Media Coverage of Politicians and the Popularity of Search Queries on Google: Evidence from Five Countries

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Abstract

The media coverage of politicians has received substantial scholarly attention in the study of political communication. However, the consequences of media visibility for political information-seeking among the public has not been the subject of much empirical research. Combining an original dataset of over 3 million news stories from 15 national newspapers in Belgium, Denmark, Norway, the Netherlands, and the UK, the biographies of nearly 1,500 members of parliament (MPs) and data on their search popularity on Google from the period of 2005-2019, we examine the extent to which representatives' media visibility affects their search popularity. Our results show that while politicians' news visibility is positively associated with their popularity in Google search queries, this association is substantially stronger among MPs of ethnic minority background and female MPs. These results have important implications for the role of identity in political communication and democratic processes.

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1 Introduction

A vast literature has examined the various factors that make politicians more visible in the news media (Tresch 2009; Vos 2014). Among the factors examined as predictors of media visibility in this body of research are politicians' personality characteristics (Amsalem et al. 2020), political office (Gattermann and Vasilopoulou 2015), gender (Van der Pas and Aaldering 2020; Van der Pas 2022), race (Terkildsen and Damore 1999; Ward 2016, 2017), parliamentary activities (Yildirim et al. 2023), politicians' use of negativity in political rhetoric (Poljak 2024), and various system-level characteristics that pertain to the media and institutions (Vos and Van Aelst 2018). A conventional assumption in research on the media visibility of political actors is that biases in media coverage can hurt the electoral chances of politicians from underrepresented backgrounds (Van der Pas and Aaldering 2020, p.115). However, despite the far-reaching consequences of media coverage of politicians for electoral competition, political representation, and accountability, empirical research has primarily treated it as an outcome variable and has not comprehensively examined its implications.

In this research, we seek to fill this void by studying how politicians' media coverage affects public information-seeking behavior. For democratic representation to function effectively, it is essential that elected officials understand the needs and preferences of their constituents, and that constituents, in turn, are sufficiently aware of the policy positions of those who speak on their behalf (Delli Carpini and Keeter 1993; Popkin and Dimock 1999). Past research has shown that citizens who consume less political news are less likely to evaluate and hold opinions about their representatives (Hayes and Lawless 2015). Studies also showed that name recognition among voters is key to electoral success, even among incumbent politicians (Hood III and McKee 2010; Kam and Zechmeister 2013). Consequently, media coverage of politicians, particularly those from historically underrepresented groups such as women and visible minorities, is crucial for several aspects of democratic processes.

Drawing on information-processing theories, we argue that politicians' news visibility increases the electorate's search for information about their representatives. More importantly, we explore the two potential ways in which this association could unfold, as they hold very different implications for representative democracy and under-represented groups. One possibility is that the impact of politicians' news visibility on political information-seeking efforts among the public might reinforce pre-existing biases in the political arena and the news media, which we call the *Reinforcement Hypothesis*. This would be the case if identity-related biases in media coverage (Van der Pas and Aaldering 2020; Thesen and Yildirim 2023) are replicated in the electorate's political information-seeking behavior. Ditonto (2020), for instance, has found that subjects who hold prejudiced opinion search for less information about minority candidates. Following this logic, we argue that appearing more in the news might have less of an effect on information-seeking among the public when the politician is of traditionally under-represented background.

A contrary logic, the *Compensation Hypothesis*, posits that news stories about women and visible minorities in politics may generate a heightened urge to look for information about those political actors for several reasons. Given the persistent biases in both political communication and politics, the electorate is relatively less well-informed about politicians from traditionally underrepresented groups. Consequently, the presence of these politicians in media reports increases public interest and drives a greater share of the electorate to seek additional information. Specifically, in areas where numerical distributions have traditionally favored the dominant group such as men and ethnic majorities in politics, representatives who occupy token or minority statuses such as women and ethnic minorities may face increased scrutiny and disproportionate attention (Kanter 1977). This increased awareness toward the minority group can be partly explained by the expectation that politicians from traditionally underrepresented backgrounds will 'do politics differently' (Cowley and Childs 2003; Beckwith 2007). Second, voters often stereotype politicians ideologically and on issue stances based on their gender and ethnic/racial background (McDermott 1997, 1998; Matson and Fine 2006), and such biases may result in intensified search activities directed toward women and visible minorities in politics. To the extent that this compensation mechanism is at work, we expect to see MPs from minority groups to benefit more from appearing in the news, experiencing a stronger increase in public information searches as compared to MPs from traditionally dominant groups.

We test our theoretical prepositions using two novel datasets of politicians' media visibility and Google search popularity. The dataset of media appearances includes news stories from fifteen national newspapers in Belgium, Denmark, Norway, the Netherlands and the UK, whereas the dataset of Internet search popularity of respective politicians includes popularity scores collected from the Google Trends. Inspired by a growing body of research that makes use of online search traffic data (Brown 2011; Mellon 2013, 2014; Tkacz 2014; Haman, Školník, and Čopík 2021), we examine the relationship between the frequency of MPs' visibility in the media and their Google search popularity on a monthly basis over the period of 2005-2019.[1]

Our empirical results from two-way fixed effects models suggest considerable influence of media visibility over the extent to which representatives appear in Google searches, where appearing more in national newspapers increases MPs' popularity in search engine queries. Perhaps more importantly, we also show that the effect of media visibility on one's popularity in Google search queries is differential across gender and ethnic background. Specifically, we find that the search traffic of historically underrepresented groups, women MPs and ethnic minority MPs, generally benefits more from media visibility across most country cases in our study. This pattern is suggestive of a *compensation mechanism* that can enhance the name recognition of politicians from traditionally underrepresented backgrounds.

In the remainder of this article, we first review the literature on political communication and political information-seeking before developing our theoretical expectations. Next, we introduce our original datasets of media coverage and political information-seeking behavior among the public, and describe the process through which we put together our MP-level dataset based on representatives' visibility in the print media, their popularity in Internet search traffic, and background characteristics. We then present

1. Because Google Trends does not allow users to generate monthly data for periods shorter than four years, our dataset includes select periods from our country cases. We analyze MPs for the period of 2010-2014 and 2014-2019 in Belgium, 2011-2015 in Denmark, 2005-2009, 2009-2013, and 2013-2017 in Norway, 2006-2010 and 2012-2017 in the Netherlands and 2005-2010 and 2010-2015 in the UK.

our results and discuss their implications for the study of political communication and democratic processes.

2 Theoretical Background

2.1 Online Political Information-seeking

It is widely accepted that "all things being equal, the more informed people are, the better able they are to perform as citizens" (Delli Carpini and Keeter 1993, p. 68). However, the expectation that voters possess the knowledge and ability necessary to make informed decisions about whom to vote for is hardly realistic (Somin 2016; Achen and Bartels 2017). In fact, decades of research suggest that a significant portion of voters lacks political knowledge, interest, or the civic skills essential for informed political decision-making (Bennett 1988; Delli Carpini and Keeter 1993; Converse 2006; Shaker 2012). This has important consequences for democratic representation. Studies show that constituents are less likely to trust their representatives when they know less about representatives' characteristics (Bianco 1994, Almond and Verba 1963, p. 357). Political knowledge, along with political trust, fosters political participation and other forms of political engagement that are central to representative democracy (Galston 2001; Christensen 2018). Because knowledge about legislators, parties and ideologies is essential for effective citizenship, as Delli Carpini and Keeter (1993) argues, the lack of such knowledge harms the effectiveness of democratic processes (Popkin and Dimock 1999).

Although the traditional media have long been the main source of political information for the masses, a growing number of studies turn to new media platforms such as Wikipedia, political blogs, and various other sources of political information, as such platforms have gained considerable visibility over the past two decades (Kaye and Johnson 2002; Granka 2010; Mellon 2014). Prior research showed that new information and communication technologies foster citizens' political engagement and information-seeking behavior (DiMaggio et al. 2001b; Vitak et al. 2011; DiMaggio et al. 2001a). Cognizant of potential benefits of going online for name recognition, elected officials seem to have taken online political information-seeking seriously and devoted significant time to online platforms that can help them develop personal vote-earning attributes (D'Alessio 1997; Gibson and McAllister 2011; Hoffmann, Suphan, and Meckel 2016; Bright et al. 2020). Given the high data quality on these platforms, scholars increasingly encourage their use in empirical social science research (Brown 2011; Vosen and Schmidt 2011). Previous research indicates that in addition to being useful for predicting issue salience and public mood (Scharkow and Vogelgesang 2011; Scheitle 2011), online search platforms also help citizens gather political information about domestic and international politics (Reilly, Richey, and Taylor 2012; Pelc 2013).

Analyzing information about politics on Wikipedia, Agarwal et al. (2020, p.1) argued that Wikipedia fulfills important functions of the communication media in democratic societies, thanks to its widespread use and high data quality: "informing citizens of what is happening around them; educating as to the meaning and significance of the 'facts'; and publicizing the activities of governmental and political institutions" (see also

Konieczny 2010; Brown 2011). Using information on the Wikipedia pages of politicians in the Czech Republic, Haman, Školník, and Čopík (2021) recently found a strong statistical association between the name recognition of politicians and their Wikipedia page traffic. As such, the authors suggested that Wikipedia page views can be used as a strong proxy for name recognition. Others went so far as to suggest that Wikipedia traffic data predict changes in overall turnout in elections and changes in vote share for particular parties (Yasseri and Bright 2016). While not testing this claim directly at the individual-level, Göbel and Munzert (2018) analyzed the timing of editing the personal Wikipedia pages of German MPs and attributed the strategic editing behavior to representatives' reelection efforts.

Research suggests considerable variation in online information-seeking regarding politicians. For instance, in a recent analysis of German MPs' representation in new media platforms, Pradel (2020, p.6) argues and shows that search behavior is often "influenced by underlying stereotypes and expectations based on them, which are influenced by the social identity of the politician." This implies that search popularity does not necessarily suggest the importance of the MP or her work in parliament, but instead is a product of the interplay between stereotypical perceptions and newsworthiness. By the same logic, it is possible that certain MPs receive higher search traffic due to how they are portrayed in the mass media, regardless of their political work, policy preferences, or priorities.

Although scholarly inquiry into the link between representatives' visibility in the media and online political information-seeking behavior has been somewhat limited, existing research offers some clues. Granka (2010) shows that search query volume, especially regarding sensational political events, follows news coverage. Using Google search trends as a search behavior measure, Weeks and Southwell (2010) show that news regarding political leaders appearing in the traditional media affects same-day Google searches about them. Swearingen and Ripberger (2014) report that public attention to candidates in the U.S. Senate elections based on the Google Insights is significantly correlated with two-party vote share. On the contrary, focusing on the 2009 and 2014 European Parliament elections, Yasseri and Bright (2016) find no evidence of news media effects (mentions in the traditional media) on Wikipedia traffic. Instead, they find that newer parties tend to receive disproportionately high levels of Wikipedia traffic, leading the authors to argue that Wikipedia page views may be driven by potential swing voters considering changing their votes in elections. Alternatively, this finding may have been driven by the fact that the urge to seek political information is heightened when relatively little is known about candidates or parties.

While Yasseri and Bright (2016, p. 4) report null findings regarding the link between news media coverage and Wikipedia traffic, the authors acknowledge that European elections could be a least-likely case, "as European elections are typically perceived as secondary elections in most EU member states, subordinate to the national electoral contest." Indeed, there are good reasons to believe that the relationship between one's visibility in the traditional media and online search traffic should be stronger in the national context. First of all, as the literature on news consumption and political knowledge has shown, voters rely heavily on both user-generated and traditional news in acquiring information about political figures and processes (Brians and Wattenberg 1996; Chaffee and Kanihan 1997; Bimber 1998; Eveland and Scheufele 2000; Kaufhold, Valenzuela, and De Zúñiga 2010). Even the politically less connected appear to have taken advantage of the rise of media technologies and online platforms, which alleviated the scope of barriers (e.g., informational costs) hindering political engagement (Bimber 1999).

2.2 From Politicians' Media Coverage to the Public's Online Political Information-Seeking Behavior

That voters know little about who their representatives are and what they do in legislatures during their term of service is a well-established finding (Campbell et al. 1980; Zaller 1992; Alvarez and Gronke 1996; Converse 2006; Somin 2016; Van Coppenolle 2018; Balles, Matter, and Stutzer 2023). Analyzing decades of data from the National Election Study in the US, Neuman (1986) report that most Americans were unable to name any congressional candidates in their district during the election campaign. The same can be said of European democracies, where citizens tend to have difficulty identifying the parliamentarians from their districts (Mitchell 2000, p. 346). Based on survey experiments, Butler et al. (2023) show that voters have scant knowledge of their representatives' lawmaking effectiveness, but express greater approval of their work upon receiving credible information about representatives. Strikingly, Snyder and Strömberg (2010)'s findings suggest that while politicians' name recognition among the public is generally low, those living in areas with more press coverage of representatives are more likely to recall their representative's name, more able to describe and rate their work. Similarly, François and

Navarro (2020) underscore the importance of media platforms that report on politicians' legislative work in increasing constituents' knowledge about their representatives.

However, it is important to note that when politicians appear in the news, they are often mentioned in the context of a topical event or debate. Most often, limited background information on the MP is disclosed (beyond party and constituency) since this is rarely of direct relevance to the news story. Also, the vast majority of MPs do not hold leadership or other visible positions, which makes it even more difficult for voters to rate politicians and their work. We therefore contend that when representatives appear in the news, citizens will seek additional information on the MP regarding the MP's political and personal background. Based on this line of reasoning, we formulate our first hypothesis as follows:

> *Information-seeking hypothesis:* The MP's news visibility will be positively associated with his/her popularity in online search terms

The hypothesized positive association between news visibility and online search traffic discussed above could, in theory, be roughly of equal strength for all MPs. However, given what we know about biases in political processes from a vast body of scholarly inquiry (e.g., Mutz 1989; Cohen, Tsfati, and Sheafer 2008; Walgrave 2008; Bird, Saalfeld, and Wüst 2010; Helfer 2016; Kenny and Verge 2016; Van der Pas and Aaldering 2020), such an outcome is highly unlikely. This leaves us with two reasonable, but contradictory, potential outcomes from the perspective of traditionally under-represented groups in legislatures. The first would be that the news effect on political information-seeking follows the same biased pattern generally observed in the media. As discussed above, we know, for example, that the minority group of female representatives attract less attention from news media compared to their male colleagues. This pattern is partly attributed to the impact of gender stereotypes, namely, that stereotypical representations of men are more closely linked to stereotypical representations of politics (Van der Pas and Aaldering 2020, p. 117). Specifically, qualities such as leadership, ambition, aggression, independence, and self-confidence are more prominent in male stereotypes and at the same time deemed important to politics (Brescoll 2016; Eagly and Karau 2002; Lawless 2004). Politicians from minority groups that have historically been neglected or underrepresented, such as women and visible minorities, are likely to be perceived as less powerful and influential in politics (Lovenduski 2005). Additionally, as Ditonto (2020, p.72) put it, "individuals high in racial prejudice may be less willing to spend time and energy learning about candidates who are members of the groups about whom they have prejudicial attitudes." Based on these studies, we argue that such cognitive biases favoring dominant political groups may trigger political information seeking behavior among the public at greater rates when the politician covered in the news is of the privileged background. Stated differently, this *reinforcement mechanism* suggests that the link between news visibility and information searches is weaker for women MPs and MPs of ethnic minority background.

An alternative potential outcome is that the effect of news on information searches does not align with patterns of historical bias. Instead, MPs from historically underrepresented groups might benefit more from news visibility, experiencing a stronger boost in online search traffic compared to their colleagues from historically dominant groups.

Theoretically, this expectation is inspired by the "rarity" argument, which received attention in early studies of gender bias in political communication. Fridkin (1996)'s study on news attention to US senators initially hypothesized that women would attract more media attention than men on the grounds that their rarity in politics fulfilled the news value of novelty. While this view received limited empirical evidence in her study, we argue that the novelty perspective might have merit when studying information-seeking behavior among the public as opposed to sourcing in political journalism. The underlying assumption is that individuals' online search traffic is mainly driven by a need or want for more information about political elites. From this perspective, what matters is not only how influential voters think an MP is, but also the scope of their knowledge about an MP. Since the urge to seek political information about historically underrepresented characters will naturally be stronger (Kanter 1977), one could expect the effect of media visibility on Internet search popularity to be greater for those underrepresented in politics. Simply put, we argue that because the public's knowledge of women MPs and MPs of ethnic minority background will be relatively limited, the public will seek more information about those political actors online. In contrast, the media visibility of politically dominant groups should elicit relatively less political information-seeking among the public, for such groups are, on average, more known and less novel in the world of mediatized politics. Based on the above discussion, we propose the following competing hypotheses:

The reinforcement hypothesis: The positive association between news visibility and online search popularity will be weaker for ethnic minority legislators and female legislators

The compensation hypothesis: The positive association between news visibility and online search popularity will be greater for ethnic minority legislators and female legislators

3 Empirical Methodology

We draw on a unique combination of two comprehensive datasets that cover the media visibility of around 1,500 MPs from Belgium, Denmark, Norway, the Netherlands and the UK, and the popularity of these MPs in Google search queries for the period of 2005-2019. Our dataset includes data on parliamentarians from two legislative terms in Belgium, one in Denmark, two in the Netherlands, three in Norway, and two in the UK (see Table A2 in Appendix A). Following past scholarship on political journalism (de Vreese et al., 2017), we selected a left-leaning broadsheet, a right-leaning broadsheet and a mass-market newspaper with a sizeable national circulation from each country.[2] Specifically, we first collected all the news stories featured in these newspapers during the period under investigation. To determine how frequently MPs appeared in the news,

2. These newspapers include De Morgen, De Standaard, and Het Laatste Nieuws from Belgium, Politiken, Jyllandsposten, and Ekstra Bladet from Denmark, Dagbladet, Aftenposten and VG from Norway, De Volkskrant, NRC Handelsblad, and De Telegraaf from the Netherlands, The Guardian, Daily Telegraph and The Sun from the UK. More details about the news corpus are provided in Appendix C.

which is our main independent variable, we queried the news corpus for the presence of all MPs. The searches looked for the given name and surname in close proximity to each other (allowing for the inclusion of middle names) and were restricted to the period when the MP held a seat in parliament. The resulting variable, news visibility, measures the number of news articles in which a given MP appears on a monthly basis.

Our dependent variable measures actual search requests made to Google regarding respective elected legislator in each country on a monthly basis. Google Trends normalizes and categorizes search data to allow users to make comparisons across time. Absolute search results are normalized to the time and location of a query so that the data reflect the relative importance of the query within the same temporal (e.g., month) and spatial (e.g., country) unit. Ranging from 0 to 100, Google Trends data therefore represent relative interest in a search query at a given time period versus other time periods. A decrease from 100 to 50 in Google Trends search data from time t to time $t+1$ represents a 50 percent decrease in relative popularity of the search query. However, an important drawback of Google Trends data is that popularity values are not directly comparable across search terms (in this case, MPs) in absolute terms, as the baseline popularity for each search term is different.

Following past scholarship, we collected data on five commonly used search terms in all five countries, "Gmail", "Youtube", "Wikipedia", "Google Maps", and "Google Translate". Using the search term popularity scores for these five terms, we calculated MPs' popularity relative to these terms to create standardized MP popularity scores that are comparable across time and space.[3] Because MPs' popularity is dwarfed by the popularity of the five popular search terms, the resulting variable is skewed to the right. Although we log-transform this variable and use it as our main dependent variable in subsequent analysis, we present results using the original version of the variable for robustness. After arranging our news visibility dataset in an MP-month fashion, we merged the dataset with the Google Trends dataset. During the period under investigation, our standardized, log-transformed Google Trends variable ranged from 0 to 5.45 per month, with a mean of 1.15 and a standard deviation of 1.28.

It is worth pausing at this point to briefly describe our motivation in using Google Trends data as a proxy for public information-seeking regarding political actors. Past research relied heavily on data from Wikipedia (or similar online platforms) to analyze political information-seeking among the public. While such platforms have their own advantages, we believe that Google Trends data constitute two important improvements over Wikipedia data. First, Wikipedia (and similar platforms) are a subset of Google search data, and therefore underestimates the popularity of search queries regarding political actors. Secondly, Wikipedia does not allow users to identify the source of page traffic (i.e., page visits). This implies that high search query volumes for popular politicians within a country may partly be driven by visitors from abroad. Unlike Wikipedia, Google Trends allows users to restrict search queries to a specific country. Moreover, in the absence of data normalization, scholars using Wikipedia data rely on absolute numbers of search

3. To make sure our standardized scores are not driven mainly by one of the five terms, we used alternative combinations to recreate our standardized scores. Our results are not sensitive to the choice of search term used in the standardization procedure.

requests, and by doing so, do not take into account total number of searches in a specified time period or location. In an attempt to demonstrate the usefulness of Google Trends data, Vosen and Schmidt (2011) examined the forecasting performance of Google search queries relative to common survey-based indicators such as the University of Michigan Consumer Sentiment Index and found that Google Trends data outperform the survey-based indicators in private consumption forecasts. Ginsberg et al. (2009) suggest that Google search queries can be used even to track influenza-like illness in a population, as search requests and doctor visits are highly correlated. In short, a growing body of work recognizes the importance of search query engine data in understanding various social phenomena that involve mass human behavior.

We used official parliamentary sources to collect data on MPs' gender and visible ethnic minority status. Two research assistants used official parliamentary sources, candidate websites and social media accounts, newspaper articles to identify legislators' gender assigned at birth and ethnic minority background. While our approach to coding ethnic background does not take the self-identification of politicians themselves into consideration (Spicer, McGregor, and Alcantara 2017), it does reflect the process through which voters identify visible minorities in politics. Our dataset also includes various time-invariant variables such as seniority (number of years since first elected), age, political party, election period (the 3-month period prior to elections),[4] although we do not include these time invariant variables in our fixed-effects models. We present the descriptive statistics of our variables in Table A1 in the online appendix.

4. We also utilize an alternative election period variable, the 6-month period prior to elections.

In our modeling strategy, we use both unit- and time-fixed effects to account for unobserved confounders. Coefficients thus reflect the average within-MP effect of the independent variables on Internet search popularity, conditional on these fixed effects. In the first step, we estimate separate two-way fixed effects regressions for each country. In the second step, we estimate new models based on the pooled sample (i.e., observations from all five countries) that include the interaction between the news appearance and gender/ethnicity variables. Finally, we disaggregate these results by country to demonstrate how this relationship unfolds in individual countries.

4 Results

4.1 Main Findings

We begin our analysis by estimating separate two-way fixed-effects models for Belgium, Denmark, Netherlands, Norway and the UK. Table 1 reports five models, one for each country, that illustrate the relationship between MPs' Google search popularity (log-transformed) and news visibility. Given that the size of parliaments and the length of legislative terms vary considerably across our country cases, the number of observations (i.e., MP-month) in each model is drastically different, with Denmark having the smallest and the UK largest samples.[5] The coefficient on the news count variable is positive and statistically significant in all five models ($p < 0.01$), although the size of the coefficient

5. Unlike Belgium, Netherlands, Norway and the UK, we cover only one legislative term in Denmark, which explains why the Danish sample size is smaller than, for example, Norway's.

varies substantially across models. Overall, the coefficients on the news appearance variable are of substantively modest size for all five countries. A one-unit increase in the number of news appearances is associated with an increase in Google search popularity ranging from 2.2% (in Belgium) to 7.2% (in the Netherlands) across the five countries in our study. The models also show that MPs in Belgium, Denmark, and Norway were much more popular during election periods, compared to non-election periods ($p < 0.01$). In the UK and Netherlands, the coefficient does not reach statistical significance at any conventional levels.

We now turn to the question of whether the search popularity of female MPs and ethnic minority MPs, two traditionally underrepresented groups in all five parliaments, benefits more from news appearances compared to male MPs and ethnic majority MPs. Recall that we proposed two competing mechanisms and argued that the positive effect of news visibility on online search popularity would be weaker (*reinforcement* mechanism) or stronger (the *compensation* mechanism) for female MPs and ethnic minority MPs. Practically, this can be implemented in at least two ways. First, we can estimate separate fixed effects models for subsamples defined by gender and ethnicity, namely, women only, men only, ethnic minority only, and ethnic majority only, and then compare the resulting coefficients using a generalized Hausman test based on seemingly unrelated estimations (Weesie 2000). Alternatively, we can estimate models that include interactions between the news appearance variable and the key social identity variables. While our main conclusions remain robust across both estimation strategies, we only present results from interactive effects for the sake of efficiency.

Table 1: Two-Way Fixed Effects Models based on Individual Countries

	Belgium	Denmark	Netherlands	Norway	UK
News Appearances	0.0224***	0.0357***	0.0719***	0.0380***	0.0333***
	(17.60)	(11.39)	(16.70)	(9.95)	(26.50)
Election Period	1.235***	1.252***	-0.0227	0.777***	0.0141
	(5.82)	(7.13)	(-0.10)	(3.57)	(0.13)
Constant	1.382***	1.671***	2.103***	1.003***	2.723***
	(7.77)	(13.58)	(14.21)	(6.33)	(36.61)
R^2 within	0.039	0.049	0.048	0.021	0.031
R^2 between	0.420	0.311	0.156	0.201	0.029
R^2 overall	0.088	0.071	0.062	0.035	0.036
Observations	20,530	6,867	13,088	19,119	70,603

t statistics in parentheses
$*p < 0.1, **p < 0.05, ***p < 0.01$

The results are presented in Table 2.[6] The coefficient on the news appearance variable is positive and statistically significant at $p < 0.01$ in both models. The coefficients on the interaction terms are positive and statistically significant at $p < 0.01$, which suggests that the extent to which media appearances boost one's public visibility is larger for women and ethnic minority MPs compared to men and ethnic majority MPs. These results support the *compensation hypothesis* and suggest that, despite systematically giving less attention to female MPs and ethnic minority MPs,[7] the media provide traditionally underrepresented groups of politicians with an opportunity to close potential visibility gaps with the public.

6. Note that the gender and ethnicity variables were excluded from the models due to the presence of unit fixed effects.

7. Mean-comparison tests indicate that women MPs and ethnic minority MPs appear significantly less frequently in print media compared to their male and ethnic majority counterparts (both statistically significant at $p < 0.001$).

Table 2: Gender, Ethnic Background and News Visibility: Interactive Effects

	Model 1	Model 2
News Appearances	0.0288***	0.0293***
	(31.76)	(34.74)
Gender x News Appearances	0.0130***	
	(5.93)	
Ethnic Minority x News Appearances		0.0446***
		(10.58)
Election Period	0.259***	0.260***
	(8.81)	(8.84)
Constant	2.348***	2.351***
	(32.03)	(32.08)
R^2 within	0.027	0.027
R^2 between	0.032	0.030
R^2 overall	0.025	0.026
Observations	130,207	130,207

t statistics in parentheses

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

While the results presented in Table 2 are supportive of the *compensation hypothesis*, we do not know if the documented relationship varies across the five countries examined in this study. We disaggregate these models by country, and present the interactive effects of news visibility and gender/ethnic minority background separately for individual countries. Results illustrated in Figure B1 (gender) and Figure B2 (ethnicity) show that there are considerable differences across countries. Most importantly, as seen in Figure B1, the gender-news visibility interaction is positive and statistically significant only in Belgium, Denmark and the UK. In the model based on Norwegian MPs, the interaction is positive, but fails to reach statistical significance. In the Dutch model, the interaction is statistically significant but carries a negative sign, supporting the *reinforcement hypothesis*. Figure B2, on the other hand, illustrates more consistent patterns across countries. In this figure, the *compensation hypothesis*, the idea that women MPs and MPs of ethnic minority background benefit more from appearing in the news compared to male and ethnic majority MPs, finds support in Belgium, the Netherlands, the UK, and Norway, but not in Denmark. Overall, these results suggest partial support for the *compensation hypothesis*: three of the five countries conform to the trend regarding gender, and four of the five do so regarding ethnic minority background.

4.2 Additional Analyses

We replicate the results presented in Table 1 and Table 2 using alternative model specifications. First, we replicate all our models using the original (unlogged) version of our dependent variable. Because the mean of the original popularity variable is much smaller than its standard deviation, we opt for conditional fixed-effects Poisson regressions, with robust standard errors (see Table B1 and Table B2). Owing to its relative advantage in handling non-negative skewed outcomes compared to log-linearized models and Generalized Linear Models, the use of fixed-effects Poisson regressions has become increasingly common in analyses dealing with non-count data (see Manning and Mullahy 2001; Santos Silva and Tenreyro 2006; Wooldridge 2010, ch.18; Silva and Tenreyro 2011). In these models, no coefficient switches sign or loses its statistical significance.

Second, we reproduced our results presented in Table 1 and Table 2 using a new dependent variable, media visibility measured at the sentence level.[8] Despite appearing only few times in the media, MPs' name may appear several times in the same news story. Results based on this new dependent variable are strikingly similar to those presented in this article: the news visibility variable, as well as interaction terms, are positive and statistically significant at $p < 0.05$. Naturally, the effect sizes in these new models are between three and five times smaller than in the models presented above.

Finally, we also consider the role of sentiment in shaping search query popularity. We coded each news story using an extension of a method involving word embedding models (Rheault et al. 2016; see Appendix C). It is possible that the negativity of news stories featuring political actors could drive stronger political information-seeking behavior among the public. After incorporating the sentiment variable, which measures the average sentiment of the news in which actors were featured, we re-estimated our models.

8. The pairwise correlation between news visibility measured at the article level and at the sentence level is 0.91 ($p < 0.001$).

One limitation of this variable is that a considerable portion of observations are missing in the new estimations, as sentiment data is unavailable for actors who do not appear in any news stories during a given month. Our new results show that the tone of news stories in which politicians appear is not related to search query popularity. Additionally, controlling for news sentiment in our models do not change our main conclusions. However, we proceed with caution in interpreting the results from these new models due to the excessive amount of missing data.

5 Conclusion

The media coverage of politicians has been at the core of a large strand of scholarly inquiry in political communication research. While we know a great deal about what characteristics make representatives more visible in the media, we know much less about the consequences of politicians' media visibility. The question of what media appearances of politicians mean for the represented becomes particularly important in light of the literature showing that politicians from traditionally underrepresented backgrounds tend to face disadvantages in media access. In an effort to expand our understanding of why and how politicians' media visibility matters for democratic processes, our study brings together original datasets of media coverage of politicians and public political information-seeking. Motivated by the normative importance of political information-seeking among citizens for representative democracy, especially with respect to information and knowledge biases, we examined the relationship between politicians' monthly media appearances and their popularity in search engine queries, paying special attention to the role of gender and ethnic background.

We argued that politicians' popularity in search queries is a function of their media appearances. Our first hypothesis, expecting a positive association between news appearances and search traffic, received strong support in our empirical analysis. When MPs appear more often in the news, they come up more frequently in online search terms. This highlights the importance for MPs to attract attention in traditional media in order to become more familiar to their constituents. At the same time, it also suggests that online information about MPs does fulfill a function in demand within the electorate, providing additional information which voters do not acquire from daily news. We further argued that the positive effect of media appearances on Internet search popularity likely varies across groups of MPs, and that this pattern could either reinforce or help compensate for historical biases. For both of the minority groups in the parliament that we looked at, women MPs and MPs of ethnic minority backgrounds, we found considerable support for the compensation mechanism across most country cases in our study. Female MPs and ethnic minority MPs experience a stronger, positive effect on search popularity when appearing in the news compared to male and ethnic majority MPs, respectively.

We believe that these findings have important implications for political communication and democratic representation. For instance, the positive association between news and online searches is, on the one hand, indicative of a strong mediatization of politics. Citizens' search for information about their representatives, arguably an important aspect of political behavior, is indirectly but strongly influenced by standards of newsworthiness. To a certain degree, this constitutes a democratic concern, especially when we know that the commercially inspired media logic will often contradict with the political logic. In other words, the MPs featured in news stories are not always those who would be highlighted if factors like policy relevance or competence played a more significant role in determining newsworthiness and journalistic decisions. Nevertheless, our conclusion regarding mediatization should be nuanced as we also found suggestive evidence of a compensation mechanism. Even though news attention is highly important to search behavior, the fact that the public responds with stronger information-seeking when minority groups are in the news implies a weaker mediatization and a more autonomous public that actively seeks to compensate for information imbalances.

We conclude by recommending some pathways for future research on political elites. Most importantly, we join a growing body of research that highlights the utility of search engines (as well as socially generated data) for political science research (Brown 2011; Mellon 2013, 2014; Göbel and Munzert 2018; Prado-Román, Gómez-Martıénez, and Orden-Cruz 2021), and argue that future research needs to rely more on such data sources, especially where it is difficult to develop reliable measures of name recognition and political information-seeking (Haman, Školník, and Čopík 2021). Secondly, more comparative work is needed across electoral systems and political contexts to determine the conditions under which politicians' media visibility influences the public's search for information about politicians. Although studies showed that online search engines are commonly used for political information-seeking purposes in advanced democracies, the link between online information sources and news appearances in developing countries with relatively limited Internet access might be weaker. On the other hand, in advanced democracies where traditional news readership continues to decline, it is worth considering how visibility in the social media platforms, either in online news sources or personal social media platforms, might influence one's popularity in search queries. Within advanced democracies, comparative research based on different electoral systems might prove useful in exploring the relationship between public and media visibility across systems, especially where personal vote-earning attributes are of limited importance (e.g., closed-list proportional representation systems). Finally, future research should explore the broader implications of the link between politicians' media strategies and citizens' online information-seeking. In particular, questions remain about the extent to which increased online search traffic contributes to democratic accountability, shapes voting behavior, and influences elite decision-making in legislatures.

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Part I
Appendix

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A Descriptive Statistics

Figure A1: Monthly Averages of (raw) Google Trends Popularity Scores across Men and Women MPs

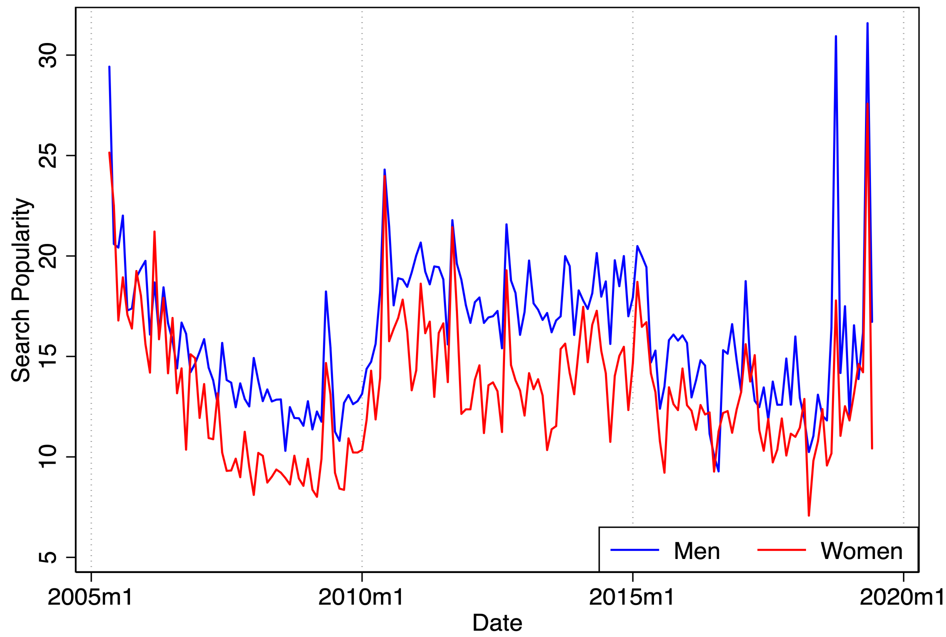


Figure A2: Monthly Averages of (raw) Google Trends Popularity Scores across Ethnic Minority and Ethnic Majority MPs

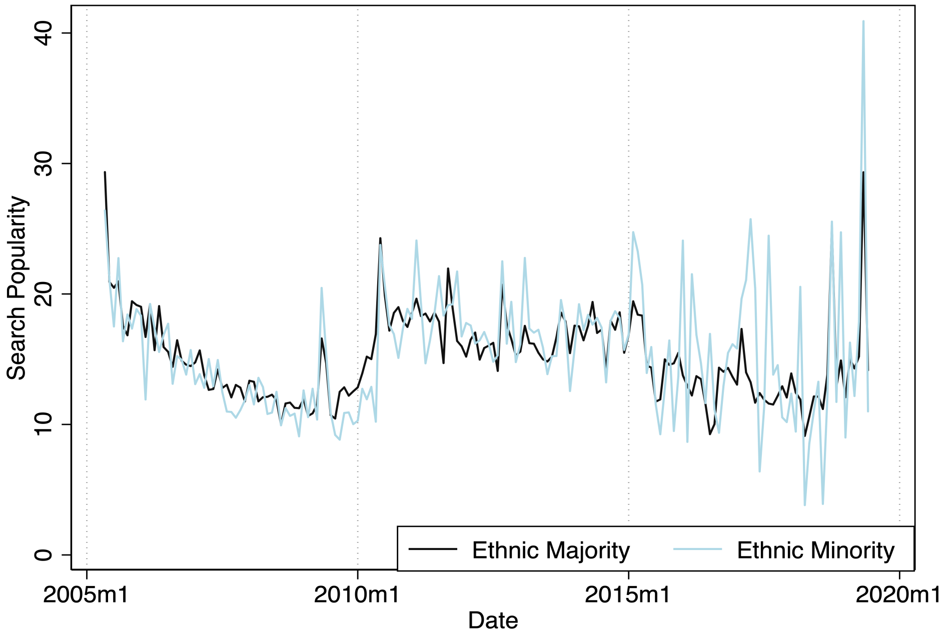


Table A1: Summary Statistics of Key Variables

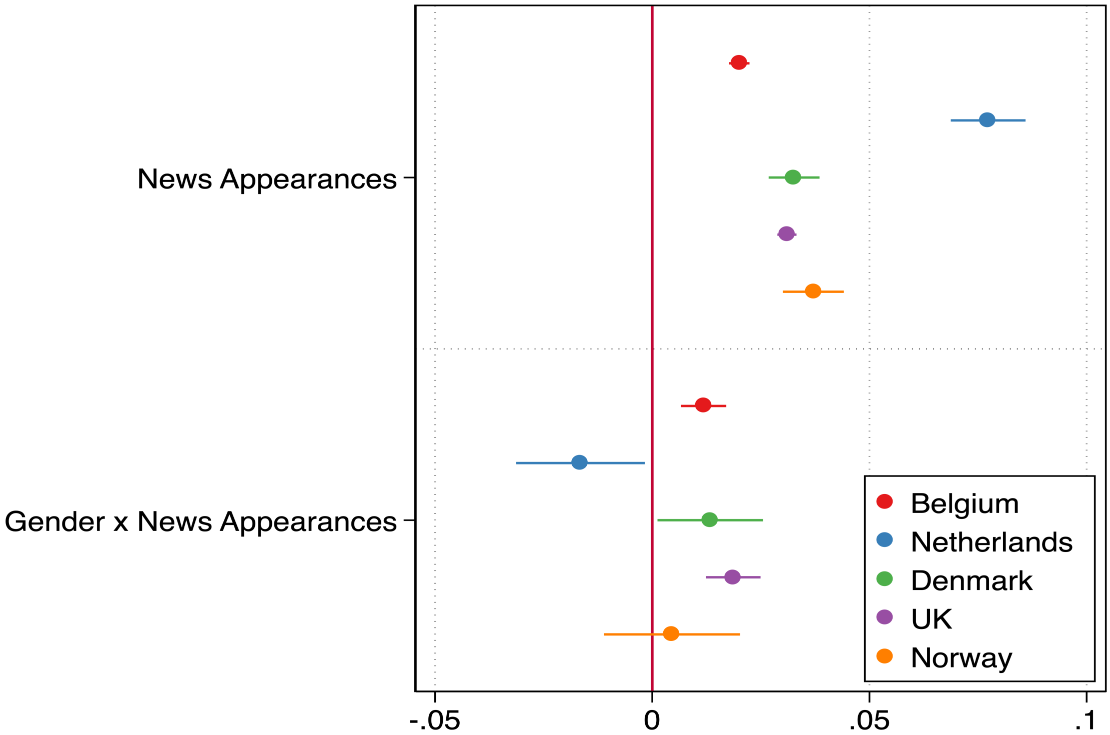
Variable	Mean	Std. Dev.	Min.	Max.	N
Google Trends (standardized, log-transformed)	1.89	1.99	0.0008	7.06	130,207
Google Trends (standardized, unlogged)	0.34	0.80	0	11.62	130,207
News visibility (articles)	2.81	8.56	0	833	137,886
Female	0.30	0.45	0	1	143,611
Ethnic minority	0.12	0.32	0	1	143,980
Election period (3-month)	0.053	0.22	0	1	144,100
Belgium	0.145	0.35	0	1	143,635
Denmark	0.048	0.21	0	1	143,635
Norway	0.158	0.36	0	1	143,635
Netherlands	0.09	0.29	0	1	143,635
UK	0.51	0.49	0	1	143,635

Table A2: Legislative Terms and Observations across Countries

Country	Period	Observations
Belgium	2010-2014	5,956
	2014-2019	14,890
Denmark	2011-2015	6,914
Netherlands	2006-2010	6,292
	2012-2017	7,610
Norway	2005-2009	7,615
	2009-2013	7,617
	2013-2017	7,568
UK	2005-2010	36,965
	2010-2015	36,459

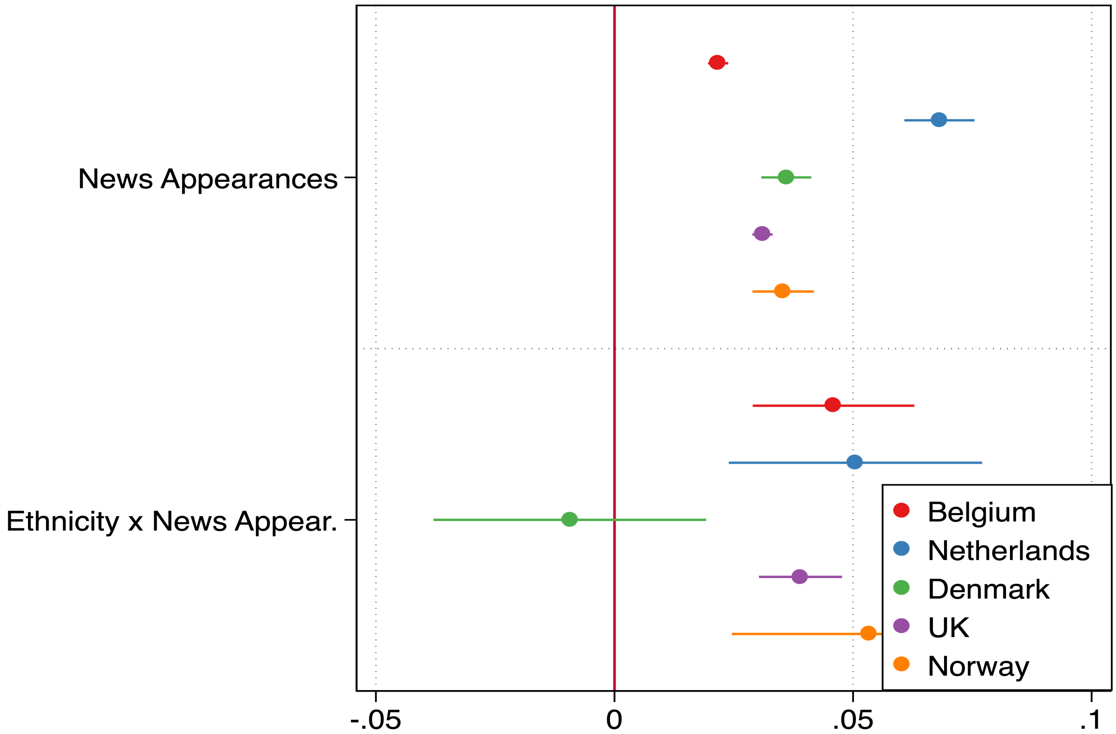
B Additional Model Specifications

Figure B1: Disaggregating the Interactive Effects of Gender and News Appearances by Country (based on Table 2)



Note: The variable election period is excluded from the figure for better visibility.

Figure B2: Disaggregating the Interactive Effects of Ethnic Minority Background and News Appearances by Country (based on Table 2)



Note: The variable election period is excluded from the figure for better visibility.

Table B1: Two-Way Fixed Effects Models based on Individual Countries: Conditional Fixed-Effects Poisson Regressions with Robust Standard Errors

DV: Unlogged Popularity Score	Belgium	Denmark	Netherlands	Norway	UK
News Appearances	0.0133***	0.0267***	0.0459***	0.0240***	0.0160***
	(5.92)	(7.65)	(8.49)	(5.40)	(6.92)
Election Period	0.466**	0.958***	1.227***	-1.059***	-2.282***
	(2.53)	(7.29)	(7.07)	(-4.36)	(-34.91)
Observations	20,530	6848	13,072	19,118	70,602

t statistics in parentheses

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

Table B2: Gender, Ethnic Background and News Visibility: Interactive Effects using Conditional Fixed-Effects Poisson Regression with Robust Standard Errors

DV: Unlogged Popularity Score	Model 1	Model 2
News Appearances	0.0153***	0.0158***
	(8.32)	(8.97)
Gender x News Appearances	0.0112***	
	(2.88)	
Ethnic Minority x News Appearances		0.0291***
		(5.83)
Election Period	0.188***	0.186***
	(6.05)	(5.96)
Observations	130,170	130,170

t statistics in parentheses

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

Part II
Appendix

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C News Corpus Construction and Sentiment Coding

The news corpus used to measure media visibility of MPs consists of all articles published on paper by the fifteen newspapers (see footnote 2, page 14) throughout the legislative terms covered in our analyses. This selection of newspapers was based on a comparative analysis of political journalism (De Vreese, Esser and Hopmann 2017) which included the leading left-leaning broadsheet, the leading right-leaning broadsheet and one mass-market newspaper in each country. However, note that we have made one change to the sources applied in De Vreese, Esser and Hopmann (2017). The left-leaning broadsheet Dagsavisen, which was part of the Norwegian sample in their study, was not an option due to low data quality and accessibility. On the one hand, this arguably constitutes less of a problem in Norway compared to the other four countries, since there are no strong candidates for a left-leaning broadsheet with a sizeable and national circulation in Norway. Dagsavisen for instance, has a limited circulation which amounts to less than 10% of the leading right-leaning broadsheet Aftenposten. Furthermore, nearly all of its readers are located in the capital region. In the end, we chose to include the tabloid Dagbladet as a replacement, meaning that we capture a substantially larger share of the national news market.

Before querying the corpus for MPs, three types of news items were excluded. First, items with a word count below 30 were removed because they nearly always refer to longer articles on other pages in the newspaper. Second, the newspapers contained a varying number of duplicate articles (within the same day). To increase the validity of comparisons, duplicate entries have been removed based on the cosine similarity of article pairs published on the same day by the same newspaper. When article pairs had a similarity of 0.85 or above, one of the articles was (at random) removed from the dataset. Third, before querying the corpus for MPs, we also removed the news stories that deal mainly with sports and entertainment. This procedure relies on samples of hand-coded articles in each language, distinguishing between regular news and the categories "Culture/art events and entertainment", "Sporting events and athletes" and "Miscellaneous" (intercoder reliability between 0.81 and 0.86, measured with Krippendorff's Alpha). The hand-coded articles were then used as input for a Naive Bayes classifier, achieving a precision of between 0.87 and 0.94.

The measure of news tone or sentiment, used in the additional analyses, is built on an extension of a method involving word embedding models (Rheault et al. 2016). The process starts with a small and context-independent "seed dictionary" containing one hundred unambiguous negative and positive words in each language. This is used to build an extensive sentiment dictionary adapted to the news corpus, with the help of machine-learning models that extract meaning from a text by estimating a multi-dimensional vector space in which each word is positioned. Essentially, the approach finds the words that appear in proximity to our words of interest from the seed dictionary, based on the assumption that neighboring words will share an association to the latent semantic meaning of a piece of text (Mikolov et al. 2013). The result is a longer dictionary with sentiment values for each word: higher positive values indicate closer proximity to the positive seed words, and higher negative values indicate closer proximity to the negative seed words. Based on the expanded dictionary, we then calculate how positive or negative each sentence and article in our corpus is. The procedure is validated by having pre-trained research assistants code a random sample of sentences. Performance is adequate, with macro F1 between .61 and .64 when analyzing sentiment per sentence.