political information repertoires and political participation’, *New Media & Society*, vol. 18, no. 9, pp. 2096–2115.

Zaller, J. (1992) *The Nature and Origins of Public Opinion*, Cambridge University Press, New York.

**Online Appendix for ‘Media Diet and Polarisation: Evidence from Spain’,
by Albert Padró-Solanet and Joan Balcells, published in *South European
Society and Politics***

Content:

- A. Timing of the E-DEM panel waves and related political events**
- B. Operationalisation of the dependent variables:**
 - a. Variation in ideological extremism**
 - b. Variation in territorial affective polarisation**
- C. Operationalisation of media diet heterogeneity**
- D. Operationalisation of the control variables**
- E. Univariate descriptive statistics and graphs**
- F. Regression results**

A. Timing of the E-DEM panel waves and related political events¹

Table 1A. Timing of the waves and related major political events in Spain

Wave	Begin	End	Days	Gap	Major political events in Spain
Wave 1	25/10/2018	07/11/2018	14	n.a.	Andalusian regional elections (2/12/2018)
Wave 2	12/02/2019	19/02/2019	8	97	Formation of the Andalusian regional government (16/01/2019)
Wave 3	23/04/2019	26/04/2019	4	63	Spanish general elections (28/04/2019)
Wave 4	17/05/2019	24/05/2019	8	21	Spanish local, regional, and European elections (26/05/2019)
All	25/10/2018	24/05/2019	34	181	

Source: Torcal and Comellas (2022, online appendix)

Notes: Days = The number of days during which survey responses were collected. Gap = time elapsed, in days, from the last day of data collection of the previous wave to the first day of response collection of the current wave; n.a.: not applicable, since in the first wave there is no previous wave with respect to which a time gap may be calculated.

¹ Sections A and B are reproduced or adapted from Torcal and Comellas (2022, online appendix).

B. Operationalisation of the dependent variables

a. Ideological Extremism

The measure is simply the absolute difference between the respondent's self-ideological position and the country-wave/study average ideology. The scale measuring the respondent self-ideological position ranges from 0 to 10 in the E-DEM dataset. In the CIS dataset, the scale originally ranges from 1 to 10; however, we have rescaled it to range from 0 to 10 as well. The formula of the index is as follows:

$$IE_i = \sqrt{(Ideol_i - \underline{Ideol})^2} \quad (1)$$

Here, i is the individual respondent, $Ideol_i$ is the reported self-ideological position of respondent i , and \underline{Ideol} is the country-wave/study average ideology of respondents.

The regression model uses the variation in ideological extremism between the third and the first wave (first difference).

b. Territorial Affective Polarisation

The E-DEM dataset contains feelings (0–100) and trust (0–10) scales towards each of four different Spanish territorial groups: Basques, Catalans, Andalusians and Madrileans. We have built combined scales measuring sentiments towards each of these four groups: first, we have divided feelings by 10 to obtain a 0–10 scale; and, second, we have added up the two items (feelings and trust) and divided the resulting scale by two. The combined scales range from 0 (very negative sentiments) to 10 (very positive sentiments). This has been done for each panel wave. These sentiment scores have been used to build different indices measuring territorial affective polarisation.

First, we measured territorial affective polarisation as the mean distance from respondents' own territorial group (or in-group), based on Wagner (2020)'s index for feelings towards parties. This index captures how much an individual on average dislikes/distrust other territorial groups compared to his/her territorial group. The following is the general formula:

$$APDT_i = \sum_{t=1}^t (Sentiments_{in-group,i} - Sentiments_{it}) / n_t \quad (2)$$

Here, t is the out-territorial group, i the individual respondent, $Sentiments_{in-group,i}$ is the sentiment score assigned to the in-territorial group, $Sentiments_{it}$ is the sentiment score assigned to each out-territorial group t by individual respondent i , and n_t is the number of out-territorial groups.

For this index, we defined three territorial groups: Catalans, Basques and the rest of respondents. As explained above, in the E-DEM data set there are specific feeling and trust scales for Catalans and Basques, which constitute the two territorial groups with a stronger particular national/regional identity. Then, we assume that the sentiments towards the people from the other regions of Spain (who are not Catalans or Basques) are approximately captured by a combined scale of feelings/trust towards Madrileans and Andalusians. That is, in the other regions the core elements of the dominant Spanish national identity are identified with Castile and Andalusia. We know that this

assumption can be problematic for some regions with relatively strong national/regional identities (such as Galicia, Navarra or Valencian Community), although these are clearly weaker compared to those in Catalonia and the Basque Country.

For Catalans, sentiments towards the in-group are measured by sentiment scores to Catalans, while the sentiments towards the out-group are captured by the combined scale of sentiment scores to Madrileans and Andalusians, two groups that represent the dominant Spanish national identity. The same applies for Basques. While the sentiments towards the in-group are measured by affect/trust scores to Basques, the sentiments towards the out-group are measured by the combined scale of affect/trust to Madrileans and Andalusians. Finally, for the rest of respondents (those who are not Catalans or Basques), the sentiments towards the in-group are captured by the affect/trust scores to Madrileans and Andalusians, while the sentiments towards the out-groups are captured by the sentiment scores to Catalans and Basques.

The index is calculated for all respondents who declare a level of affect or trust for their in-territorial group and, at least, one territorial out-group. The APDT index ranges from -10 to 10. A score above 0 (positive score) means that the respondent has more positive sentiments towards his/her in-territorial group than towards the out-territorial groups; a score equal to 0 means that the respondent has the same sentiments towards the in- and the out-territorial groups; and a score below 0 (negative score) means that the respondent has more positive sentiments towards the out-territorial groups than towards his/her in-territorial group.

As with ideological extremism, the regression model uses the variation in Territorial Affective Polarisation between the third and the first wave (first difference).

C. Operationalisation of media diet heterogeneity variables

To elaborate the indicators of media diet heterogeneity, we calculated first the location of media outlets on two different scales, i.e. left-right and centre-periphery. Media outlets' location on both scales are computed as the average self-placement of the respondents that have visited the outlet at least at three of the four waves of the panel, in order to focus the attention on usual consumers. Table 2C shows the list of the media outlets that the passive meter tracked.

Respondents' left-right location uses the self-placement on the traditional left-right scale.

p6_1 When talking about politics, people talk about "left" and "right". Could you please tell us where you would position yourself on a scale of 0 to 10 where 0 means "left" and 10 means "right"?

Respondents' location on the centre-periphery conflict is based on a combination of two questions referred to the evaluation of the devolution policy in Spain and the sentiment of

identification with Spain. The indicator is computed by adding two eleven-point scales and dividing the result by two. These scales have been centred at the point 5 and, therefore, their re-scaled range goes from -5 to 5. The exact wording of the questions is as follows:

p8_1 Nowadays, the Autonomous Communities can legislate, together with the Government and the National Legislature, on some aspects of the citizens' daily life, such as health and education. However, not everyone considers that this should be the case. On this subject, could you tell me where you would position yourself on the following scale from 0 to 10?

0, 'The Spanish Government should regain its powers', to 10, 'The Autonomous Communities should be able to legislate on major issues in citizens' daily lives'

p15c_1 'We all feel more or less connected to the territory or political community (town, city, region, etc.) in which we live, but some of us feel more connected to some places than others. To what extent do you identify with the following localities?'

0, 'Do not identify at all', to 10, 'Identify strongly'

Table 2A. Average location of media consumers in the left-right and centre-periphery dimensions according to the number of waves they visited each media outlet.

Mean location of media outlet consumers on each scale									
	Left-Right Ideology				Centre-Periphery Scale				
<i>Number of waves</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>Number of</i>
<i>visiting the media</i>									<i>visitors</i>
El País	3.9	4.1	4.1	4.0	-0.5	-0.5	-0.9	-1.5	1187
El Mundo	3.9	3.7	4.6	4.4	-1.2	-0.3	-1.8	-1.3	1062
ABC	4.0	3.8	4.4	4.6	-0.5	-0.7	-1.2	-1.4	1016
La Vanguardia	4.2	3.9	3.9	3.8	-0.9	-0.4	-0.6	-0.1	963
El Confidencial	3.9	3.9	4.2	4.5	-0.6	0.8	2.4	1.2	891
20 Minutos	3.9	4.2	4.1	4.0	-0.6	-0.6	-0.5	0.8	840
RTVE	3.8	4.2	4.1	3.9	-0.6	-0.8	-0.8	-1.1	779
Antena3	4.1	3.9	4.0	4.1	-0.7	-0.8	-0.7	-1.2	710
El Periódico	4.1	4.2	3.5	3.0	-0.3	-0.7	-0.8	-1.1	638
El Diario	4.1	4.2	3.3	3.2	-0.5	-0.6	-1.1	-1.3	609
La Sexta	4.0	3.9	3.4	3.4	-0.8	-0.3	-0.1	-0.9	553
Telecinco	4.2	3.9	4.2	4.3	-0.9	-0.8	-0.9	-1.1	547
Huffingtonpost	4.0	3.7	3.6	3.5	-0.8	-0.6	-0.6	-0.8	503
Cadena SER	4.1	3.9	3.7	3.4	-0.9	-0.9	-0.8	-0.4	468
Público	3.8	3.7	3.3	3.0	-0.7	-0.8	-0.2	0.5	443
La Razón	4.2	4.7	4.7	6.3	-0.8	-1.8	-0.3	-1.2	370
La Voz de Galicia	4.1	3.8	4.2	3.6	-0.4	-1.2	-1.2	-0.8	339
Atresplayer	4.0	3.8	4.6	2.8	-0.8	-0.8	-1.0	0.1	339
LNE	4.1	4.5	4.8	4.1	-1.4	-1.8	-1.5	-1.6	274
COPE	4.7	4.9	5.0	6.2	-1.4	-1.6	-1.9	-3.4	264
Heraldo	3.8	4.4	4.7	4.2	-0.6	-1.0	-0.8	-1.1	211
Onda Cero	4.2	4.0	5.5	3.8	-1.3	-1.7	-2.0	-2.8	136
Diario Vasco	4.1	3.9	2.4	3.2	0.2	0.5	1.6	2.6	118
Ara	3.1	3.4	2.9	3.2	1.5	2.5	3.2	3.4	115
Infolibre	3.5	4.1	2.2	2.0	-0.7	-2.1	2.3	-0.7	101
Deia	4.0	3.4	3.5	3.8	-1.4	-1.6	-1.9	-3.4	70

El Diario Montañés	4.0	3.7	2.7	4.4	-0.8	-0.6	-0.1	-0.3	65
Cadena 100	4.0	3.9	4.8	5.0	-1.7	-1.5	-0.6	-1.3	61
Ctxt	2.7	2.0	2.3	5.0	0.6	1.4	0.5	-1.5	54
Politikon	2.3	0.0	3.0	3.0	1.5	1.5	1.0	-4.0	6

NB: Left-Right Ideology is measured in an 11 points scale [0, 10]

Centre/Periphery Scale is measured in an 11 points scale [-5, 5]

Source: own elaboration.

D. Operationalisation of the control variables

a. Party closeness

Party closeness is measured as an ordinal four-points scale. After asking ‘Do you consider yourself close to any political party?’, the following question asks: p35b_1 ‘And how close do you feel to this party?’ The four response options are labelled: ‘3’ ‘Very close’, ‘2’ ‘Somewhat close’, ‘1’ ‘Not very close’, ‘0’ ‘Not at all close’

b. Political interest

Political interest is measured on an ordinal four-points scale. The wording of the question is as follows: p1_2 ‘To begin with, how much are you interested in politics? A lot, a fair amount, a little or not at all?’. And the four response options are labelled: ‘1’ ‘A lot’; ‘2’ ‘A fair amount’; ‘3’ ‘A little’; ‘4’ ‘Not at all’

c. Political information

Political information is measured as an additive index based on the frequency of information consumption. It combines five different sources (newspapers, radio, magazines, television, and social networks) and ranges from 0 to 40. The wording of the question is as follows:

‘Now, indicate through what means and how often you are kept informed about current issues. Keep in mind the importance of reading the questions carefully and choosing the answer that best fits your thoughts and opinions. The results and quality of this international research depend on your effort and attention to your responses.

Could you please say how often you keep yourself informed about current political issues, news or opinions through... ?

Newspapers, Radio, Magazines, Television or Social Networks

‘0’ Never; ‘1’ Less than once a month; ‘2’ Once a month; ‘3’ Several times a month; ‘4’ Once a week; ‘5’ Several times a week; ‘7’ Every day; ‘8’ Several times a day

d. Index of issue extremism

The index of issue extremism is an additive index composed of eight items of political and socio-economic opinion. All the items are measured in an eleven-point scale and centred and squared. Then, the values are added and divided by eight. The actual range of values goes from 0 to 25.

p10a_1 Would you say that, in general, immigrants have to adapt to the customs of Spain and their region or that they should be able to maintain their customs despite living in another country?

0, They have to adapt to the customs of Spain, to 10, They should be able to keep their customs.

P10b_1 And, do you think that private initiative (private companies) or, on the other hand, state intervention is the best way to solve the problems of the Spanish economy?

0, 'Private initiative is the best way', to 10, 'State intervention is the best way'

p10c_1 Would you say that same-sex marriages should be prohibited or allowed by law?

0, 'They should be forbidden by law', to 10, 'They should be allowed by law'

p10d_1 And, do you think that the main public services should be carried out by private companies or by public institutions of the State?

0, 'They should be carried out by private companies', to 10, 'They should be carried out by public institutions'

p10e_1 Would you say that women should have the right to abortion?

0, 'Women should not have the right to abortion', to 10, 'Women should have the right to abortion'

p10f_1 Would you say that income and wealth are distributed fairly among regular people in Spain or that wealth should be redistributed more fairly?

0, 'Wealth is fairly distributed', to 10, 'Wealth should be redistributed more fairly'

p10g_1 And, do you think a woman should be prepared to give up her job for the sake of her family or should she be able to work?

0, 'She should be prepared to quit her job for the sake of her family', to 10, 'She should be able to work'

p10h_1 Would you say that immigration to Spain should be reduced or increased?

0, 'Immigration to Spain should be reduced', to 10, 'Immigration to Spain should be increased'

Table 3A. Univariate descriptive statistics Dependent Variables

Dependent variables				
Variable name	mean	min	max	sd
Ideological Extremism (3-1)	0.174	-5.895	6.061	1.209
Territorial Affective Polarisation (3-1)	-0.089	-7.5	9.125	1.620

Table 4A. Univariate descriptive statistics Media Diet Variables

Media diet variables				
Variable name	mean	min	max	sd
Total Number of Media (TNM)	4.124	0	23.000	4.011
Eff. Number Media (ENM)	1.659	0	10.289	1.399
Euclidean Dist. Left-Right	0.511	0	6.062	0.784
Intensity Left-Right	0.932	-7.052	10.877	2.350
Euclidean Dist. Centre/Periphery Conflict	0.600	0	6.700	0.944
Intensity Centre/Periphery Conflict	0.746	-8.500	13.950	2.372

Table 5A. Univariate descriptive statistics Control Variables

Control variables				
variable names	mean	min	max	sd
female	0.493	0	1	0.5
age	43.384	18	82	13.734
education	5.059	1	8	1.469
pol_interest	2.255	1	4	0.838
pol_information	16.645	0	40	8.412
party_closeness	1.369	0	4	1.566
issue_extremism	15.275	0	25	5.347
n_observations	2,501			

Autonomous Communities	N	%
Rest of Spain (1)	658	26.3
Andalusia (2)	453	18.1
Valencia and Balearic Isl (3)	322	12.9
Catalonia (4)	400	16.0
Basque Country Navarra (5)	149	6.0
Galicia (6)	155	6.2
Madrid (7)	364	14.5
Total	2,501	100

G. Regression results

Table 6A. Regression on Ideological Extremism Polarisation

Standardized coefficients Robust standard errors used	Ideological Extremism (Variation between wave 3 and wave 1)			
	coefficient	std.error	t.value	p.value
(Intercept)	0.02	0.028	0.705	0.481
Total Number Media (TNM)	-0.123	0.036	-3.371	< .001 ***
Effective Number Media (ENM)	0.014	0.037	0.393	0.695
Euclidean Left-Right	-0.261	0.035	-7.372	< .001 ***
Intensity Left-Right	-0.057	0.032	-1.795	0.073 .
Euclidean Centre-Periphery	0.157	0.03	5.239	< .001 ***
Intensity Centre-Periphery	0.041	0.027	1.492	0.136
Age	-0.02	0.026	-0.751	0.453
female	-0.013	0.026	-0.523	0.601
education	-0.075	0.027	-2.77	0.006 **
Rest of Spain (ref. cat.)				
Andalusia	0.036	0.04	0.895	0.371
Valencia and Balearic Is.	-0.078	0.039	-2.006	0.045 *
Catalonia	-0.044	0.038	-1.147	0.252
Basque Country & Navarre	0.034	0.056	0.596	0.551
Galicia	0.067	0.054	1.242	0.215
Madrid	-0.062	0.04	-1.541	0.123
Political interest	-0.038	0.032	-1.214	0.225
Political information	-0.004	0.026	-0.162	0.872
Issue extremism	-0.052	0.028	-1.861	0.063 .
Party closeness	0.04	0.028	1.413	0.158

R²: 0.07, Adjusted R²: 0.059

F-statistic: 6.337 df(19,1601), p.value < .001

Nr obs: 1,621

Figure 1A. Impact of Standardised coefficients on Ideological Extremism

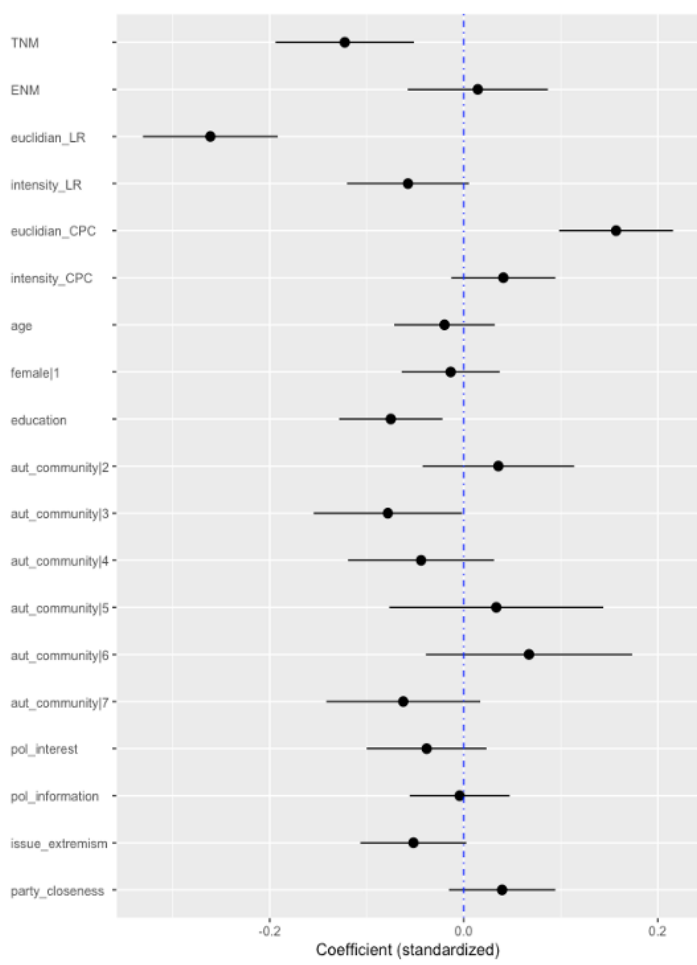


Table 7A. Regression on Territorial Affective Polarisation

Standardized coefficients Robust standard errors used	Territorial Affective Polarisation (variation between wave 3 and wave 1)				
	coefficient	std.error	t.value	p.value	
(Intercept)	-0.075	0.025	-3	0.003	**
Total Number Media (TNM)	0.118	0.036	3.291	0.001	**
Effective Number Media (ENM)	-0.078	0.033	-2.398	0.017	*
Euclidean Left-right	-0.02	0.032	-0.605	0.545	
Intensity left-right	-0.011	0.032	-0.331	0.74	
Euclidean Centre-Periphery	0.054	0.03	1.796	0.073	.
Intensity Centre-Periphery	-0.022	0.029	-0.766	0.444	
age	0.025	0.028	0.904	0.366	
female	0.031	0.026	1.2	0.23	
education	-0.025	0.028	-0.908	0.364	
Rest of Spain (ref. cat.)					
Andalusia	0.055	0.039	1.416	0.157	
Valencia and Balearic Is.	0.051	0.037	1.371	0.171	
Catalonia	0.097	0.044	2.217	0.027	*
Basque Country Navarra	0.145	0.057	2.555	0.011	*
Galicia	0.07	0.053	1.336	0.182	
Madrid	0.106	0.039	2.719	0.007	**
Political interest	0.004	0.029	0.153	0.879	
Political information	0.008	0.028	0.275	0.783	
Issue extremism	-0.059	0.029	-2.018	0.044	*
Party closeness	-0.022	0.027	-0.829	0.407	
R ² : 0.022, Adjusted R ² : 0.01					
F-statistic: 1.888 df (19,1602, p.value = 0.012					
Nr obs: 1,622					

Figure 2A. Impact of Standardised coefficients on Territorial Affective Polarisation

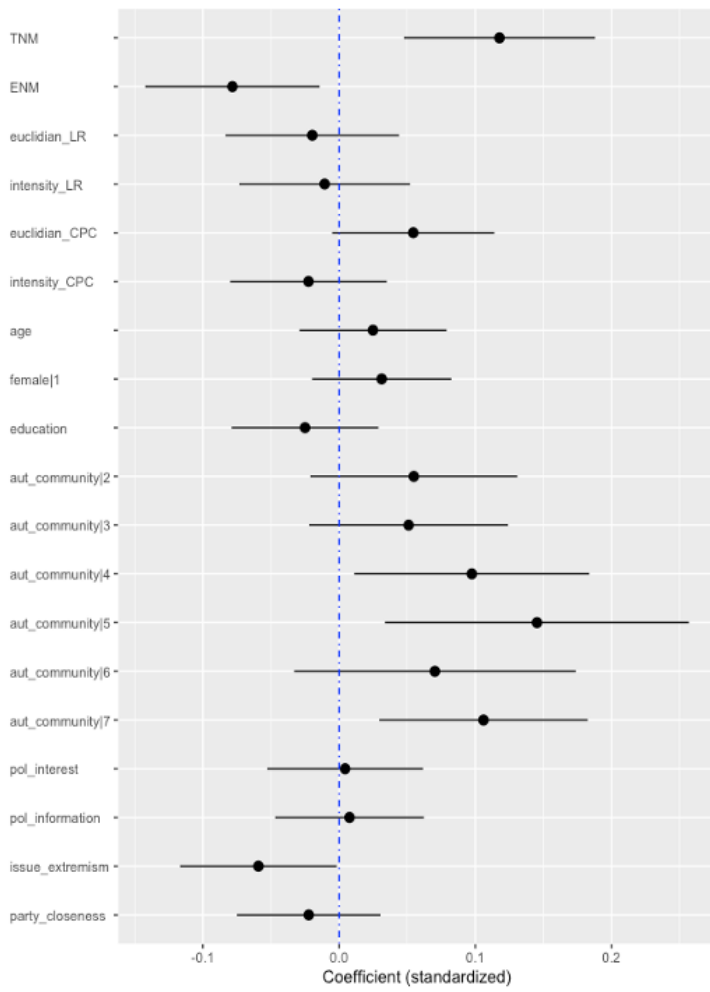


Table 8A Variance Inflation Factors

	VIF	R ²
Total Number of Media (TNM)	2.497	0.6
Effect. Number of Media (ENM)	2.317	0.568
Euclidean Left/Right	1.543	0.352
Euclidean Centre-Periphery	1.531	0.347
Political interest	1.445	0.308
Party closeness	1.299	0.23
Intensity Centre-Periphery	1.281	0.219
Intensity Left/Right	1.234	0.19
political information	1.229	0.186
Age	1.213	0.176
autonomous community	1.202	0.168
education	1.135	0.119
female	1.125	0.111
Issue extremism	1.124	0.111

Table 9A. Correlation matrix of the six media diet independent variables

	TNM	ENM	Euclidean LR	Intensity LR	Euclidean CPC
ENM	0.75***				
Euclidean LR	-0.22***	-0.07**			
Intensity LR	0.1***	0.13***	0.05*		
Euclidean CPC	-0.21***	-0.07**	0.54***	0.11***	
Intensity CPC	0.12***	0.12***	0.01	-0.31***	-0.12***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

References

- Torcal, M. and J. Comellas (2022) 'Affective polarisation in Southern Europe and Spain in comparative perspective', *Southern Europe Society & Politics*
- Wagner, M. (2020) 'Affective polarization in multiparty systems', *Electoral Studies*, vol. 69, article 102199.

Figures and Tables - 4 - Padró-Solanet & Balcells

Table 1. OLS Regression results

Dependent variables	Ideological Extremism Polarisation		Territorial Affective Polarisation	
	Coefficient ‡	std.error †	Coefficient ‡	std.error †
Total Number of Media (TNM)	-0.123	***	0.118	**
	0.036		0.036	
Effective Number of Media (ENM)	0.014		-0.078	*
	0.036		0.033	
Euclidean left-right	-0.261	***	-0.02	
	0.035		0.032	
Intensity left-right	-0.057		-0.011	
	0.032		0.032	
Euclidean Centre-Periphery	0.157	***	0.054	.
	0.03		0.03	
Intensity Centre-Periphery	0.041	.	-0.02	
	0.027		0.029	
Adjusted R ² :	0.067		0.01	
F-statistic (df19, 1602):	6.337	***	1.888	**
Number of observations:	1,621			

† Robust standard errors are used.

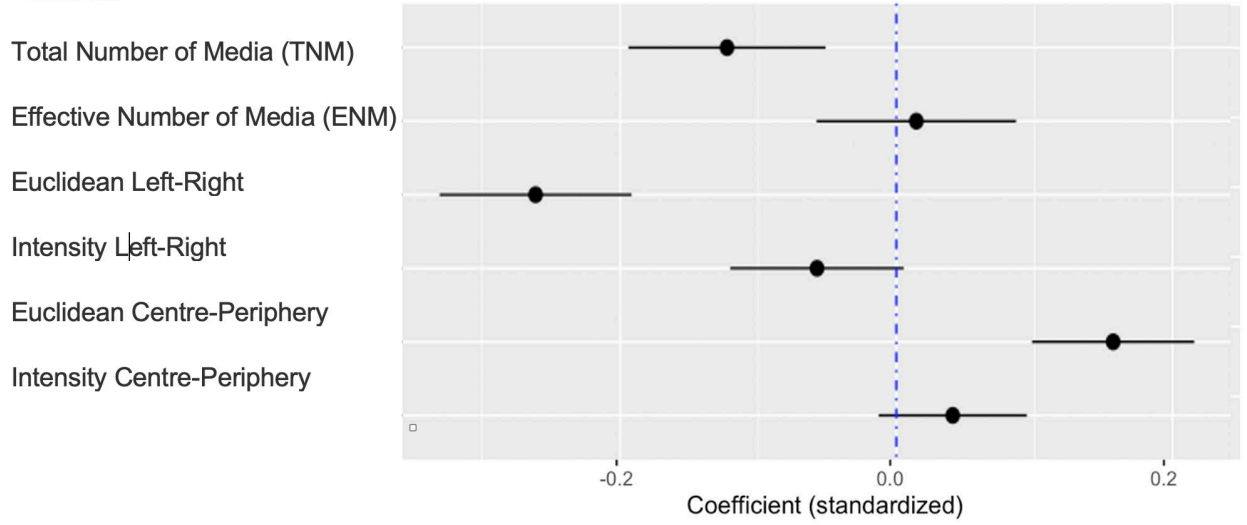
‡ Standardised coefficients are shown.

Statistical significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Source: Authors' calculation based on E-DEM dataset)

Figure 1. Ideological polarisation and media diet

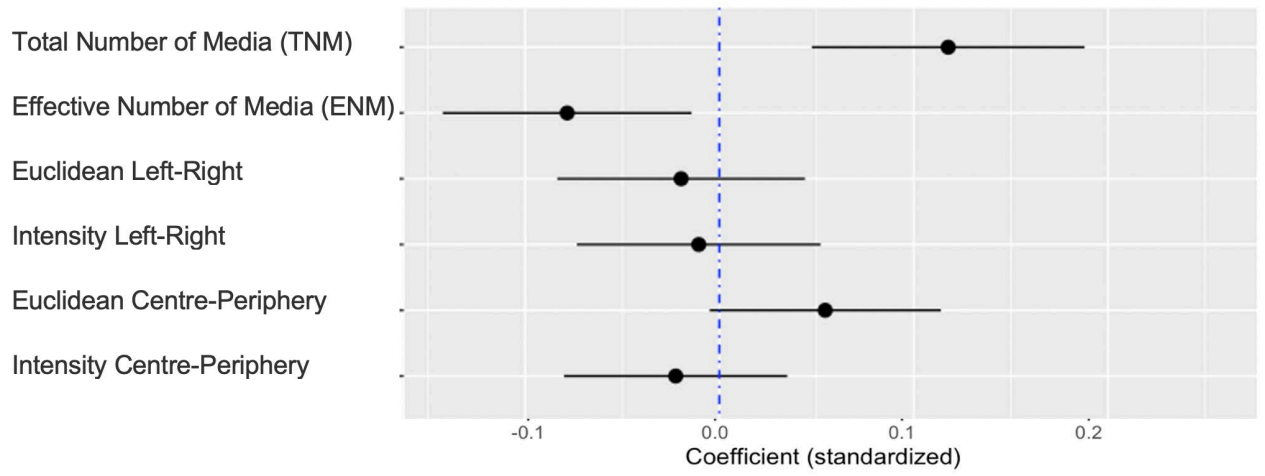
Ideological Extremism variation



Standardised coefficient margins at 0.95 confidence level (Source: Authors' calculation based on E-DEM dataset)

Figure 2. Territorial affective polarisation and media diet

**Territorial Affective Polarisation
Variation**



Standardised coefficient margins at 0.95 confidence level (Source: Authors' calculation based on E-DEM dataset)