Agencies on the parliamentary radar : exploring the relations between media attention and parliamentary attention for public agencies using machine learning methods

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Abstract:

The news media frame public and political debate about public agencies, and enable legislators with incomplete information to monitor and act upon agency (mal)performance. While studies show that the news media matter for parliamentary attention, the contingent nature of this relation has received less attention. Building on agenda-setting theory, this study theorizes that the effect of newspaper coverage is contingent on the sentiment of coverage, the majority vs. opposition role of legislators and the locus (committee vs. plenaries) of parliamentary questions. Supervised machine learning methods allow to code sentiment towards agencies in newspapers, after which a balanced panel is constructed that relates these data to questioning behavior of legislators in parliament over time. Results show that media attention for public agencies precedes parliamentary attention. Sentiment matters, as parliamentary questions about agencies are more likely to be framed negatively when agencies received negative media attention in the same or preceding month.

Key words: public agencies; agenda setting theory; news media; parliament; supervised machine learning

Introduction

One of the main and enduring questions in Public Administration (PA) has been how democratically elected officials deal with the information-asymmetries that result from agencies' arms-length status in their control efforts (Pollitt et al., 2005). PA scholars have pointed at the nature and challenges of *ministerial* oversight (Busuioc & Lodge, 2016; Schillemans & Busuioc, 2015), but have dedicated substantially less attention to the parliamentary control efforts of legislators towards public agencies (Font & Pérez Durán, 2016).

There are several reasons why the study of parliamentary oversight of agencies merits more scholarly attention. Legislators are a key link in the chain of delegation to absorb societal information about the (mal)performance of agencies, question ministers about the adequacy or legitimacy of agencies' actions, and – if needed – either pass judgment themselves (e.g. by denouncing budgetary appropriations or planned policies, or publicly condemn agencies) or press for action by the Minister. Second, elected representatives in Parliament are key actors to represent voters in the chain of delegation. In pure parliamentary systems of government, they are the only bodies directly elected by the people (Saalfeld, 2000). Third, whereas the motivation of individual ministers to control their agencies may vary because of electoral and reputational factors (Busuioc & Lodge, 2016; Schillemans & Busuioc, 2015), the varied composition of Parliament provides more institutional guarantees that at each point in time (at least some) legislators will have an interest in monitoring agency activities (Saalfeld, 2000). Fourth, parliamentary actors have been aware of the need to increase their oversight role of agencies. Font and Pérez-Durán (2016) discuss how the European Parliament introduced legislative amendments that enhance parliamentary oversight of agencies, and argue that legislators use questioning mechanisms as an oversight mechanism to control, via the Commission, the decision and actions made by agencies.

Given these evolutions, it is important to increase our understanding on when and how legislators dedicate parliamentary attention to public agencies. Several of the problems with ministerial control extend to the parliamentary arena: how do legislators deal with the information-asymmetries between them and public agencies? How do they make sense of performance and under which conditions are they more or less motivated to engage in oversight of agencies?

A growing literature points at the agenda-setting role of the mass media in informing and framing public and political debate (Bovens, 2007; McCombs et al., 2014; Vliegenthart et al.,

2016a). Already in 2003, agenda-setting effects were documented in more than 300 studies for a wide array of national and local issues (Carroll & McCombs, 2003). Concerning the political agenda, the media enable legislators with incomplete information about government activities, to monitor and evaluate the actions of agencies (Carpenter & Lewis, 2004; Maggetti, 2012). This is particularly true as the volume of news about organizations – both private (Carroll & McCombs, 2003) and public (Deacon & Monk, 2001; Schillemans, 2012) –strongly increased over the years and became a matter of strategic concern for agency managers (Fredriksson et al., 2015; Schillemans & Pierre, 2016).

This study will address the question: how are media attention and parliamentary attention for public agencies related? We look at written questions in parliament, which are a "prototypical example of symbolic parliamentary activity […] They do not have direct policy consequences and they do not announce policy or necessarily initiate it. Rather, questions are verbal skirmishes between political actors only loosely connected to policy making" (Vliegenthart et al., 2016b, p. 285). This study has no interest in examining substantive consequences of media attention, neither in terms of policy nor in terms of account-holding behavior and organizational design; see for instance Bertelli and Sinclair (2015). Our focus is on capturing the extent to which agencies receive attention from legislators; an ambition that fits well to the characteristics of parliamentary questions (Vliegenthart et al., 2016b). Parliamentary questions are the most accessible and widely used instruments for legislators to signal their attention to certain issues and organizations (Font & Pérez Durán, 2016; Saalfeld, 2000).

This study makes several contributions. First, by recognizing, theorizing and testing the contingent nature of the media-parliament interplay.[1] PA scholars interested in public accountability, institutional design and delegation, or agency termination have mainly treated media attention as an empirical proxy for public salience (James et al., 2015; Koop, 2011; Ringquist et al., 2003). No studies have comparatively and longitudinally analyzed whether (sentiment in) parliamentary attention for agencies is contingent on the sentiment in media coverage towards these agencies, nor how this relation may be contingent on the role of legislators (majority vs. opposition) and on the locus of parliamentary activities (plenary vs committee sessions). To address these limitations, the present study brings in insights from the political agenda-setting literature (McCombs et al., 2014; Vliegenthart et al., 2016a), which has – compared to Public Administration scholarship – been strongly focused on the complexities of the relations between media and political agencies.

The second main contribution of this study is empirical. Collecting and coding sentiment in vast amounts of media and parliamentary texts, for a wide variety of agencies, and over a longer time period has been a formidable task, both because of the sheer volume and of the inherent difficulty of coding sentiment reliably (Lacy et al., 2015). For this study, all media attention was collected for the 24 most salient agencies in the Flemish administration (total number of articles = 91883) for the period 1/01/2000-30/06/2020. Supervised machine learning (SML) methods were used based on a training set of 4404 hand-coded texts. These sentiment data (aggregated per month) were then coupled to a dataset on the written questions posed by Flemish legislators, including the sentiment of the question, the role (opposition-majority) of the respective legislator and locus where the question was asked (plenary/committees).

In the remainder of this article, we first introduce and present our theoretical framework, after which we document our methodological approach that centers on automated text analysis methods. We then present our results, after which we end with a discussion and conclusion section.

Theoretical framework: political agenda-setting

The PA literature has only recently recognized the news media as a critical actor for public governance and accountability (Bovens, 2007; Jacobs & Schillemans, 2015; Klijn & Korthagen, 2018; Maggetti, 2012; Schillemans & Pierre, 2016). Scholarship on institutional design, delegation and agency termination have identified political salience – the extent to which agencies attract public debate and media attention – as an important antecedent of politicians' willingness to control agencies (Koop, 2011; Ringquist et al., 2003). Koop (2011) finds that agencies which operate in more salient issue areas are also subject to more extensive accountability arrangements. Bertelli and Sinclair (2015) show how media attention in newspapers serving the voters of government parties places agencies in less peril of reform. While these studies hint at the importance of the media for a wide variety of PA topics, in-depth theorization and empirical testing on the conditions under which media attention precedes parliamentary attention for public agencies is non-existent.

The political-agenda setting literature is the main reference for insights into the determinants of political attention (or: the political agenda). The media has been a consistent source and topic of interest. Over 50 years of research has developed a strong body of evidence on the relation between media agendas and political agendas (McCombs et al., 2014), establishing that

legislators turn to the media as a source of information about societal problems and available solutions, public opinion, and other elites' plans and actions (Vliegenthart et al., 2016a).

The agenda-setting literature posits that the media is particularly likely to influence public and political agendas when there is a high "need for orientation" (NFO). NFO is defined by two lower-order concepts being relevance and uncertainty: individuals will be particularly likely to turn for the media for orientation when issues are of personal relevance and when they do not yet possess the information they desire (McCombs et al., 2014). Many public agencies perform tasks of high public importance with substantial public funding, with high levels of autonomy. Because legislators suffer from a structural information disadvantage vis-à-vis agencies, they must turn to external sources of information to get an idea whether the agency is acting in accordance with the principal's wishes (Carpenter & Lewis, 2004; Maggetti, 2012). As the news media select and frame stories involving these agencies, they constitute a potential linkage mechanism between agency activities and political oversight (Waterman et al., 1998; Yesilkagit & Van Thiel, 2012). Media attention provides cues about public sector performance that serve as heuristics guiding the formation of opinions and behaviors among accountors and account-holders (Bertelli & Sinclair, 2015).

Agenda-setting scholars distinguish between first-level agenda-setting effects (*what* issues or objects does the public think about) and second-level agenda-setting effects (*how* does the public think about these issues or objects) (McCombs et al., 2014). Concerning first-level agenda-setting effects, accumulated evidence convincingly shows that when issues are salient in the media, the attention of other actors is directed towards these issues as well (McCombs et al., 2014); a statement that seems to hold with the rise of social media (Ceron et al., 2016; Gilardi et al., 2021). While studies used to focus on the agenda-setting impact of the media on the public, the last decades have also demonstrated the influence of media salience on the attitudes and behaviors of political elites:

> "The reason for the media's significant agenda-setting role is that they form a formidable source of information, not only for ordinary citizens but also for political elites. Elites draw on other sources of information as well, but from the media they can learn about societal problems and the available solutions (Vliegenthart et al. 2013), about public opinion (Herbst 1998) and about other elites' plans and actions (Davis 2007, 2009)" (Vliegenthart et al., 2016a, p. 285).

The media not only influence the salience of objects and issues by merely discussing them, but also by framing them in a particular way that stresses certain substantive and/or evaluative attributes. This study will focus on the impact of evaluative attributes, which "recognizes that news coverage conveys more than just facts, it also conveys feeling and tone" (McCombs and Ghanem, 2001 cited in Caroll and McCombs, 2003, p. 39). We will do so by theorizing the role of sentiment, which refers to the tone (positive/negative/neutral) of coverage *towards agencies* (i.e. is the agency assigned responsibility in some way for a positive or negative incident, or is it merely mentioned and/or described in neutral terms – see supplementary materials for further insight). The theory of affective intelligence states that negative news is more likely to produce (strong) emotions, which triggers political judgment among the public, and incentivizes legislators to demonstrate their responsiveness to public demands (Hester & Gibson, 2003; Wanta et al., 2004; Wu & Coleman, 2009). Given that people are more likely to focus on preventing loss than obtaining potential gains, negative news will evoke a stronger attitudinal response than positive news (Jonkman et al., 2020; Kahneman & Tversky, 1979). Politicians might be even more prone to react to negative coverage than the general public. As public actors, they "must consider that they might be held responsible for their actions or inactions — or how these are played out in the media" (Strömbäck, 2008, p. 239).

Research in the political agenda-setting literature shows the relevance of including sentiment when analyzing the relation between media and parliamentary attention. In this study, we will focus our attention on negative sentiment, which has been shown to be a strong driver of political behavior (e.g. George et al., 2020; Nielsen & Moynihan, 2017). Conflict, after all, is at the heart of politics (Schattschneider, 1960). Politicians tend to focus more on controversial issues, which confront them with societal problems on which they might need to make their standpoint clear to the electorate (Kingdon, 1973). The tone of news coverage is generally considered to impact political agenda-setting (Sevenans & Vliegenthart, 2015). Thesen (2013) shows that the political agenda-setting effect of the news media is stronger when blame attributions are present. In an experimental set-up, Helfer and Van Aelst (2020) find that negative news reports trigger politicians to take political action, such as asking a parliamentary question. We expect to see a similar trend when it comes to the sentiment of media coverage related to agencies. A negative tone may well reflect legitimacy concerns with the agency, given that not only performance but also the perceived appearance of performance challenges organizations' legitimacy (Lodge, 2002).

Building on these insights, the following hypothesis is formulated (note that we use the term 'precede' to avoid impressions of examining causal relations):

> H1: Media attention in newspapers precedes parliamentary questions about public agencies. This effect is more pronounced for news with a negative tone, compared to news with a neutral or positive tone.

We not only expect negative media attention to impact the likelihood of parliamentary attention, but also – and primarily – to impact *negative* parliamentary attention. This bring us to second-level agenda-setting effects, related to the media's influence on *how* the public thinks about issues or objects (McCombs et al., 2014). Organizational reputation scholarship – interested in how stakeholders perceive organizations – has developed a convincing body of evidence on the importance of negative news. Jonkman et al. (2020) and Zhang (2016) find that negative news outweighs positive news in the formation of reputation judgment. Salomonsen, Boye and Boon (2021) show the sticky and self-reproducing effects of negative news on reputations, the reversal of which requires levels of positive attention that are hard to attain. To our knowledge, no studies have examined whether negative news triggers negative attention for organizations among politicians. Yet building on second-level agenda-setting insights from the reputation literature, we expect that:

> H2: Negative media attention for public agencies in newspapers is more likely to precede parliamentary questions than positive and neutral media attention.

We will also explore how the role of sentiment in media attention may be contingent on the role of legislators (opposition vs. majority) and on the locus of the parliamentary question (plenary or committee). First, a recurring finding in the political agenda-setting literature that the impact of the news media on parliamentary attention is contingent on the opposition vs. majority status of legislators (Vliegenthart et al., 2016a). Because of its focus on negative, problematic and controversial issues (Thesen, 2013), the information that is provided in the media is more appropriate for oppositional behavior. After all, the opposition is charged with questioning the government in any way they can, and is therefore expected to be more likely to use media attention. Second, other than arenas consisting of (opposition and majority) legislators and parties that may act upon media input about agencies in particular ways, parliaments are also actors that are organized through the distinction between plenary (floor) sessions and committees. Breaking up the dataset in plenary vs. committee attention may shed light on parliamentary dynamics that impact the link between media and parliament. On the one hand,

the committees include parties' portfolio specialists which are more likely to (a) follow media attention about public agencies active in their domain of expertise, and (b) follow-up on said media attention to further position themselves as committed experts. On the other hand, committees are less visible towards the broader public compared to plenaries, which may make legislators more likely to discuss media salient events in the plenaries.

Data

Research context

Our study focuses on Flemish public agencies. Flanders is an autonomous region in the federalized system of Belgium. The Flemish government has its own parliament, cabinet, and public administration (consisting of departments and agencies). The Flemish government (and other regional governments) have equal legislative and executive powers, as decrees issues by the regional governments have the same legal standing as federal laws. Flanders should therefore be considered a full-fledged state for the competences under its remit (Verhoest et al., 2012). In total, 24 agencies are accounted which vary in terms of their task (service delivery, regulation, other authoritative task, Verhoest et al., 2012), policy domain, formal-legal status (Type1 or Type 2, Van Thiel, 2012) and size.

Main independent variable: media attention

This study relies on machine learning methods and natural language processing (NLP) to gather and code sentiment to public agencies in news media articles. We use newspaper data to code sentiment towards public organizations. All content of three national newspapers in Flanders - *Het Laatste Nieuws* (best sold popular newspaper), *De Standaard* (best sold quality newspaper, center-right orientation), and *De Morgen* (second-best sold quality journal, center-left orientation) were scraped from an online newspaper archive.[1] We then used regular expressions to search and filter on articles that contained the name or abbreviation of each of the public organizations under study for the period 1/01/2000-30/06/2020. For each article, the sentence(s) in which the organization was mentioned was taken as unit of analysis to calculate sentiment. Each newspaper article can contain multiple sentences (o: 'texts'), as an organization can be mentioned multiple times in an article. Similarly, texts can contain the names of multiple organizations, in which case they appear multiple times in the dataset (once for each

[1] https://academic.gopress.be/. Formal permission to scrape the archives was granted.

organization). Table 1 shows the overview of the included organizations and their media attention.

[Please include Table 1 here]

We chose to use online newspaper archives as our data source. Social media data, and in particular Twitter, have been fruitfully applied to measuring sentiment or other reputationally relevant concepts regarding public organizations (Anastasopoulos & Whitford, 2018). Twitter data, however, have some disadvantages for the specific purposes of this study. The most pressing concern is that a reliance on tweets would restrict our analyses to the timeframe during which Twitter existed. Using newspaper data allows us to go back longer in time than we would be able to do using social media data (e.g. tweets).

A SML approach involves the following tasks (Anastasopoulos & Whitford, 2018):

> *Step 1* – for a subset of texts, perform *human coding* (or: annotation) of sentiment for each public organization;

For human coding, 4404 texts were coded: 1485 with negative sentiment; 1257 with positive sentiment; 1662 with neutral sentiment (see supplementary materials for more information).

> *Step 2* – randomly partition human-coded sample into *training subset and a testing subset*, of which the first is used to teach the algorithm the word patterns that belong to each sentiment category, and the second to assess the performance of the algorithm on unseen data;

Different performance metrics can be used to evaluate models: *precision* measures how many of the samples predicted in each class (negative, neutral, positive) correspond to the true labels; *recall* measures how many of the true samples in each class are captured by the predictions; the *f1-score*, lastly, provides a harmonic mean of precision and recall. These metrics are derived from the confusion matrix (see Table 2). In the confusion matrix, each cell allows to compare the instances of predicted labels for a particular class (e.g. negative opinion) with the actual labels. From the confusion matrix, the precision, recall and f1-score of each model can be calculated (see Table 3). The end product of a Grid Search cross validation procedure is a "best model" (i.e. with optimized generalization performance estimated using only training data). The best performing model had a macro average f1-score of 86.4% (see Table 3), which is well above minimum thresholds of around 65%-70% (Lemmens et al., 2021; Orellana & Bisgin, 2023). Table 4 gives some of the features (words) that are associated (positive features) with

the different output classes (negative opinion, neutral opinion, positive opinion). As this is not a dictionary-based study, these features are only indicative of the more complex patterns of words that the algorithm actually uses in its predictions. For more detailed information about the SML approach, please see the supplementary materials.

[Please include Table 2 here]

[Please include Table 3 here]

[Please include Table 4 here]

Step 3 – apply the validated algorithm to *predict* the scores on the texts in the full dataset.

After the optimal algorithm was selected, a model was trained on the entire annotated data. For each observation, the selected text was passed through the classifier and labeled "neutral", "positive" or "negative". Table 1 shows the percentages of neutral, positive and negative texts for each organization. Several measures are constructed based on these data: a measure representing the total amount of articles per month that mention the organization ('Media attention') as well as the total amount of positive ('Positive media attention'), negative ('Negative media attention') and neutral ('Neutral media attention') articles over a period of month for each organization.

Main dependent variable: parliamentary attention

Legislators have several parliamentary tools at their disposal to scrutinize the executive branch. Among these, Font and Pérez Durán (2016) argue that questioning mechanisms offer particularly fruitful avenue for empirical research, because they allow individual legislators to solicit information and alert the executive of improper implementation of policies. Furthermore, questions are relatively easy and straightforward to submit and have been found to be particularly sensitive to media attention (i.e. most likely case) (Van Aelst & Vliegenthart, 2014). We focus on written questions, both in commissions and in the plenary meetings.

We used the flempar package developed for R to scrape all written questions from the Flemish Parliament's API (Willems et al., s.d.), after we copied our approach from the newspaper data to extract sentences that contained the name or abbreviation of at least one of the organizations under study.

First, we look at the total amount of parliamentary attention ('Parliamentary attention'): per month and for each organization, the total amount of these diverse parliamentary questions was calculated.

Second, we are interested in the sentiment of parliamentary attention. Since NLP models typically suffer from a strong performance drop when applied to data from a different domain or genre, we fine-tuned the classifier that was developed on sentences from newspaper articles, training it with additional sentences from the corpus of parliamentary data before making predictions on it. We used active learning, which is an approach first introduced in the 1990's and works as follows: A model is first fine-tuned on a small set of annotated data. Then, the model makes predictions for the rest of the (unannotated) corpus. Afterwards, the top n most difficult cases according to the outputs of the model's *softmax function* are annotated and used as additional training data. The reasoning behind this approach is that the more difficult a case is, the more it can contribute to the model when used in training. We annotated two batches of 1000 sentences each, where the first batch was selected randomly, and the second batch was selected on the basis of prediction difficulty. Afterwards, cross validation was used to fine-tune and optimize the classifier (using the difficult batch only in the training partitions).

[Please include Table 5 here]

[Please include Table 6 here]

The results of the optimized model can be found in Table 5 (confusion matrix) and Table 6 (performance statistics). The macro-averaged f1-score dropped to 72.9%, which is normal when applying a classifier trained on particular data (here: media attention) to new (parliamentary) data. In addition, the f1-score is still well within the accepted range (Lemmens et al., 2021; Orellana & Bisgin, 2023). Particularly when one considers the goal of this study, which is not so much to explain individual texts as reliably as possible but to capture trends across time. The error rate on individual cases will therefore be compensated by the large sample size.

Third, for the measurement of opposition/majority role, we used named entity recognition techniques and coupled our data (which also contained the name and party of the respective legislator) to an existing dataset that included the majority vs. opposition role for each legislator through time. Potential problem cases (e.g. legislators with the same name) were handled manually. Fourth, we distinguish between written questions asked in commissions from those asked in plenary meetings.

Methods

The structure of our dataset requires careful consideration of the analysis method. First, a lagged dependent variable was added in each of our models to deal with the temporal dependency (autocorrelation). Second, we also included lagged values for the independent variables.

In order to explore the link between media attention and parliamentary attention we construct a balanced panel. This means that only organizations are included with media and parliamentary attention for all available time periods. The missing observations in our original, non-balanced panel are purely random. Therefore, we prefer to reduce the included organizations in order to construct a balanced panel, for the following reasons (also note that analyses on the full sample of 24 agencies – or: unbalanced panel – are reported in the supplementary materials):

- A balanced panel allows for *more efficient estimation* because it uses all available information for all units in every time period, reducing estimation errors and increasing precision;
- A balanced panel allows for *better control of unobserved heterogeneity* (factors that influence both the media sentiment and parliamentary attention) because it is more likely to capture stable unit-specific characteristics that are not captured by time-invariant variables. Since it enables to control for unobserved heterogeneity and time-invariant confounding factors, a balanced panel helps to shed some light on causality;
- A balanced panel is *more robust* to issues such as selection bias, attrition, and measurement error, as it ensures that all units are observed at every point in time, reducing the potential for bias in estimates;
- An additional benefit of relying on a balanced panel, is that the included agencies correspond to the more salient agencies which are used to a certain baseline of media attention. For less salient agencies, we expect that the role of sentiment will be less pronounced. Since media attention is overall rare, *when it occurs* it may lead to parliamentary attention regardless of the underlying sentiment (in other words: the effect of sentiment will be harder to isolate from the effect of media salience). The focus on salient agencies, however, allows to test the "pure" effect of sentiment within an overall context of high media attention.

Table 7 shows the descriptive statistics. Our final and balanced panel exists out of 8 organizations (Sports Flanders, The Line, Child & Family, Public Waste Agency, Visit Flanders, Flemish Public Employment Service, Flemish Land Agency, and Flemish

Environment Agency), for which we have monthly information over a time period of 20 years (t=245).

[Please include Table 7 here]

Results

Table 8 shows the regression results on the balanced panel of 8 organizations with media attention (i.e. newspaper coverage) and parliamentary attention (i.e. written questions by legislators) for all available months. We utilized a fixed effects model[2], and included lagged variables for both media and parliamentary attention. Model 1 presents the results for the general relation between media attention and parliamentary questions. We consider both unlagged media attention (i.e. media and parliamentary attention occur within the same month) and lagged media attention (i.e. media attention occurs in the month before parliamentary attention) The following models 2-3-4-5-6 delve into the effects of sentiment in unlagged and lagged media attention (model 2), and how these effects may be contingent on the majority vs. opposition role of legislators (models 3-4) or locus of parliamentary attention (models 5-6).

[Please include Table 8 here]

The results in model 1 show that unlagged media attention is positively related to parliamentary attention. These results support H1. In order to examine whether media attention precedes parliamentary attention (or vice versa), we performed Granger non-causality tests that demonstrate the preceding role of the media (see Table 9).

[Please include Table 9 here]

Model 2 shows that both negative and positive unlagged media attention are positively related to parliamentary questions. The effect of neutral media attention does not reach significance. Furthermore, it now is clear why we saw no effect of lagged media attention in model 1: depending on the tone of coverage, lagged media attention either precedes less parliamentary questions in the following month (for neutral coverage) *or* more parliamentary questions in the

[2] Hausman tests were conducted to test if fixed effects were preferred over random effects models, which was indeed confirmed (Model 1:$\chi^2(34)=249.95$***; Model 2: $\chi^2(38)=260.69$***; Model 3: $\chi^2(39)=331.10$***; Model 4: $\chi^2(39)=58.32$**; Model 5: $\chi^2(39)=756.95$***; Model 6: $\chi^2(38)=78.94$***).

following month (for negative coverage). The effect of the lag for positive media attention does not reach significance. These observations are in line with H1.

In addition, we were interested in the congruence in sentiment between media attention and parliamentary questions (H2). The findings in Table 10 demonstrate that negative media attention is positively related to negative parliamentary questions, both within the same month and in the following month. Supporting H2, negative media attention is the only sentiment that triggers more negative parliamentary questions, both in the same month (unlagged) and in the following month (lagged). Yet negative media attention also significantly and positively impacts positive parliamentary questions within the same month, and neutral parliamentary questions within the same and in the following month.

[Please include Table 10 here]

Returning to Table 8, Models 3 and 4 explore the effect of the sentiment of media attention within the subsamples of majority legislators (model 3) and opposition legislators (model 4). Surprisingly, only neutral media attention (unlagged) has a significant and positive effect on the number of parliamentary questions of opposition legislators. Both negative and positive media attention are positively correlated to parliamentary questions from majority legislators within the same month, while lagged neutral media attention decreases majority questions. Lastly, the distinction between parliamentary questions in committee and plenary sessions produces largely similar results in both models: unlagged negative media attention triggers questions in both venues, as opposed to unlagged positive media attention (which increases parliamentary attention only in the plenaries) and lagged neutral media attention (which decreases parliamentary questions in the plenaries).

Discussion

Overall, our findings are conducive of several main conclusions. First, results show that media attention (newspaper coverage) for public organizations generates parliamentary attention (written questions) for these organizations in the same month (supporting H1). The media are an important source of information for political elites to learn about societal issues and what their potential electorates care about. The media is particularly important as an information-source for issues that are relevant yet to some extent clouded in uncertainty (McCombs et al., 2014); a description that fits well with the information disadvantage many legislators have vis-

à-vis agencies (Waterman et al., 1998; Yesilkagit & Van Thiel, 2012). Furthermore, written parliamentary questions are of symbolic nature compared to substantive parliamentary output, and hence have no direct policy consequences. In such cases, agenda-setting scholarship argues that the media will be more important as a source of information for legislators than the other way around (Vliegenthart et al., 2016).

Second, our results show that in order to understand under which conditions media attention for public agencies spills over to parliamentary attention in the following month, we need to look at the role of sentiment. Both positive and negative media attention precede more parliamentary attention for agencies in the same month, though only the impact of negative media attention spills over to the next month (supporting H1). Depending on the sentiment of media coverage, media attention for public agencies is either unrelated to parliamentary attention in the next month (positive tone), precedes more parliamentary attention (negative tone), or less parliamentary attention (neutral tone). This observation is in line with H1.

From an agenda-setting theory perspective, our results also offer support for first- and second-level agenda-setting effects of negative media attention. Media attention is more likely to precede parliamentary attention (both positive, negative and neutral) when it discusses agencies negatively. This finding supports the theory of affective intelligence which argues for the emotion-triggering role of negative news, which triggers political judgment among the public, and incentivizes legislators to demonstrate their responsiveness to public demands (Hester & Gibson, 2003; Wanta et al., 2004; Wu & Coleman, 2009). It also echoes previous political agenda-setting scholarship on the attention-increasing potential of negativity, conflict and controversy (Kingdon, 1973; Sevenans & Vliegenthart, 2015; Thesen, 2013).

This observation that negative information about agencies precedes parliamentary questions is also in line with the controlling function of parliament. Parliament *should* scrutinize the executive functions of government, and it is therefore reassuring that indications of potential malfunctioning as suggested by negative media attention are picked up by legislators. The finding that the tone of media coverage decides how much lasting parliamentary attention receive also fits with insights from the reputation and accountability literature. Negative media attention may reflect negative reputations or legitimacy concerns with public agencies which, in turn, incentivizes politicians to demonstrate their responsiveness to these concerns (Busuioc & Lodge, 2016). The observation that positive media attention also generates predominantly positive parliamentary attention in the same month (cf. Table 10) also testifies to the benefits

of obtaining positive media reputations as these seem to spill over to the parliamentary arena (Salomonsen, Boye, & Boon, 2021).

Third, the observation that the question-inducing effects of negative media attention are driven by majority legislators (model 3) was surprising in line of previous research by political agenda-setting scholars that discusses the appropriateness of negative news for oppositional behavior (Thesen, 2013; Vliegenthart et al., 2016a). Our results suggest that the notion that majority legislators will not be responsive to negative news might have been overly simplistic. There are many ways other than "silence" to manage negative news. The observation that negative news triggers more (lasting) parliamentary attention from majority legislators reflects more hands-on approaches, perhaps driven by their own reputational or political agenda (Busuioc & Lodge, 2016).

Our study comes with several limitations. First, there is the issue of causality, which cannot be definitely accounted for in our research design, even though the Granger non-causality tests give a strong indication of the preceding role of media attention. While our main research interest was in theorizing the conditions under which media attention precedes parliamentary attention, it should also be clear that we cannot (and should not) exclude the existence of the reverse relation. In fact, this is exactly what is predicted and demonstrated by political agenda-setting scholars. The relation between politicians and journalists is likened to a tango; an intimate dance characterized by interdependence (Van Aelst & Vliegenthart, 2014). Even though we established that media attention for agencies preceded parliamentary attention in the same month, we cannot be sure whether it was the media coverage that caused the parliamentary activity or whether it was the underlying event. While we cannot empirically solve this issue, scholars have expressed their confidence that the media at least have some "net" effect on top of the underlying events (Sevenans et al., 2016).

We therefore refrained from using language that suggests causality throughout the manuscript; rather describing role of the media vis-à-vis parliament as 'preceding'. While our research design cannot make definitive statements on the media's influence and power, we do expect that the media will generally be quicker to respond to and cover events than legislators. Parliament, like the media, is an institution with its own established routines, practices and norms. Institutions can differ dramatically in their ability and speediness of responsiveness to incoming signals. Unlike the media and its 24-hour news cycle that places a premium on fast-paced responsiveness, parliament is limited by decision-making procedures that constrain an immediate reaction in the form of parliamentary activity (Walgrave & Vliegenthart, 2010).

Second, an inevitable drawback of creating a balanced panel, in which only organizations are present with consistent media attention and parliamentary attention throughout all months under examination, is that we end up with a sample of highly salient agencies. While this approach allowed us to more easily include lagged variables and reduced the noise introduced by unit heterogeneity, it does raise questions pertaining to the external validity of our results. To test the robustness of our results, we performed a regression on our full sample of 24 agencies (i.e. unbalanced panel; or: no exclusion of organizations that do not consistently have media and parliamentary attention in each month). The significant results from the balanced panel consistently return in the unbalanced panel, except for the changed sign of lagged neutral attention. The unbalanced panel provides more significant results, namely: lagged media attention (positive effect, model 1), neutral media attention (positive effect, models 2,3,5) and lagged positive media attention (negative effect, models 2, 4, 5).

Third, we decided to focus on written questions as a form of *symbolic* parliamentary attention, which was expected to be particularly sensitive to media attention. Future studies may consider the relations between media attention and more substantive forms of parliamentary attention (e.g. decrees), considering that such substantive work will probably react more slowly to media attention than more symbolic activities. Future studies may also delve deeper into the parliamentary dynamics that may explain why media attention to agencies is followed-up on. This study tested a first – arguably rough – distinction between plenary and committee behavior and found little difference. Perhaps a more fine-grained focus at the level of committees is more insightful. Agencies are distributed among portfolios that are regarded by their own parliamentary committee. By exploring differences between parliamentary committees more nuanced views of attention cycles and dynamics may emerge (e.g. are all committees equally active?).

Fourth, the study uses data from the Flemish (Belgian) context, which – while fully comparable to full-fledged nations for the competences under its remit (Verhoest et al. 2012) – comes with a particular media system ('Democratic Corporatist', comparable to Nordic countries, the German-speaking countries, and the Netherlands, cf. Brüggeman et al., 2014) and political-administrative system (Latin-Napoleonic, comparable to France, Spain, Portugal, and Italy, cf. Verhoest et al., 2012), the external validity of which warrants further examination.

Conclusion

The main contribution of this study was to examine how the questioning behavior of legislators about public agencies was related to the news media attention for these agencies.

Our results support the expectation that legislators rely on media attention to provide information about agencies in their questioning behavior. More prolonged (lagged) effects on increased parliamentary attention are driven by negative media attention. At the empirical level, this study benefited from state of the art in machine learning methods to collect and code sentiment in media and parliamentary data for a wide variety of agencies over a period of 20 years.

While we already discussed the variety of implications for scholars, our findings also have important implications for the accountability relations between agencies and legislators and, more broadly, the functioning of our democratic systems. Positive media attention engenders (positive) parliamentary attention in the same month, whereas negative media attention has broader and longer-lasting effects on questioning behavior. These findings demonstrate the relevance of the media for parliamentary control behavior towards these agencies. Agencies that attract negative media attention are more likely to face critical scrutiny in parliament, whereas agencies that succeed in attaining positive coverage may avoid such scrutiny.

Endnotes

[1] 'Contingency' is an ambiguous concept that can be understood in both a correlational and causal sense. In this paper, we take the former correlational perspective. By contingency, we refer to the (co)relation between two variables (here: media attention and parliamentary attention for public agencies) being impacted by the values of other variables.

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Tables to be included in the manuscript

Table 1: Overview of organizations and their media attention

Organization	Number of texts	% neutral	% positive	% negative
The Line (public transport agency)	32921	55%	19%	26%
Flemish Public Employment Service	11227	68%	23%	9%
Agency for Roads and Traffic	12184	73%	14%	14%
Sports Flanders	8157	74%	20%	6%
Child and Family	6026	70%	16%	14%
Agency for Nature and Forests	4.536	70%	18%	12%
Public Waste Agency of Flanders	3738	80%	13%	7%
Visit Flanders	3798	59%	32%	9%
Flemish Environment Agency	2943	82%	11%	7%
Flemish Land Agency	1668	76%	17%	7%
Agency for Care and Health	1316	81%	11%	8%
Agency for Infrastructure in Education	615	78%	14%	8%
Flemish Regulator for Energy and Gas	494	81%	8%	11%
Institute for Agricultural, and Fisheries and Food Research	466	68%	22%	10%
Research Institute—Nature and Forest	367	86%	12%	3%
Agency for Entrepreneurship	275	56%	38%	7%
Care Inspectorate	201	52%	14%	34%
Flemish Agency for Social Housing	249	70%	17%	13%
Flemish Agency for Persons with Disabilities	215	52%	13%	35%
Youth welfare agency	206	61%	25%	15%
Institute for Science and Technology	147	48%	41%	11%
Housing Flanders	52	77%	15%	8%
Arts and Heritage	50	50%	18%	32%
Inspection Spatial Planning and Housing Policy	32	50%	3%	47%
Total	**91883**			

Table 2: confusion matrix classifier media

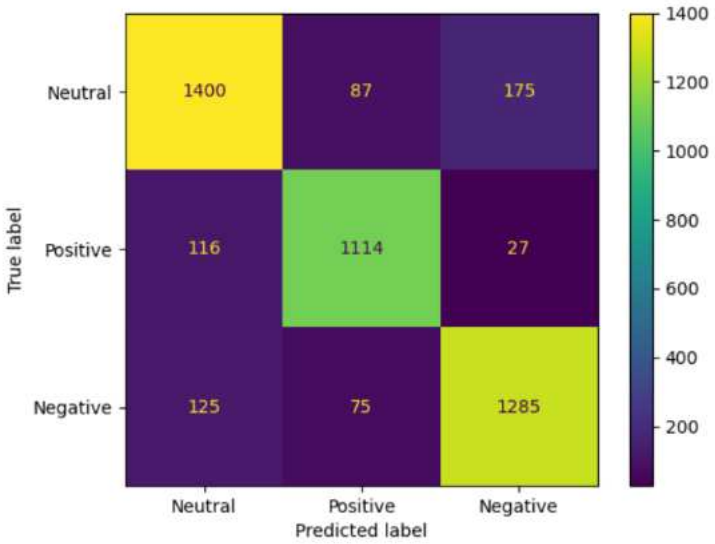

Table 3: performance statistics classifier media

	Precision	**Recall**	**F1-score**
Positive opinion	87.3	88.6	88.0
Negative opinion	86.4	86.5	86.5
Neutral opinion	85.3	84.2	84.7
Macro averaged	86.3	86.4	86.4

Table 4: Feature analysis (translated from Dutch)

Negative opinion	[critical; insufficient; not good; dissatisfaction; complaints; accidents; error; responsibility; politics]
Neutral opinion	[circumstances; possibility; end; participants; come; property; need; to place; administrative]
Positive opinion	[success; good; safe; improve; thanks to; satisfied; support from; happy; strong; fruits;; pleased; interest; nice; proud; ideal; perfect; positive; comfort]

Table 5: confusion matrix classifier parliament

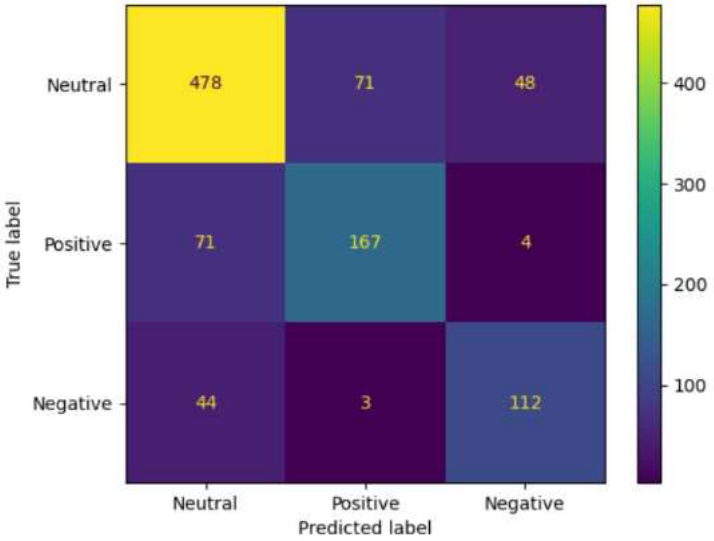

Table 6: performance statistics classifier parliament

	Precision	**Recall**	**F1-score**
Positive opinion	69.3	69.0	69.2
Negative opinion	68.3	70.4	69.3
Neutral opinion	80.6	80.1	80.3
Macro average	72.7	73.2	72.9

Table 7: Descriptive statistics

Variables	Mean	SD.		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Parliamentary attention	12,20427	15,262	(1)	1								
Parliamentary attention_ negative	0,541279	1,297	(2)	0,665	1							
Parliamentary attention_ positive	0,619767	1,168	(3)	0,706	0,428	1						
Parliamentary attention_ neutral	7,668023	9,917	(4)	0,964	0,596	0,639	1					
Neutral media attention	22,72663	23,131	(5)	0,588	0,611	0,373	0,549	1				
Positive media attention	6,875508	8,383	(6)	0,568	0,571	0,400	0,527	0,887	1			
Negative media attention	5,891768	12,061	(7)	0,545	0,643	0,309	0,519	0,863	0,802	1		
Opposition	0,340116	0,474	(8)	0,063	0,035	0,034	0,053	0,137	0,122	0,068	1	
Commission	0,292175	0,455	(9)	0,014	0,057	0,021	-0,032	0,052	0,007	-0,017	0,04	1

Table 8: Regression results

Variables	(1) Full model	(2) Full model - sentiment	(3) Majority	(4) Opposition	(5) Plenary	(6) Commission
Media attention	0.126***					
	(0.0170)					
Lagged Media attention	-0.0108					
	(0.0173)					
Neutral Media attention		0.0418	-0.00301	0.115**	0.0459	0.0568
		(0.0308)	(0.0425)	(0.0515)	(0.0372)	(0.0671)
Positive Media attention		0.185***	0.275***	0.139	0.199**	0.133
		(0.0660)	(0.0939)	(0.112)	(0.0813)	(0.135)
Negative Media attention		0.270***	0.393***	0.135	0.245***	0.413***
		(0.0498)	(0.0695)	(0.0863)	(0.0618)	(0.114)
Lagged Neutral Media attention		-0.218***	-0.176*	-0.128	-0.244***	0.161
		(0.0654)	(0.0917)	(0.113)	(0.0796)	(0.149)
Lagged Positive Media attention		-0.000446	0.0422	-0.0672	0.00241	-0.0523
		(0.0311)	(0.0431)	(0.0533)	(0.0385)	(0.0670)
Lagged Negative Media attention		0.112**	-0.0104	0.0547	0.0625	0.0603
		(0.0501)	(0.0724)	(0.0803)	(0.0599)	(0.129)
Lagged Parliamentary attention	0.258***	0.249***	0.130***	0.366***	0.228***	0.184***
	(0.0219)	(0.0219)	(0.0301)	(0.0370)	(0.0258)	(0.0653)
Opposition					0.0866	0.325
					(0.612)	(0.974)
Month dummies Year dummies	Included	Included	Included	Included	Included	Included
Constant	5.023***	5.961***	5.719***	4.057	7.117***	2.988
	(1.457)	(1.459)	(1.813)	(3.209)	(1.952)	(2.383)
Observations	1,960	1,960	1,130	583	1,388	325
R-squared	0.306	0.318	0.259	0.359	0.269	0.344
Number of Org	8	8	8	8	8	8

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 9: Granger non-causality test

Dumitrescu & Hurlin (2012) Granger non-causality test results		
Relation	Testing the causal effect of sentiment on parliamentary attention	Testing the causal effect of parliamentary attention on sentiment
Lag order	1	1
W-bar	2.961	1,502
Z-bar	3.921***	1,005
Z-bar tilde	3.848***	0,974
Tested hypotheses	H0: sentiment does not Granger-cause parliamentary attention.	H0: parliamentary attention does not Granger-cause sentiment.
	H1: sentiment does Granger-cause parliamentary attention.	H1: parliamentary attention does Granger-cause sentiment.

*** p<0.01, ** p<0.05, * p<0.1

Table 10: Regression results parliament sentiment

Variables	(1) Positive parliamentary attention	(2) Negative parliamentary attention	(3) Neutral parliamentary attention
Neutral Media attention	-0.000286	0.00481	0.0117
	(0.00337)	(0.00341)	(0.0232)
Positive Media attention	0.0205***	0.00522	0.0624
	(0.00729)	(0.00739)	(0.0505)
Negative Media attention	0.0171***	0.0386***	0.153***
	(0.00542)	(0.00550)	(0.0376)
Lagged Neutral Media attention	0.0134*	-0.0235***	-0.174***
	(0.00719)	(0.00726)	(0.0494)
Lagged Positive Media attention	-0.00902***	-0.00213	0.0168
	(0.00338)	(0.00343)	(0.0233)
Lagged Negative Media attention	-0.00343	0.0110*	0.0850**
	(0.00551)	(0.00569)	(0.0383)
Lagged Positive Parl. attention	0.0367		
	(0.0257)		
Lagged Negative Parl. attention		-0.00654	
		(0.0255)	
Lagged Neutral Parl. attention			0.257***
			(0.0248)
Month dummies Year dummies	Included	Included	Included
Constant	0.354**	0.0992	2.463**
	(0.159)	(0.161)	(1.099)
Observations	1,555	1,555	1,555
R-squared	0.102	0.106	0.259
Number of Org	8	8	8

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1