Social Identity, Group Representation, and Unequal Responsiveness in the US and UK

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Zachary P Dickson

University of Glasgow
School of Social and Political Sciences

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Secondary supervisor: Prof. Sergi Pardos-Prado

Declaration

I hereby declare that the work described in this dissertation is, except where otherwise stated, entirely my own work and has not been submitted as an exercise for a degree at this or any other University.

Zachary P Dickson

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Abstract

Legislative responsiveness to the preferences of an informed electorate is a key characteristic of representative democracy. Yet, studies increasingly show that the degree to which representatives respond to voters is contingent upon a host of features such as gender, social class and ideology. In this thesis, I argue that group identity shapes responsiveness to constituents and representation more broadly. I show that representation can be understood through the lens of intergroup conflict, with shared identity acting as a defining pre-requisite for group responsiveness. The thesis consists of four empirical chapters, each of which feature original research that leverage new observational data collected from national representatives in the United States and the United Kingdom. Methodologically, I rely on a variety of computational approaches to the study of text data such as transformer based language models, neural networks, and supervised machine learning. Additionally, I apply a range of statistical methods that incorporate both Bayesian and frequentist approaches to probability and uncertainty. Although each of the four articles utilize state-of-the-art methods, one of the real values of the thesis comes in its substantive contributions to our understanding of representation and elite behavior.

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Chapter 1

Introduction

1.1 Introduction

Responsiveness to the preferences of constituents is a key characteristic of democracy. Although there are certainly other characteristics that are required for a system to be considered democratic, "one of the characteristics of which is the quality of being completely or almost completely responsive to all its citizens" (Dahl 1971, p. 2). In the liberal and representative form, the representative relationship includes voters with inherent preferences, treated as political equals, who select individuals to represent their interests in government. Because the electoral fate of representatives is in the hands of voters, legislators anticipate the mood of the electorate and respond accordingly (Stimson, MacKuen, and Erikson 1995; Dahl 1971; Powell Jr. 2000).

Yet, while a number of studies show that representatives are indeed responsive to the changing demands of the electorate, responsiveness is far from perfect. What accounts for variation in how legislators respond to voters? Throughout this thesis, I study when and to what extent representatives are responsive to the public. I focus on the individual characteristics of representatives that encourage responsiveness, as well as the incentives legislators face that may constrain responsiveness.

Throughout the thesis, I draw from and expand the ideas of descriptive representation by incorporating social identity theory (Tajfel and Turner 1982; Huddy 2001; Hogg 2016). I argue that the group identities of elected representatives are key to understanding the constituents with whom they relate, represent, and ultimately to whom they are responsive. A shared social identity between representatives and constituents can occur on a number of identity characteristics, not only commonly highlighted factors such as ethnicity and gender, and as I argue throughout, a shared social identity can be a pre-requisite for substantive representation and ongoing responsiveness.

In the rest of the introduction chapter to the thesis, I first situate the concept of responsiveness within the wider literature on substantive representation. I then highlight some of

the key contributions that offer explanations for differential responsiveness, before narrow-ing in on descriptive representation and social group identity. After outlining the ways in which descriptive representation can be extended to apply to how we think about unequal responsiveness, I center the research aims of the thesis project and detail how they speak to the broader literature on representation. The chapter closes by outlining key concepts and providing an overview of the empirical chapters to follow.

1.1.1   Substantive Representation

The contemporary understanding of legislative responsiveness is best conceptualized in Pitkin's (1967) articulation of substantive representation. In *The Concept of Representation*, Pitkin (1967, p. 209) outlined what it means to substantively represent, which she ultimately describes as "acting in the interest of the represented, in a manner responsive to them." Pitkin (1967) centers individuals with distinct interests as the recipients of substantive representation, likening the relationship between representative and represented as a principle and agent. The agent, or representative, is tasked with acting in the interest of the principle, or represented, and is held accountable for their actions.

Pitkin (1967, p. 210) concedes that representatives must make use of their own discretion and judgment, but she argues that "conflict between representative and represented about what is to be done... must not normally take place." Moreover, when such conflict does occur, it is the responsibility of the representative to justify their actions to constituents, who should not be "without a good explanation of why their wishes are not in accord with their interest" (p. 210).

Pitkin (1967) delineates from Burke's (1826) views of representation by viewing the rep-resented as equal in capacity, wisdom and information. For Burke (1826), the representative was superior in reasoning and ability to the represented, and was therefore best placed to make decisions on their behalf. In contrast, representatives are flawed humans just like the

individuals they represent, and are tasked with making decisions that do not have clear and objective answers. Consequently, representatives should engage with their constituents, and should act upon their interests and have adequate justification for their actions when they do not (Pitkin 1967).

Pitkin's (1967) delineation from Burke's (1826) conceptualization of representation serves to highlight a dichotomy between "trustee" and "mandate" models of representation.[1] The trustee model of representation, conceives the role of the representative as independent decision makers who are not bound by the wishes of their constituents. In contrast, the mandate model of representation views representatives as delegates of the public, and asserts that they should act in accordance with the wishes of their constituents.

Pitkin's (1967) conceptualization of substantive representation as "acting for" the represented, in a responsive manner, serves as a useful starting point and is often cited by representation scholars studying responsiveness (Dahl 1971; Mansbridge 2003; Soroka and Wlezien 2010; Powell Jr. 2000; Stimson, MacKuen, and Erikson 1995). Building on the theoretical contributions of Pitkin (1967), responsiveness is often used as one potential proxy for representation quality. Despite the fact that responsiveness is far from the only measure of representation quality (Harden 2013), it is a key component of representation and is often enhanced by other normatively desirable attributes, such as accountability, transparency and political equality (Powell Jr 2004). Moreover, responsiveness is often used as a barometer for representation quality because it is a measurable and observable phenomenon (Eulau and Karps 1977). Pitkin (1967, p. 112) famously argued that representation is not a "certain characteristic activity", which raises challenges for scholars interested in measuring representation.

Elections act as the key mechanism driving responsiveness to constituents (Powell Jr. 2000). In this regard, representatives rationally anticipate the electoral consequences of their actions and are therefore incentivized to act in accordance with the wishes of their

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1. These roles are also referred to as "delegates" and "trustees" (Rehfeld 2009; Mansbridge 2011).

constituents (Powell Jr 2004; Stimson, MacKuen, and Erikson 1995; Mayhew 2004; Miller and Stokes 1963). Yet, the degree to which representatives are responsive to their constituents varies across institutions, issues and individuals. For instance, Soroka and Wlezien (2010) argued that federal and unitary states provide differing levels of policy representation and responsiveness. The electoral connection between representatives and their constituents is also likely to be mediated by the electoral system, with single-member plurality systems providing a stronger connection between representatives and the represented than proportional representation systems (Powell Jr. 2000; Soroka and Wlezien 2015; Hobolt and Klemmemsen 2005; Golder and Ferland 2017).

Responsiveness may also be a function of the level of importance attributed to an issue. For example, Page and Shapiro (1983, p. 182) argued that responsiveness is greater on "issues about which the public has well-defined opinions and shows more concern." The role of issue salience as a moderator of responsiveness features prominently throughout the literature on responsiveness (Lax and Phillips 2009; Hagemann, Hobolt, and Wratil 2017; Hobolt and Klemmensen 2008; Jones and Baumgartner 2005; Franklin and Wlezien 1997).

Responsiveness also varies according to characteristics of the electorate. One of the pioneering works in this area is from Gilens (2005), who showed that government was much more responsive to the wealthy in relation to lower income individuals. In fact, Gilens (2005) argued that the preferences of low income individuals had virtually no impact on public policy whatsoever in the US context.

Similarly, Schlozman, Verba, and Brady (2012) point to varying levels of participation across income groups as a key driver of unequal responsiveness. The authors argue that the wealthy are more likely to participate in politics, and that this participation is a key driver of unequal responsiveness. This finding is consistent with other studies that draw similar conclusions (Bartels 2016; Dalton 2017; Marien, Hooghe, and Quintelier 2010).

Finally, responsiveness can also vary according to the individual characteristics of representatives. Because representatives are indeed fallible humans, subject to biases and cognitive distortions like the rest of us, the individual characteristics of representations can systematically lead to variation in responsiveness across individual representatives. This is not only a finding that increasingly features in the literature on representation and responsiveness (Butler and Dynes 2016; Broockman and Skovron 2018; Pereira and Öhberg 2020; Walgrave et al. 2022; Miller and Stokes 1963; Pilet et al. 2023), but is also a key focus throughout this thesis and is discussed in more detail in the following sections.

1.2 Explanations for Differential Responsiveness

The extent to which public opinion influences public policy has been the focus of many studies. The vast majority of studies confirm that representatives indeed are responsive (Enns 2015; Soroka and Wlezien 2008; Stimson, MacKuen, and Erikson 1995; Burstein 2003). However, not only is responsiveness shown to be far from perfect, representatives do not respond equally to all members of the population. Beyond institutional explanations, accounts for differential responsiveness from representatives to constituents can be reduced into two camps. First, there are supply-side explanations, which examine the "supply" of responsiveness from the perspective of the representative. Second, there are demand-side explanations, which examine characteristics of the electorate that may create incentives for differential responsiveness.

Demand-side explanations for differential responsiveness focus to varying degrees on differences in political participation. The main culprit of such differences is often wealth or income (Bartels 2016; Gilens 2012), although asymmetries in information (Elkjær 2020) and education (Schakel and Van Der Pas 2021) also create the conditions necessary for unequal responsiveness. Supply-side explanations often point to the identity characteristics

of representatives, such as gender or social class background, or financial or career incentives (O'Grady 2019; Carnes 2013; Wängnerud 2009).

Throughout this section, I consider demand and supply-side explanations for differential responsiveness. As the focus of the thesis is on the representative relationship between politicians and their constituents, I do not consider explanations that focus on the role of political parties or the media. The focus on the representative relationship between politicians and their constituents is not to suggest that the role of institutions are not important. Rather, the focus on the representative relationship is to provide a more narrow focus for the thesis and the empirical chapters that follow.

1.2.1 Demand-Side Explanations

Equal consideration of constituents is a key attribute of liberal democracy. Yet, equal consideration does not mean equal participation. Although equal consideration may extend to aspects such as the right to vote, protest, or organize around political ideas, the extent to which individuals equally participate—the distribution of participation across individuals—is often highly skewed (Bartels 2016; Schlozman, Verba, and Brady 2012).

Unequal participation raises serious issues for equal representation. As Schlozman, Verba, and Brady (2012, p. 6) argue, representatives "cannot consider the voices they do not hear, and it is more difficult to pay attention to voices that speak softly." In practice, unequal participation is only a problem to the extent that the various interests of individuals are echoed equally by those with the loudest voices. Furthermore, if politicians were to accurately perceive inequality in the voices they were most likely to hear, and could somehow account for such distortions by either weighting the quieter voices more heavily or by seeking out such preferences, then the problem of unequal participation would be largely solved. Yet, when the interests and preferences of certain individuals or groups are disproportionately

loud and influential for politicians, it becomes inevitable that the interests of some will be ignored.

One of the most well-documented disparities in political participation occurs between rich and poor citizens (Verba, Nie, and Kim 1978; Schlozman, Verba, and Brady 2012). This participatory gap motivates differential responsiveness to the extent that there are substantive differences in the preferences of the rich and poor, which is consistently shown to be the case in previous studies when it comes to both policy positions (Page, Bartels, and Seawright 2013) and policy priorities (Traber et al. 2022; Flavin and Franko 2017).

There are numerous accounts for how unequal participation between the wealthy and the poor drive unequal responsiveness. One account examines the ability of wealthy individuals to effectively "buy" greater attention to their preferences. For example, Witko et al. (2021) detail the ways in which wealthy and business interests "hijack" the political process, effectively "buying" representatives' attention through outsized campaign contributions. The authors differentiate between structural power and kinetic power, both of which they argue are required for political change. Whereas structural power refers to an actor's structural position in the economy, kinetic power refers to the resources from which actors are able to draw in order to increase the salience of certain views. Although cause groups and labor unions may at times effective leverage kinetic power, only wealthy individuals and businesses are able to consistently leverage both structural and kinetic power to influence the political process.

Research on the gap between wealthy and poorer individuals and the different incentives it creates for responsiveness extends beyond income. Other studies have explored correlates with wealth, such as social status (Traber et al. 2022), social class (Carnes 2013), and affluence (Gilens 2012). Though these studies do not explicitly test the degree to which unequal participation drives differential responsiveness, the argument is commonly applied as an explanation for unequal responsiveness.

Additionally, studies have also explored differences in education and information as drivers of differential participation and ultimately unequal responsiveness. Schakel and Van Der Pas (2021) separate voters according to their level of education to compare the degree to which voter preferences predict subsequent changes in public policy according to education level. The authors show that highly educated voters have a considerable impact on government policy, while lower educated voters have only negligible effects.

Taking a different angle, Elkjær (2020) argues that representatives are only "coincidentally" more responsive to higher income earners because such voters are more likely to adjust their preferences according to new information. Confirming previous understandings of (unequal) participation (Schlozman, Verba, and Brady 2012), the authors show that higher income earners are "more involved in political discussions; they are better informed about political and economic issues; and they express more balanced, thermostatic, and counter-cyclical preferences compared with lower income classes" (Elkjær 2020, p. 2215). Systematic asymmetries in voters' political information, the authors argue, explains why representatives appear to be more responsive to higher income earners.

1.2.2   Supply-Side Explanations

Supply-side explanations for unequal responsiveness have focused on two main areas. First, research has increasingly highlighted the shortcomings of representatives' ability to accurately perceive what the public wants (Broockman and Skovron 2018; Pereira and Öhberg 2020; Walgrave et al. 2023). This research highlights the cognitive distortions and biases that plague the reasoning processes of individuals and politicians alike. Second, research has focused on the ways in which representatives' socially constructed identities influence responsiveness to different groups of constituents (Carnes 2013; Mansbridge 1999; Phillips 1998). This research points to the different social experiences of representatives leading up to

and including their time in elected office, and argues that these socialized experiences shape representatives' behavior after being elected.

Representatives' Perceptions of Public Opinion

In order for representatives to respond to constituents, they must have an accurate understanding of what the public wants. Despite strong incentives to be informed of the preferences of their constituents (Downs 1957), research has shown that representatives often hold inaccurate perceptions of public opinion. Miller and Stokes (1963) were some of the firsts to highlight the confounding role representatives' perceptions play in the relationship between constituent opinions and legislative behavior. After a series of interviews with US Congress members, the authors argued that representatives perceive their constituents' opinions selectively, and that this selective perception is a function of representatives' personal political preferences. This argument is similarly made and further developed by Broockman and Skovron (2018), who show that politicians systematically overestimate constituency support for policies that align with their own preferences while simultaneously underestimating support for preferences with which they disagree.

Similar findings have also been made outside the context of the United States (Sevenans, Soontjens, and Walgrave 2022). For example, in a survey of nearly 900 politicians in four democracies, Walgrave et al. (2023) find representatives are hardly better than average citizens at predicting public opinion on salient issues. The authors find that politicians not only misperceive the general electorate's preferences, they also misperceive the preferences of their own partisan electorate. With this in mind, representatives may be well-intentioned in their attempts to respond to their constituents, but are constrained in their ability to do so because of their own cognitive limitations.

There are several explanations for why representatives may hold inaccurate perceptions of public opinion, as well as how this might impact representative quality. First, representatives

may project their views onto constituents (Pereira 2021; Pereira and Öhberg 2020). For example, legislators may overestimate the degree to which their constituents share their own preferences and underestimate the degree to which constituents disagree with them. This may be because representatives are more likely to seek out information that confirms their own beliefs (Taber and Lodge 2006). This explanation is consistent with the findings of Broockman and Skovron (2018), who show that politicians systematically overestimate the degree to which their constituents share their own policy preferences. Moreover, projection may be further magnified when politicians hold expertise on a given policy issue (Pereira and Öhberg 2020). For example, Pereira and Öhberg (2020) show that politicians who are more knowledgeable about a given policy issue are more likely to discount the opinions of their constituents. The authors call this the "expertise curse" and argue that domain expertise constrains representatives' ability to respond to constituents on a given issue.

Another explanation for inaccurate perceptions of public preferences is that representatives may be exposed to segments of the electorate that do not reflect wider society (Pereira 2021). Selective exposure to constituents may be a function of a legislator's social surroundings and the people and groups with whom they interact. For example, Hertel-Fernandez and Stokes (2019) shows that Congressional staffers systematically overestimate the degree to which their constituents hold conservative preferences. The authors argue that this is because staffers over-rely on information from conservative and business interest groups. As political staff play a crucial role in relaying information to legislators, such a bias may shape representatives' views of the electorate. Other studies have similarly found that politicians in liberal democracies tend to overestimate the degree to which their constituents hold conservative preferences (Pilet et al. 2023).

Descriptive Representation

In addition to explanations pointing to cognitive bias in politicians, studies have also shown that representatives' identity characteristics may play a role in unequal representation. Descriptive representation – representation by members who share the same social characteristics as their constituents – has been shown to increase the quality of representation in a number of ways (Mansbridge 1999; Phillips 1998; Carnes 2013). Mansbridge (1999, p. 628) argues that in situations of historic mistrust or political subordination, representation by individuals who share a common background and experiences may increase democratic legitimacy and demonstrates an "ability to rule" by individuals of particular social groups. A number of important studies similarly highlight the symbolic benefits of descriptive representation (Clayton, O'Brien, and Piscopo 2019; Verge and Pastor 2018; Alexander 2012; Ulbig 2007; Phillips 1998; Lawless 2004; Langford and Levesque 2017).

There are two mechanisms through which descriptive representation may further the substantive representation of particular groups in society. First, descriptive representatives may offer a level of policy innovation by bringing to light matters that are often overlooked in the policy making process. Second, increased communication between descriptive representatives and underrepresented constituents may increase the likelihood that political preferences are voiced in parliament. While often not wholly differentiable, a number of empirical studies find that representatives act on the behalf of the groups with whom they identify. For example, studies on the substantive representation of women show that increasing the number of women representatives is associated with policies that further women's interests (Bratton and Ray 2002; Lowande, Ritchie, and Lauterbach 2019; Ferland 2020; Barnes, Beall, and Holman 2021; Kittilson 2008). Similarly, studies examining the under-representation of the working class point to deficits in the descriptive representation of the working class as a potential explanation for the lack of substantive representation (O'Grady 2019; Carnes 2013; Alexiadou 2022).

While descriptive representation can play an important role in increasing responsiveness to groups who are otherwise under-represented, the representative connection based on group identity can also exacerbate inequalities in representation. For example, a number of studies point to the descriptive over-representation of constituents from the upper echelons of society. Carnes (2013) shows that legislators increasingly come from white-collar backgrounds, which limits the extent to which these legislators are responsive to the interests of working-class constituents. O'Grady (2019) makes a similar argument, showing that the social class composition of the UK House of Commons has shifted to include fewer and fewer working class representatives, which in turn has limited the degree to which working class interests are voiced by parliamentarians.

Findings in several other studies draw similar conclusions (Elsässer, Hense, and Schäfer 2021; Flavin and Franko 2017). Alexiadou (2022) examines the makeup of cabinet ministers in 18 parliamentary democracies to show that cabinets consisting of a higher proportion of representatives from liberal professional sectors are more likely to cut welfare spending in relation to cabinets consisting of members with sociocultural and working class backgrounds.

At the heart of the logic behind descriptive representation is the idea that descriptive representatives are socialized in settings that place them in a better position to represent the otherwise un(der)-represented. It is through a shared set of experiences, as well as enhanced communication between representatives and constituents, that improves the representation relationship and can lead to greater substantive representation.

Yet, despite the normative appeal of descriptive representation, the arguments articulated – especially the idea that representatives pursue the interests of constituents with whom they share a common identity and experiences – work in both directions. Consequently, descriptive representation is not a panacea for increasing responsiveness to marginalized groups. In fact, descriptive representation can exacerbate inequalities in representation by limiting the extent to which representatives are responsive to the interests of groups who

are otherwise under-represented. The descriptive relationship is not limited to marginalized group identities; rather, it can also be extended to the representation of an elite and exclusive minority of the population.

1.3   Substantive Aims of the Thesis

Although a number of studies highlight various explanations for why representatives respond unevenly to their constituents, we still lack a comprehensive understanding of how representatives contribute to unequal responsiveness. There are several reasons for this. First, much of the literature on responsiveness takes as its starting point either the idea that groups of representatives are homogeneous in the ways in which they respond to specific groups within the electorate (i.e. women representatives are responsive to women), or that differential responsiveness is a product of structural inequality (i.e. representatives are more responsive to wealthy and organized interests). The former perspectives ignores intersectionality as well as the often overlapping self-categorizations of representatives in multiple groups; while the latter perspective ignores heterogeneity in legislative behavior. Consequently, understanding legislative behavior in the context of differential responsiveness requires a greater understanding of the groups with whom representatives identify, the extent to which these groups are salient distinctions in society, and the compatibility or degree of alignment of a group's interests in relation to the interests of another group.

There are several separate but related questions that are unanswered in the current literature on group representation. These gaps are used as the foundation upon which the subsequent empirical chapters are based and are intended to build on the perspective of group representation as a driver of unequal responsiveness. First, to what extent does descriptive representation enhance responsiveness to under-represented groups? Despite a wide body of literature showing that women representatives act on behalf of women constituents (Bratton and Ray 2002; Lowande, Ritchie, and Lauterbach 2019; Ferland 2020; Barnes, Beall, and

Holman 2021; Kittilson 2008), and that working class representatives act on the behalf of the working class (Carnes 2013; O'Grady 2019), the extent to which descriptive representation increases responsiveness has largely been overlooked. Rather, many studies show that descriptive representatives act proactively rather than re-actively, which raises the question of whether descriptive representatives act on the behalf of their own preferences which in turn further the wider preference of the group, or if descriptive representatives indeed shift their representative behavior in line with the changing preferences of the groups with which they identify.

Second, is group representation a zero-sum game? In other words, do representatives respond to the interests of one group at the expense of another, or can representatives simultaneously respond to the interests of multiple groups? This question is especially important to the literature on women's descriptive representation due to conflicting explanations of women's behavior in public office. While the literature studying women's representative behavior in office suggests that women are more likely to act on the behalf of female electorate (Lowande, Ritchie, and Lauterbach 2019; Holman 2014; Wängnerud 2009; Beckwith 2007), the extent to which women in parliament substantively represent the preferences of other groups within the electorate is less explored.

Third, what is the limit to group loyalty? Ostensibly, representatives pursue the interests of the groups with whom they identify, and have strong allegiances to these groups which may even distort their interpretation of information that places their group in a negative light (Flynn, Nyhan, and Reifler 2017; Turner 1991). Yet, at what point do individuals abandon their group-based identities in exchange for conflicting ideas or values? This question has received some attention in the literature on party defections, but multiple processes are at play when representatives vote against their parties (Kam 2009). Consequently, a greater understanding of the bounds of group loyalty is not only important for understanding

representation and responsiveness, it is also important for understanding the power and influence of group identity more broadly.

In the next section, I offer an explanation for unequal representation by drawing from the ideas of shared group identity and social identity theory (Tajfel and Wilkes 1963). The group identity approach I apply to representation complements the logic underlying descriptive representation by highlighting that the descriptive relationship that is said to increase representation of marginalized groups can also be extended to the representation of any group identity. I argue that it is only through such a shared group identity that representatives are able to respond to the interests of their constituents. Without at least some degree of shared interests or shared social experience with constituents, representatives are unlikely to fully understand and accurately respond in a meaningful way to constituents' preferences.

1.4 Social Group Identity

Social context affects intergroup relations. Tajfel and Turner (1982) outlined the ways in which social groups can exist according to external or internal designations. Whereas external designations include categories often assigned by society, such as an occupation or an ethnicity, internal designations are group identities, which, in addition to an external designation, require a sense of awareness and the belief that the group identity has some underlying value orientation that is shared by all members of the group.

Members self-categorize into groups based on their internal designations, and this self-categorization is a necessary condition for the formation of intergroup behavior. Furthermore, group identity categorizations activate changes in the way individuals perceive themselves and their role within the group (Hornsey 2008). For example, members of a group may perceive themselves as more similar to other members of the same group, which in turn may perpetuate behavioral changes to bring individuals in line with the group's norms and values.

Group identity made salient through perceived threats or differentiation of other groups can erode traditional distinctions between what is right or wrong. Instead, value judgments are made in the context of what the group deems as right or wrong based on the implicit belief that the group's norms and values are superior to those of other groups (Turner 1991).

The social identity approach provides further understanding of the role of descriptive representation and the extent to which it affects substantive representation because political interests are often attached to group-specific identities (Pitkin 1967). To the extent that a shared group identity and a common set of interests are the basis for greater substantive representation and responsiveness from descriptive representatives to the interests of marginalized groups (Mansbridge 1999), similar patterns of enhanced responsiveness may emerge in the case of any shared salient and internal identity categorization. In other words, a shared common identity between representatives and constituents enhances the representative relationship, regardless of the identity category. The relationship is further enhanced when a group identity is salient and there are high levels of external group acknowledgement of the identity designation (Turner 1991). When group identities are solidified, they can be used to justify the exclusion of other groups deemed as unworthy or inferior (Tajfel and Wilkes 1963). In the context of representation, representatives may not only find it easier to privilege an "in-group", they also may find it easier to justify the exclusion of "out-groups", reducing responsiveness to certain groups of constituents they view as members of groups in opposition to their own.

There is considerable explanatory power in extending the concepts of descriptive representation to include intergroup relations and social identity. Specifically, differential responsiveness and substantive representation more broadly can be understood in terms of intergroup conflict on behalf of group interests in which members, in addition to their party affiliation, have individual group loyalties that shape their behavior. Although party affiliation is a foundational group loyalty, party members can maintain multiple group identities beyond

their party affiliation (Davenport, Franco, and Iyengar 2022). This phenomenon commonly is displayed when individual legislators are more responsive to groups that are not necessarily the targets of their party's ambitions.

In the representation literature, the concept of "unattached interests" is used to refer to the interests that exist unattached to the person in question's specific identity categorization (Pitkin 1967; Staehr Harder 2020). Yet, "unattached interests" are nonetheless the shared interests of the representative when she acts on their behalf. Whether through empathy or sympathy, the representative who responds to another group's interests is at least to some degree *identifying* with that group. Following this conceptualization, I argue that a shared group identity is a necessary pre-requisite for responsiveness. Without some degree of identification between the representative and the group to which she responds, the response is not on behalf of the said group and instead is in the interests of another group.

1.5   Structure of the Thesis

One common narrative put forth to explain growing discontent in liberal democracies centers around feelings of alienation and abandonment (Citrin and Stoker 2018). Voters increasingly feel that their representatives do not relate to their concerns, and that their interests are not adequately represented in government (Mutz 2018). These feelings not only erode trust in government, they also lead to a documented rise in support for populist and anti-establishment candidates and parties (Berman and Snegovaya 2019; Goodhart 2017; Oesch 2008). One of the keys to understanding growing discontent is through the lens of representation (Kriesi 2014). This thesis not only shines a light on the roles of different group identities that shape representation, it offers a new way to think about the conditions that allow for systematic unequal representation.

In chapter 2 – *The Relative Online Influence of NGOs, Corporations and the Media* – I explore the relative influence of corporations, interest groups and the media on MPs' issue

attention on social media. In the chapter, I argue that representatives have strong personal incentives to respond to corporations because they view corporations as potential employers once leaving office. The findings indicate that multinational corporations have a leading influence on politicians' attention on multiple issues, while NGOs and civil society groups have very little relative influence on the attention of MPs.

The key contribution of this chapter is in examining the relative influence of each of the three groups on the attention of MPs. While previous studies have examined the ways in which one or two of the different actors can influence politicians (Gilardi et al. 2022; Barbera et al. 2019), or the various pathways through which these actors influence politicians (Haugsgjerd Allern et al. 2022; Schmitz et al. 2020; Joachim 2003), this chapter contributes to the literature by examining the *relative* influence of each of the three actors on the same playing field: Twitter. I collect over two million separate messages sent by MPs, NGOs, corporations and the media in order to map the dynamic issue attention of each of the actors to ten different issues. The analysis then uses vector autoregressions to model the degree to which shifts in the attention of each actor are associated with shifts in the attention of MPs.

In chapter 3 – *Elite Legislators and Unequal Representation in the UK* – I examine the ways in which representatives' social class backgrounds shape responsiveness to changes in public issue salience. In the chapter, I use attendance at one of the two Oxbridge Universities – Oxford and Cambridge – as a proxy for social class. Despite the fact that fewer than 1% of the British population attends Oxbridge, nearly 20% of MPs attended one of the two elite universities as of the 2019 UK General Election. I argue that three class sorting mechanisms – self-selection, socialization, and value signalling – make Oxbridge attendance a useful proxy for social class in the UK. I then examine the extent to which representatives' social class background shapes the ways in which they emphasise different issues in the House of Commons via written and oral questions and ealy day motions.

Empirically, the chapter relies on nearly 300 separate public opinion surveys asking constituents to identify the most important issues to them. The analysis then pairs the data from these weekly surveys with the universe of oral and written questions as well as early day motions put forward by MPs in the House of Commons. I employ two designs – one based on a close elections regression discontinuity design and a second using hierarchical regressions – and find that MPs who attended Oxbridge are less responsive to changes in public issue salience in relation to their colleagues who did not attend one of the two Oxbridge universities.

In chapter 4 – *The Gender Gap in Elite-Constituent Responsiveness Online* – I focus on an old but important question about the descriptive and substantive representation of women. Despite numerous studies showing that women in politics further the interests of women constituents by proactively championing gendered policies (Holman 2014; Bratton and Ray 2002; Barnes, Beall, and Holman 2021), the extent to which descriptive representation leads to higher levels of responsiveness is less understood. In this chapter, I study the responsiveness of women in the UK House of Commons and the US Congress to dynamic issue salience on several issues according to the gender of respondents.

Empirically, I leverage a combination of repeated public opinion surveys to gauge public issue salience on eight different issues and the universe of messages sent by MPs and MCs on Twitter. The findings make three contributions to the literature. First, I find that women's issue priorities receive less attention than men's when examining responsiveness from representatives in aggregate. Second, I find that women representatives are more responsive to changes in women's issue salience than male representatives. Third, I show that women similarly lead when it comes to responding to men's issue salience as well. These findings are consistent in both countries and when using a number of different model specifications.

In the fifth chapter of the thesis – *The Limits of Group Loyalty in Congress* (with Tevfik Murat Yildirim) – we identify to a limit to group loyalty among representatives. We focus on US legislators in the House of Representatives and the Senate throughout the COVID-19 pandemic, and show that COVID-19 infection reduces legislators' opposition to COVID-19 mitigation policies. In the chapter, we draw from the literature on partisan motivated reasoning and group identification to highlight the considerable influence many legislators had to continue opposing measures aimed at slowing the spread of the virus. We argue that legislators reach and "affective tipping point" in their loyalty to party narratives once they are infected, which leads to a reduction of around 30 percent in expressed opposition to COVID-19 policies.

In chapter 5, we make use of legislators' social media posts on Twitter. We train a transformer based language model to classify tweets according to whether they express opposition to a COVID-19 policy or not. After training the model and classifying over 80,000 tweets sent by representatives over the course of 28 months, we estimate the causal effects of COVID-19 infection using both Bayesian and frequentist methods. The results are surprisingly similar, suggesting that COVID-19 infection indeed reduced the probability that legislators would express opposition after infection.

Although an intervention in the form of infection with a deadly virus is less than ideal as a means to reduce opposition to COVID-19 mitigation measures, the findings of the analysis show that there is in fact a point at which representatives abandon their group loyalties and act according to available information. This chapter contributes to the literature in two ways. First, it identifies an affective tipping point to partisan loyalties for congressmembers. Given the degree to which the US Congress is polarized, as well as the salience of COVID-19, highlighting a point at which partisans abandon their pretenses is important in understanding group loyalties. Second, the literature on exogenous shocks in the context of climate change finds mixed results on the effect of extreme weather events on attitudinal changes in climate

change related policies (Baccini and Leemann 2021; Howe 2021). Although our study does not solve the debate as to whether extreme weather events cause changes in climate attitudes, it convincingly shows that exogenous shocks can have a clear effect on representatives' behavior in other domains.

1.6 Key Concepts

In the final section of the introduction chapter, I outline some of the key concepts used throughout the thesis. The aims of the section are to clarify the ways in which different concepts are defined throughout the thesis in relation to existing literature and to offer a unified approach to the empirical chapters to follow.

The thesis is organized into four empirical chapters, each of which features a different empirical approach to understanding the role of group identity and its effects on representation quality. At the same time, the thesis relies heavily on several concepts that are important to define and clarify. In this section, I define several of the key concepts used throughout the thesis, including issue responsiveness, issue attention, issue priorities and political agenda.

1.6.1 Public Issue Priorities

Issue priorities refer to the issues that are prioritized by constituents (Bevan, Jennings, and Wlezien 2016). In the thesis, I refer to the public's issue priorities, as well as men and women's issue priorities. In chapter 2 and chapter 3, I refer to the level of prioritization of an issue as its *salience*. Issues differ from policies in that issues are broad categories with which a number of policies may be associated. For example, in the US context, the issue of "healthcare" is associated with a number of policies, such as the Affordable Care Act, Medicare and Medicaid.

1.6.2   Issue Attention

Issue attention refers to the level of attention devoted to an issue or a set of issues (Klüver and Spoon 2016; Peeters, Van Aelst, and Praet 2021). Unlike public issue priorities, the unit of analysis for issue attention can be an individual actor, or a group of actors such as a political party's MPs. For example, in chapter 2, I examine the issue attention of different actors in relation to each other. I refer to the level of attention each actor devotes to the set of issues as the actor's issue attention.

1.6.3   Political Agenda

Governments focus on a number of different issues for various reasons. The combination of these issues make up the political agenda (Baumgartner and Jones 1993). The political agenda differs from issue attention in that the political agenda refers to the set of issues that receive attention from politicians or a group of politicians. In contrast, issue attention is a measurement of the level of attention politicians (or other actors) devote to a given issue or a set of given issues.

1.6.4   Issue Responsiveness

Issue responsiveness refers to the degree to which an actor's issue attention reflects the issue attention of a different actor or the issue salience of the public at a later point in time (Traber et al. 2022; Klüver and Spoon 2016). Issue responsiveness is often operationalized by examining the issue attention of representatives in relation to public issue salience (Bevan, Jennings, and Wlezien 2016; Traber et al. 2022). In chapter 2, I examine issue responsiveness to the issue attention of other actors, such as cause groups and corporations.

Although issue responsiveness is often the focus throughout the thesis, it is important to note that representatives emphasize different issues for a number of reasons other than with the intention of responding to constituents. Moreover, a representative's "issue attention" may

be directed toward issues that are not necessarily prioritized by constituents. For example, representatives may emphasize issues that are important to their party, or issues that are important to them personally.

There are several explanations for the issues that representatives emphasize. For example, representatives may emphasize issues on which their party is seen as more competent (e.g. issue ownership) (Petrocik, Benoit, and Hansen 1996; Budge and Farlie 1983; Green and Hobolt 2008). Alternatively, they may choose to respond to salient issues, "riding the wave" of public salience and appearing attentive to their constituents' needs (e.g. issue responsiveness or a "riding the wave" strategy) (Abou-Chadi 2018; Klüver and Spoon 2016; Petrocik, Benoit, and Hansen 1996). Additionally, parties may emphasize issues that are intended to divide existing coalitions, creating a wedge between the opposition and their constituents (e.g. wedge issue strategy) (Van de Wardt, De Vries, and Hobolt 2014; De Vries and Hobolt 2012), or they may emphasize niche or novel issues that are intended to mobilize or expand their base (e.g. issue entrepreneurship) (De Vries and Hobolt 2012; Van de Wardt, De Vries, and Hobolt 2014).

In reality, however, parties (and representatives) likely adopt a combination of issue strategies as part of a wider effort to maximize their electoral success. Yet, only one strategy demonstrates a empirical link between the changing interests of constituents and the subsequent issues emphasized by representatives: issue responsiveness.

1.6.5   Issue Priorities and Issue Attention as Proportions

One way to understand public issue salience or representatives' issue attention is as proportions. For example, either group has a set of issues that they care about, each of which are attributed a given level of importance in relation to the others. However, there is an upper bound on the total level of attention or prioritization either group can place on a given combination of issues within the set. Consequently, the distribution of attention or

prioritization across the set of issues is constrained, which means that the public's issue priorities and representatives' issue attention to a particular issue can be understood as a proportion of the total attention or prioritization that can be placed on the set of all potential issues.

This can be understood mathematically as follows. Formally, let P be the set of all potential issues and p_i represent a specific issue within the set P. Let P_{public} be the set of issues that the public cares about. Let $P_{\text{representatives}}$ be the set of issues on which representatives focus. Let α_i represent the importance level that both the public and representatives assign to issue p_i. Let T be the total attention or prioritization capacity (upper bound) that can be allocated to *all* issues. With these variables, we can express the public's issue salience and representatives' issue attention as proportions of the total attention or prioritization capacity that can be allocated to all issues as follows:

$$\sum_{p_i \in P_{\text{public}}} \alpha_i = \text{Proportion of public's attention} = \frac{\sum_{p_i \in P_{\text{public}}} \alpha_i}{T}$$

$$\sum_{p_i \in P_{\text{representatives}}} \alpha_i = \text{Proportion of representatives' attention} = \frac{\sum_{p_i \in P_{\text{representatives}}} \alpha_i}{T}$$

Since there is an upper bound (T) on the total attention or prioritization that either group can place on a given combination of issues, the distribution of attention or prioritization across the set of issues is constrained to 1 (or 100%). This follows the logic that the public and representatives cannot allocate more than 100% of their attention or prioritization capacity, and that the cost of attributing more attention or prioritization to one issue is less attention or prioritization for other issues (Baumgartner and Jones 2010). Moreover, neither representatives nor the public can give "negative" attention to different issues, they can only choose to ignore issues (i.e. $\{p_1, p_2, \ldots, p_n \mid p_i > 0, \sum_{i=1}^{n} p_i = 1\}$). Therefore, the public's

issue priorities and representatives' issue attention can be understood as proportions of the total level of attention or prioritization that can be placed on the set of all potential issues.

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In what follows, the empirical chapters – chapter 2, chapter 3, chapter 4 and chapter 5 – build on the literature and key concepts outlined in the introduction. Following the empirical chapters, the thesis concludes by bringing together the findings while also highlighting the limitations of the results and avenues for future research.

Chapter 2

The Relative Online Influence of NGOs, Corporations and the Media

It is well-established that various actors compete to draw the attention of politicians to issues they view as important. Yet, given the numerous channels through which different actors attempt to influence the political agenda, we know less about the relative influence of these different actors. This chapter examines the degree to which non-governmental organizations (NGOs), multinational corporations (MNCs) and top UK media organizations influence the issue attention of parliamentarians in the UK House of Commons on the same playing field – social media. Using a dataset that includes the universe of social media messages from the top-100 British MNCs and NGOs, top British media organizations, and messages sent by elected MPs, I rely on Natural Language Processing (NLP) methods to measure the dynamic attention of each actor to different salient issues. After creating and validating an issue dictionary based on semi-supervised machine learning, I use vector autoregression (VAR) models to estimate the relative influence that each actor has on MPs' issue attention online. Findings reveal broad support for the influence of the media and corporations.

2.1 Introduction

One of the greatest powers in politics is the ability to set the political agenda. A dominant argument in agenda setting literature – which encompasses research from the perspectives of political communication (Gilardi et al. 2022; Russell Neuman et al. 2014), media studies (McCombs and Valenzuela 2020), and political science (Baumgartner and Jones 2010) – is that the media plays a central role in influencing the political agenda. Yet, the media landscape is increasingly characterized by competition between a variety of actors who attempt to influence public and political attention. For example, interest groups, corporations, and non-governmental organizations (NGOs) all have a vested interest in drawing the attention of voters and governments to their issue priorities (Binderkrantz and Rasmussen 2015; Haugsgjerd Allern et al. 2022; Bouwen 2002). Moreover, the means by which these various groups seek to set the political agenda has expanded dramatically in recent years with the rise of digital advocacy (Schmitz et al. 2020; Langer and Gruber 2021; Princen 2011).

These developments raise important questions about the *relative* influence of different actors influencing the attention government. Specifically, to what extent can different actors influence MPs' issue attention, and how does the relative influence of different actors vary across issues? To answer these questions, I examine a setting in which different actors are required to use the same means to gain the attention of politicians: social media. Social media presents a unique opportunity to study the degree to which the issues emphasized by NGOs, multinational corporations (MNCs) and top UK media organizations are reflected in the issue attention of parliamentarians. Because the vast majority of MPs, as well as other political actors, routinely emphasize political issues online, I leverage the universe of social media messages from the top-100 British MNCs and NGOs, top British media organizations, and messages sent by elected MPs to examine the relative influence of these actors.

Empirically, I rely on Natural Language Processing (NLP) methods to measure the attention of each actor to ten different salient political issues. After creating and validating

the measurement method, Vector autoregression (VAR) models are used to estimate the relative influence that each actor has on MPs' issue attention. Findings highlight the broad influence of corporations and the media on the attention of MPs in the House of Commons.

This chapter thus makes three key contributions to the literature. First, it contributes to the literature on agenda setting by examining the relative influence of different actors on the political agenda. Despite a extant body of scholarship on the influence of different actors on the political agenda, the pathways through which these actors wield influence varies widely, leading to empirical challenges when making comparisons. By focusing on a single platform – Twitter – this chapter provides a more direct comparison of the relative influence of different actors.

Second, the chapter contributes to the literature on the political influence of corporations by examining the extent to which corporations influence the political agenda through digital advocacy. Although previous research has demonstrated that corporations are influential in setting the political agenda (Binderkrantz and Rasmussen 2015; Haugsgjerd Allern et al. 2022; Bouwen 2002), the extent to which corporations are able to influence the political agenda through digital advocacy has received less attention. This chapter thus provides a wider picture of the political influence of corporations by examining the extent to which corporations are able to influence the political agenda through digital advocacy.

Finally, this chapter contributes methodologically by developing a method of quantifying issue attention to multiple issues by different actors. The method developed in this chapter is not only flexible enough to measure the issue attention of social media messages that differ by actor and that are not exclusively political in nature, it is also accurate enough to achieve similar F1 scores as state-of-the-art supervised methods. This method thus provides a new tool for scholars interested in studying issue attention and the agendas of different actors.

In the rest of the chapter, I first examine different accounts for the influence of political actors on the political agenda. The section allows for developing three guiding hypotheses

for the empirical analysis, and is then followed by a section on the data and methods used to test the hypotheses. The results section presents the results of the empirical analysis, and the final section concludes.

2.2 The Political Agenda and the Media

The political agenda includes the issues that receive attention from political actors (Baumgartner and Jones 1993). The political agenda is distinct from the public agenda, which includes the issues that receive attention from the public (McCombs and Shaw 1972), as well as the policy agenda, which includes the policies that are pursued by policy makers (Kingdon 1995). Rather, the political agenda encompasses broad issue categories that are salient to political actors, such as immigration or the economy.

Previous research has demonstrated that the media plays a large role in shaping the political agenda (McCombs and Valenzuela 2020; King, Schneer, and White 2017). In seminal work by McCombs and Shaw (1972), the authors describe the role of the media as dictating not only the issues the public thinks about, but also the level of importance such issues command. Through choosing to cover certain issues at the cost of neglecting others, media sets the public agenda, shaping the political reality of its viewers. Yet, the media's influence on the political agenda – the combination of issues that politicians emphasize in their communication and legislative activities – is less clear. Walgrave, Soroka, and Nuytemans (2008) argue that the media's influence on the political agenda is conditioned by the substance of the government's agenda. Governments with substantive and ambitious policy agendas are less likely to be influenced by the media. In contrast, governments with less substantive agendas are more likely to react to the media, therefore giving the media more influence over the political agenda.

Another line of reasoning suggests that the media's influence on the political agenda is conditional on the issue at hand. Sciarini and Tresch (2018) find that the media tend

to have a greater influence on domestic issues compared to foreign issues. Focusing on Switzerland, the authors show that media coverage of European-related issues do not lead to the same response from members of parliament as media coverage of domestic issues. One reason for this could be that politicians are more likely to follow the media on issues where they envision a potential political opportunity. Van Aelst and Walgrave (2016) argue that politicians require media access to disseminate their issue ambitions and therefore are most attentive to the media's agenda when it serves their own interests.

Additionally, the degree to which media influences the political agenda may depend on the salience and popularity of the media entity itself. For example, a popular and national newspaper may have a differential impact on the political agenda compared to local newspapers (Bartels 1996).

The degree to which media influences the issues that are salient to politicians may also vary according to the affiliated party's position in government. Government parties are less responsive to the ebbs and flows of the media for several reasons, including the fact that they are more likely to have their own (Vliegenthart and Walgrave 2010). This differs for opposition parties who may stand to benefit from riding the wave of media attention (Sevenans, Walgrave, and Vos 2015).

2.3   Interest Groups & Political Influence

Despite wide ranging evidence of the media's influence on the political agenda, other actors also have incentives to influence the political agenda. In particular, interest groups and NGOs seek to draw attention to their issue priorities (Binderkrantz and Rasmussen 2015; Haugsgjerd Allern et al. 2022; Bouwen 2002). Moreover, the means by which these various groups influence the political agenda differ from the media as well. Whereas the media's influence on the political agenda is largely a function of the media's ability to set the *public* agenda – which may in turn influence the political agenda (McCombs and Valenzuela 2020) –

NGOs and other interest groups leverage a number of tactics to influence policy diffusion, such as lobbying, campaign contributions, and digital advocacy and activism (Schmitz et al. 2020; Klüver, Braun, and Beyers 2015; Haugsgjerd Allern et al. 2022; Flöthe 2019; Garrett and Jansa 2015).

One strategy interest groups may use to influence the policy making process is by changing the ways in which the public view or prioritize an issue. For instance, Dür and Mateo (2014) show that interest groups influenced the ratification of the Anti-Counterfeiting Trade Agreement in the EU by increasing the salience of the issue. The authors show that by increasing the salience of the issue, other interest groups similarly mobilized against the issue, amounting ultimately to the EU deciding against the Agreement's ratification.

Another strategy interest groups may use to influence the policy making process includes strategically framing certain aspects of a policy that are favorable while excluding aspects that are not (Baumgartner, De Boef, and Boydstun 2008; Klüver, Braun, and Beyers 2015; Baumgartner and Mahoney 2008). Framing is an especially important tool for interest groups who may not have the resources to influence policy in other ways, and provides an accessible means by which more limited groups can mobilize interest in a certain aspect of a policy (Beyers 2013).

All interest groups, however, are not created equally, nor do they have the same ambitions and strategic objectives. A high-level dichotomy made in the interest group literature is between cause groups and sectional groups (Klüver and Pickup 2018; Giger and Klüver 2016). Whereas cause groups represent specific principles and maintain open membership for anyone in support of such principles, sectional groups represent the private interests of specific segments of society. Cause groups, such as non-governmental civil society groups, have a longstanding history of facilitating bottom-up democratic representation, and past research demonstrates that they can enhance the relationship between government and voters (Beyers 2013). This process often occurs through the enhanced exchange of information

(Flöthe 2020), ultimately increasing the weight policymakers place on public preferences (Rasmussen, Binderkrantz, and Kluver 2021). Additionally, cause groups can also offer politicians electoral support and campaign contributions, which provide further incentives for politicians to be responsive (Klüver and Pickup 2018).

Although the means by which cause groups and sectional groups influence the political agenda can often be similar, sectional groups, such as business associations, represent the private interests of specific segments of society. These groups are often more exclusive in their membership and are more likely to represent the interests of a specific industry or sector. Increasingly, corporations have taken on a similar public role as sectional groups by taking public political positions (Endres and Panagopoulos 2017; Wettstein and Baur 2016).

Despite a documented history of corporate influence on the political agenda through corporate and business lobbying (Rasmussen 2015; Coen, Katsaitis, and Vannoni 2021), political advocacy – which includes attempting to influence the political agenda by shifting the public's attention to selected issues on social media – goes beyond what has traditionally been included under corporate social responsibility (CSR). While CSR attempts to balance both shareholder and corporate interests, corporate social advocacy (CSA) is evidenced by corporations "voicing or showing explicit and public support for certain individuals, groups, or ideals and values with the aim of convincing and persuading others to do the same" (Wettstein and Baur 2016, p. 206).

Past accounts for why corporations take political positions in attempt to shift the political agenda have been tied to CSR, which explain the behavior as a reactive rather than a proactive strategy and as a means to increase profits (Frynas and Stephens 2015). Yet, other accounts demonstrate that corporations are also inclined to take political positions for moral reasons (Baron 2010) or because of pro-social motivations (Bénabou and Tirole 2006; Vogler and Eisenegger 2021).

These public engagement efforts can take different formations. For example, a firm may wish to construct a positive moral identity to increase its reputation so that in the case the firm receives negative publicity, past positive associations might act as a hedge against public backlash and calls for regulatory action (Cornelissen 2020). Moreover, firms may wish to influence the political agenda in order to shift attention away from issues that are potentially damaging to their financial interests. Nyberg (2021) calls this tactic strategic exclusion, which occurs when corporations aim to manipulate public discourse to intentionally silence groups or movements that bring attention to policies that are unfavorable, such as calls for raising corporate taxes or for stricter environmental regulations.

For both cause and sectional groups, past research has indicated that the relationship between interest groups and political parties is not simply unidirectional with interest groups being the only actor standing to benefit from political influence. Klüver and Pickup (2019) show that interest groups provide tangible benefits to parties in the form of information, campaign contributions and personal rewards. The interaction is conceptualized as an exchange relationship in which two interdependent actors – parties and interest groups – "trade goods with each other" (p. 982). Because parties lack the time and necessary resources to develop a comprehensive understanding of the complexities of each and every sector and domain of the economy, they rely on different actors with domain-specific experience. Whereas parties may rely on a teachers' union for advice on tailoring education policy, parties may also rely on corporations and private corporate interests for insight on a number of issues for which these groups hold an asymmetric information advantage.

Another reason politicians may be sympathetic to interest groups is due to the potential for personal financial gain. MPs stand to benefit financially after their tenure in office due to the proverbial "revolving door" between public office and the lucrative lobbying sector (Mccrain 2018; Weschle 2021). Ex-politicians are especially lucrative as lobbyists because they are shown to be effective at getting favorable legislation passed as lobbyists (Makse

2017). For these reasons, MPs who seek a career in the private sector or with a particular interest group following their time in public office face tangible financial incentives to be sympathetic to the issues prioritized by such groups while in office.

Despite significant evidence that each of the three actors – cause groups, corporations and media – influence the political agenda, as well as incentives for politicians to be responsive to the priorities of these actors, the extent to which the issue attention of these actors are reflected in the political agenda of politicians is less clear. In this regard, social media offers a unique opportunity to assess the *relative* influence of each of the actors. As such, I outline three guiding hypotheses for how the issue attention of each of the actors is reflected in the political agenda of politicians.

> *Hypothesis 1: Shifts in corporations' issue attention predict a subsequent change in the political agenda.*

> *Hypothesis 2: Shifts in cause groups' issue attention predict a subsequent change in the political agenda.*

> *Hypothesis 3: Shifts in media issue attention predict subsequent shifts in the political agenda.*

2.4   Research Design and Methods

Despite a wide body of literature on the various strategies, methods, and levels of success achieved by interest groups in influencing the political agenda, we know less about these actors' relative influence on the political agenda. Because tactics vary widely across interest groups, it is difficult to compare the relative influence of different interest groups on the same "playing field". For example, whereas some interest groups may rely on lobbying and campaign contributions, others may rely on grassroots activism and digital advocacy.

Moreover, whereas some interest groups may have a large membership base, others may have a small but highly influential membership base. In order to compare each actor's relative incfluence, I focus on each of the actors' online social media behavior. Specifically, I rely on daily Twitter data from corporations, interest groups, politicians, and the media to measure the amount of attention each actor gives to different political issues.

Attention measures are then used to construct an "issue agenda" for each actor based on the distribution of attention to 10 different political issues. I focus on broad issue categories because they capture many of the potential policies that are addressed by government and that may receive attention from the other actors in the study. A more focused approach might examine specific policies and the influence of one or a few interest groups, however, by focusing on broader issue categories, the analysis includes multiple organizations within each actor "group".

To determine the amount of attention the different actors give to key public issues, I relied on data collected from Twitter. Twitter is especially useful because it provides a view of the combined interests and attention of elites and other powerful groups in society. One advantage of using tweets to measure issue attention is that tweets present concise and unambiguous declarations of interests and preferences. Unlike other mediums of political communication, Twitter is a "restrictive medium that does not lend itself to deep exchanges" (Scherpereel, Wohlgemuth, and Lievens 2018, p. 45). This forces Twitter users to make clear and impactful statements because tweets are limited to only 280 characters. Therefore, Twitter users must convey their ideas unambiguously, which is a constraint elites may not face to the same degree in other political environments. The concise manner in which tweets are constructed magnify intentions and leave little left for subjective interpretation (Masroor et al. 2019). When taken in combination over time, tweets can offer a granular and temporal view of users' attention to different issues and interests, making legislative communication and elite behavior on Twitter especially fruitful for understanding an actor's issue attention.

There is a strong academic precedent for using tweets to measure the agenda of politicians and the media (Barbera et al. 2019; Gilardi et al. 2022); however, there is considerably less research that looks at the political agendas of corporations and the degree to which politicians respond on social media. I therefore make the same classical principle-agent assumption about corporations that is commonly made by other researchers who assume that tweets from the media or politicians are representative of the political agenda (Barbera et al. 2019; Gilardi et al. 2022). Namely, that tweets sent from official corporate Twitter accounts represent the attention and interests of their respective organizations.

To measure the issue attention of politicians, I collected tweets from all Labour and Conservative Party MPs with a valid and public Twitter account, which included 505 different accounts. Similarly, Twitter data were also collected to measure the issue attention of the media, interest groups and corporations. For media issue attention, tweets were included from eight of the most popular UK media outlets: *BBCNews*, *Reuters UK*, *The Independent*, *The Economist*, *The Times*, *The Financial Times*, *SkyNews*, *The Sun* and *The Guardian*. These media accounts were selected because they reach the greatest audience of UK newspaper titles according to follower count on Twitter. For corporate issue attention, the top-100 companies by annual revenue headquartered in the United Kingdom were selected. In total, 69 of the 100 top corporations have public Twitter accounts and were therefore included in the analysis.[1] For interest group issue attention, I relied on tweets from NGOs from YouGov's list of the most popular charities and organizations in the United Kingdom (YouGov 2023).[2] This list exclusively includes not-for-profit civil society groups (i.e. cause groups) such as *Oxfam*, *Greenpeace* and *Amnesty International*. In total, 99 of the top-100 most popular cause groups have public Twitter accounts and were therefore included in the analysis.[3]

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1. A list of these corporations is provided in Appendix A.1.
2. The list of charities is sourced from a public opinion poll asking respondents to assign scores (negative to positive) to different charities. These scores from respondents are then used to rank the charities.
3. A list of these cause groups is provided in Appendix A.2.

The time period of analysis includes 18 months following 1 January 2020. This time period is relatively short but includes in many cases hundreds of observations each day from each set of actors. In total, the data collected in order to cover the time period of analysis included 233,031 tweets from FTSE corporations, 305,861 tweets from top NGOs, 566,804 tweets from top media outlets, 474,815 tweets from Labour MPs and 575,795 tweets from Conservative MPs. All tweets were collected using the Twitter Academic Research product track API. The Academic Research product track provides expanded access to Twitter data for academic researchers, allowing direct calls to the Twitter API (Twitter 2021).

2.4.1   Measuring the Political Agenda

To examine the extent to which the MPs are responsive to the issue attention of different actors, I created a measure of each actor's attention to 10 different issues. For selection of the issues, I relied on 10 salient issues that were identified in public opinion surveys asking about the most important issue facing the country (YouGov 2021). These issues include health, economy, Brexit, immigration, crime, defense, environment, housing, education and welfare.

Measuring the amount of attention various actors give to different issues required a method for classifying tweets as to whether they pertain to the specific issue domain. Past studies conducting similar analyses have used Latent Dirichlet Allocation (LDA) to identify topics expressed in text (Barbera et al. 2019). Latent Dirichlet Allocation (LDA) is an unsupervised machine learning method that can be used to capture underlying topics in a text (Blei, Ng, and Edu 2003). LDA uses hierarchical Bayesian models to identify a finite mixture of related words that correspond to a topic. Because the method is unsupervised, the result of an LDA topic model is a predetermined number of topics and associated keywords that make up each topic. The downside to LDA models, however, is that they do not allow for specifying the topics of interest beforehand, which is necessary for comparing actors' issue attention to specific issues. Consequently, the resulting topics (and the words associated with

each topic) from an LDA model may not correspond to the specific issues of interest (for example, "health", "economy" etc.). Moreover, in the case that the topics indeed correspond to the issue of interest, there may be significant overlap with other topics (or desired issues), which would lead to overlap in measuring issue attention on closely-related issues.

I therefore created a method of classifying the tweets to overcome these shortcomings. Specifically, issue dictionaries are first created using semantic similarity to seed words that correspond to the issues of interest. Then, tweets are classified as pertaining to a given issue if they contain words that are semantically similar to the words in the issue dictionary. This method is similar to the approach used by Barbera et al. (2019), but differs in that it uses semantic similarity to seed words to create dictionaries.[4]

After keyword dictionaries are created, each actor's issue attention is measured as the number of tweets about a given issue for a given day as a proportion of the actor's total number of tweets sent in a given day. For example, if corporations send a total of 100 tweets in a given day and 30 of the tweets are about the economy, then corporations' issue attention to the economy is 0.3 for that day. This process is repeated for each actor and each issue for each day of the analysis. This measurement follows the logic that issue attention to a particular issue must be a proportion of an actor's total attention to *all* issues (Baumgartner and Jones 1993, 2010).

Figure 2.1 provides a temporal visualization of attention from each of the actors to each of the ten issues examined in the analysis. From Figure 2.1, it appears that the issue of health has captured significant attention from each of the actors. This is no surprise given the health demands of the COVID-19 pandemic. Face validity can also be established by observing some of the significant shifts during the time period of focus. For example, there is a spike in attention to health around the time of the initial COVID-19 lockdown in mid-March 2020. This spike is observable in the attention of all actors, including the media, NGOs,

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4. I provide full details of the methodology, as well as validation checks, in Appendix A.5. On a random sample of 1,000 messages, the method achieves a multi-label weighted F1 score of 0.78. On a sample on tweets that address only political issues, the method achieves an F1 score of 0.65

corporations and MPs; however, high levels of attention are also observable in the months following the initial lockdown by Labour and Conservative MPs while the other actors' attention to health declines.

Several of the issues receive less attention than others. For example, the issues of Brexit, defense and crime appear to receive little relative attention. An exception to the issue of Brexit is observable in a brief spike around the time of the UK's final withdrawal agreements with the European Union in January 2021. When it comes to the issue of crime, a small and brief increase in attention from Labour and Conservative MPs appears to occur in March 2021. This increase may correspond to the murder of Sarah Everard by an off-duty Metropolitan Police constable. The murder was followed by protests and scrutiny of the Metropolitan Police (BBC 2021).

Fig. 2.1. Issue Attention
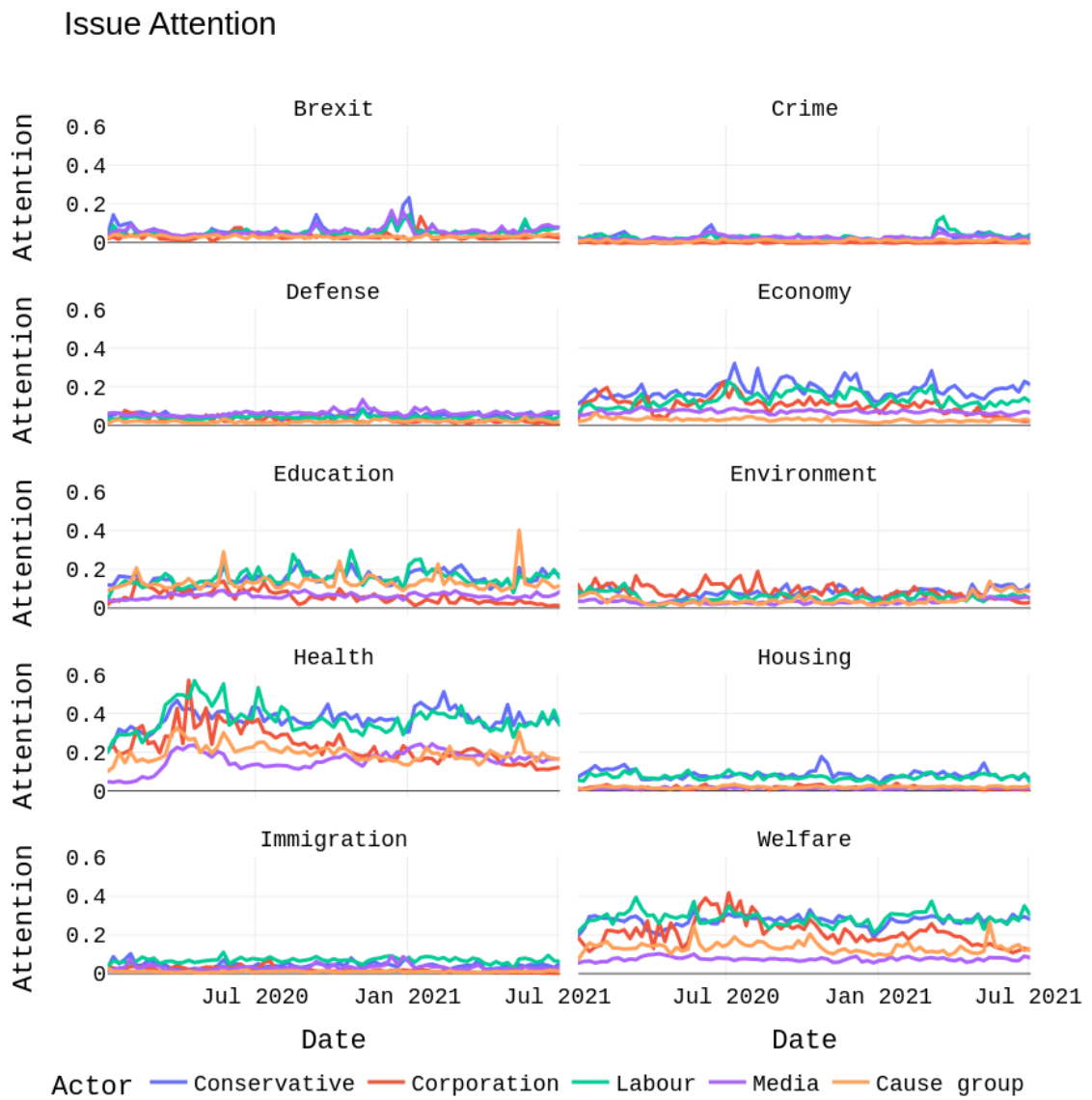
Issue Attention

Note: Issue attention is displayed using the 10-day moving average. Full descriptive statistics are available in Appendix A.4.

2.4.2   Estimation

To estimate the extent to which each of the actors' issue attention influences the issue attention of MPs, I rely on vector autoregression (VAR) models with fixed effects for issues. This strategy includes modelling the repeated observations of time series data, which makes the model suitable for the current aims. The clear limitation to this approach, however, is that findings are not necessarily of a causal nature, but rather only consider the extent to which issue attention from actor X (at $t - n$) predicts a subsequent shift in issue attention in actor Y (at t). The models are therefore endogenous and only the actors within the model are used to predict shifts in the attention of the other actors. This limitation becomes less problematic when considering the question at hand. Because the aim is to understand the degree to which one actor leads another, VAR models offer a great solution because they capture the sequential nature of an actor's attention in relation to other actors within the model.

Following previous time series practices on proportional observations (Wallis 1987), the log odds of each time series were used. Each series is stationary and stationarity was confirmed using Augmented Dickey-Fuller (ADF) unit root tests (Wei 2019).[5] After accounting for auto-correlation (ACF) and partial auto-correlation (PACF), a five-day lag structure was selected to ensure adequate values for each metric. Selection of a five-day lag structure allows for consideration of shifts in the attention of one actor to affect another actor's attention over the course of the following five days. This relatively short lag structure was also selected to minimize the potential for type 1 errors. The formal equation can be expressed as follows:

Equation 1. Issue fixed-effects VAR model

$$Z_{i,j,t} = \alpha_j + \sum_i \sum_{p=1}^{5} \beta_{i,p} Z_{i,j,t-p} + \varepsilon_{i,j,t}$$

---

5. Presence of unit roots rejected at p-value < 0.1.

Where Z_{ijt} is the log odds of each stationary time series, each of which represent the proportion of group i's attention to issue j on day t, and p represents the lag structure. Fixing issue effects assumes that estimates are consistent across all issues, which is not likely to be the case. However, this allows for individual estimates for each actor and for each issue at each lag period. This also allows for issue level predictions and comparisons of influence at the issue level using impulse response functions (IRFs), which I return to below.

2.5 Results

The first hypothesis expects that corporate issue attention will impact the attention of MPs in the House of Commons. Table 2.1 presents the influence of corporations' attention on the other actors. In Table 2.1, each row includes the lag time, in days, of the effect on the two political parties' MPs. The table's columns include the separate issue-level models corresponding to the estimates. Corporations had a statistically measurable effect (at a p-value of 0.05) on the attention of MPs on six on the ten issues. For Labour Party MPs, corporations led MPs on the issues of the economy, immigration, housing, welfare, the environment and Brexit. In comparison, Conservative Party MPs followed the lead of corporations on the economy and housing. These results confirm H1 and show the broad capacity of corporations to lead the political issue agenda of parliamentary MPs.

While there are clear financial motivations for corporations to steer MPs' attention to the economy, Brexit and the environment, the fact that corporations also lead on welfare and housing is less immediately apparent. On the issue of housing, corporations led the issue agenda of both Labour and Conservative Party MPs. Yet, upon inspection of the sectoral makeup of corporations in the analysis, eight of the top 100 companies are homebuilders or property and real-estate developers (see Appendix A.1). In combination, corporations sent 772 tweets about housing during the time period analyzed.

Housing – like other issues during the time period analyzed – was an issue of concern due to the negative effects of the lockdowns associated with COVID-19. The issue, however, did not solely affect the mass public; it also would potentially affect homebuilders and real-estate developers. Unlike other non-essential businesses, homebuilding and construction work was allowed throughout the pandemic and accompanying lockdowns. Even when social gatherings of more than two people were prohibited – and against the wishes of builders and construction workers who felt "unprotected" – homebuilding and construction companies were given the green light by the government to conduct non-essential business (ITV 2020). While this is not to say that these corporations' tweets were the deciding factor in the government's decision to grant regulatory exemptions to homebuilders, these corporations nonetheless had a clear financial incentive to draw attention to the issue of housing.

Another issue for which it may appear unclear why corporations lead MPs is on welfare. In total, corporations sent over 3,152 tweets that fall under the topic of welfare. I examined these tweets qualitatively to further gain a topical understanding of how welfare was addressed by corporations. Upon reading the tweets, they fell into two identifiable subcategories. First, there were many pro-social tweets about advancing social causes. Many of these tweets condemned racism or sexism and emphasized the importance of diversity. A second subtopic included tweets stressing the importance of employee welfare, which likely became a greater focus following the outbreak of COVID-19 and the subsequent lockdowns. Corporate tweets about welfare and the subtopics identified within these tweets are in line with previous findings on corporations' increasing proclivity to share pro-social ideals and values (Baron 2010; Bénabou and Tirole 2006).

Turning attention to the second hypothesis (H2) on cause groups reveals relatively limited influence in relation to corporations. Labour Party MPs were responsive on the issues of health and housing. Cause groups also led Conservative Party MPs on immigration and the environment. As many of the cause groups in the UK are related to health (see Appendix A.2),

Table 2.1. Corporations' Influence on Conservative and Labour Party Issue Attention

	Economy	Immigration	Health	Education	Housing	Welfare	Defense	Crime	Environment	Brexit
Corporations → Labour Party										
Lag 1 ($t-1$)	0.008	0.070	0.006	0.002	-0.009	0.013	0.016	-0.041**	-0.033	-0.002
	(0.017)	(0.076)	(0.017)	(0.014)	(0.008)	(0.014)	(0.016)	(0.017)	(0.023)	(0.014)
Lag 2 ($t-2$)	0.023	-0.193**	-0.012	0.024	0.019**	0.028*	0.013	-0.020	0.046**	0.031**
	(0.018)	(0.076)	(0.016)	(0.014)	(0.009)	(0.014)	(0.016)	(0.018)	(0.023)	(0.015)
Lag 3 ($t-3$)	-0.033	0.187**	-0.007	0.028*	0.009	0.030**	-0.006	-0.002	0.055**	0.013
	(0.018)	(0.078)	(0.016)	(0.015)	(0.009)	(0.014)	(0.016)	(0.018)	(0.023)	(0.015)
Lag 4 ($t-4$)	0.009	-0.066	0.013	-0.009	0.017*	0.014	0.007	0.004	-0.012	0.026*
	(0.018)	(0.083)	(0.017)	(0.015)	(0.009)	(0.014)	(0.016)	(0.018)	(0.023)	(0.015)
Lag 5 ($t-5$)	0.039**	0.074	-0.017	0.020	-0.001	0.023	-0.022	0.017	-0.015	0.004
	(0.017)	(0.082)	(0.016)	(0.014)	(0.009)	(0.014)	(0.016)	(0.018)	(0.023)	(0.014)
Corporations → Conservative Party										
Lag 1 ($t-1$)	0.035**	-0.063	0.009	0.006	-0.003	0.015	0.010	-0.001	-0.053**	-0.000
	(0.017)	(0.099)	(0.014)	(0.014)	(0.009)	(0.014)	(0.013)	(0.019)	(0.025)	(0.016)
Lag 2 ($t-2$)	0.009	0.027	0.003	0.015	0.002	0.018	0.017	-0.011	0.024	0.015
	(0.017)	(0.100)	(0.014)	(0.015)	(0.009)	(0.014)	(0.013)	(0.019)	(0.026)	(0.017)
Lag 3 ($t-3$)	-0.020	0.109	-0.021	0.018	0.023**	0.014	0.007	-0.018	0.042	0.015
	(0.018)	(0.102)	(0.014)	(0.014)	(0.009)	(0.014)	(0.013)	(0.019)	(0.026)	(0.017)
Lag 4 ($t-4$)	-0.003	-0.050	-0.016	0.001	0.009	0.012	-0.001	-0.022	-0.004	-0.000
	(0.017)	(0.108)	(0.014)	(0.015)	(0.009)	(0.014)	(0.013)	(0.019)	(0.026)	(0.017)
Lag 5 ($t-5$)	0.010	-0.093	-0.036**	0.004	0.0001	0.002	0.000	0.032*	-0.005	-0.007
	(0.017)	(0.107)	(0.014)	(0.014)	(0.009)	(0.014)	(0.013)	(0.019)	(0.025)	(0.016)
Observations	543	543	543	543	543	543	543	543	543	543
BIC:	-5.48928	3.98844	-11.4447	-5.67140	-0.914342	-6.50154	-0.774805	-0.172052	0.478	-5.176
AIC:	-6.51805	2.95967	-12.4735	-6.70018	-1.94312	-7.53031	-1.80358	-1.20083	-0.550575	-6.20503
FPE:	0.001477	19.2986	3.82807e-06	0.00123	0.143309	0.000536	0.164769	0.301056	0.576830	0.002
Log likelihood:	-1952.77	-4525.97	-335.858	-1903.32	-3194.86	-1677.94	-3232.75	-3396.39	-3572.94	-2037.75

*p<0.1; **p<0.05; ***p<0.01

Note: Standard errors presented in parentheses. Each lagged row represents the statistical influence of a shift in corporate issue attention on party attention n days later.

many of these organizations aim to bring attention to health-related issues. Many of the tweets sent from cause groups on health regarded physical health issues stemming from COVID-19, but there was also a significant number of tweets aimed at mental health in the wake of the pandemic.

On housing, cause groups tweeted about the effects of poverty on housing and spoke directly to the issue of youth homelessness. Cause groups also tweeted public service messages about housing benefits and programs intended to create affordable housing. Perhaps unsurprisingly, climate change was a dominant topic in tweets sent from cause groups on the environment. Many tweets encouraged environmentally sustainable practices, yet, many tweets also directly confronted governments and corporations and their role in the consequences associated with climate change. Finally, cause groups led Conservative Party MPs on immigration. Several of the NGOs in the analysis include international aid groups such as Amnesty International, Oxfam and UNICEF. Tweets about immigration from NGOs focused on restrictive and inhumane immigration policies, as well as including calls for welcoming asylum seekers and refugees.

While there was evidence that cause groups led each party's MPs on two separate issues, cause groups had considerably less influence on MPs than corporations. One potential explanation for this finding requires considering the time period analyzed, which includes the heights of the COVID-19 pandemic. This likely required many civil society groups to forego their traditional communication strategies and even may have led some groups to reduce staff and operations. A second potential explanation for the limited influence of cause groups has to do with the proximity of the electoral cycle. One of the primary mechanisms that incentivize MPs to respond to cause groups is the electoral support associated with gaining favour from different groups (Klüver and Pickup 2018). Consequently, it is possible that proximity to election increases responsiveness to cause groups because MPs anticipate electoral rewards. Given that the last general election was in December 2019, the time period

analyzed came directly after the election and the potential for increasing electoral support through responding to cause groups may not have had the same effect when compared to the time leading up to the election.

Table 2.3 presents the results from the media's influence on MPs. The results provide broad support for media influence, suggesting that the media leads on seven of the ten issues. On the issues of health, education, crime and Brexit, the media led both Labour and Conservative Party MPs. Additionally, on the environment and on defense, the media led Labour Party MPs. Further, on the issue of the economy, the media led Conservative Party MPs. These results confirm previous findings on the media's widespread influence on the political agenda (Baumgartner and Jones 1993; McCombs and Shaw 1972; Gilardi et al. 2022).

2.5.1   Impulse Response Functions

Using the same VAR models provided in Equation 1, impulse response functions (IRFs) can be used to simulate the degree to which issue attention changes given a ten percent increase in one actor's attention (Lütkepohl 2005). IRFs simulate the effects of a ten percent increase from actor X on actor Y's attention over the following days. These models have traditionally been used for economic forecasting of time series data to allow for examination of potential economic shocks; however, they can also be used to forecast potential changes in time series models. Figure 2.2 makes use of the IRFs based on a ten percent increase in attention over the course of five days. Each issue-level boxplot represents the cumulative response to the simulated increase from one of the actors, and the red dots represent the maximum value of the daily response over the five days. For example, given a ten percent increase in corporations' attention to the environment, Labour Party MPs would respond to that increase by increasing attention to the environment by about 0.1 percent. While this effect may appear

Table 2.2. Cause groups' Influence on Conservative and Labour Party MPs' Issue Attention

	Economy	Immigration	Health	Education	Housing	Welfare	Defense	Crime	Environment	Brexit
NGOs → Labour Party MPs										
Lag 1 ($t-1$)	-0.005	0.023	0.030	-0.003	-0.005	0.016	0.012	-0.002	0.046	0.020
	(0.018)	(0.022)	(0.035)	(0.043)	(0.012)	(0.032)	(0.021)	(0.017)	(0.032)	(0.032)
Lag 2 ($t-2$)	0.004	-0.004	0.088***	0.028	0.025***	0.010	0.006	0.014	0.030	0.024
	(0.018)	(0.022)	(0.035)	(0.043)	(0.012)	(0.032)	(0.021)	(0.017)	(0.032)	(0.032)
Lag 3 ($t-3$)	0.000	-0.012	-0.034	-0.088	-0.014	-0.002	0.019	-0.019	0.036	-0.005
	(0.019)	(0.022)	(0.036)	(0.044)	(0.012)	(0.033)	(0.021)	(0.017)	(0.033)	(0.031)
Lag 4 ($t-4$)	-0.001	-0.065	-0.049	-0.033	0.016	-0.015	-0.003	-0.008	-0.001	0.018
	(0.018)	(0.082)	(0.035)	(0.043)	(0.012)	(0.033)	(0.021)	(0.018)	(0.032)	(0.031)
Lag 5 ($t-5$)	-0.005	0.005	0.009	0.046	0.009	0.027	0.002	0.005	-0.010	-0.010
	(0.018)	(0.022)	(0.034)	(0.041)	(0.012)	(0.031)	(0.020)	(0.017)	(0.032)	(0.031)
NGOs → Conservative Party										
Lag 1 ($t-1$)	0.030*	0.037	-0.000	-0.007	-0.008	-0.020	0.033*	0.005	0.073**	0.049
	(0.018)	(0.029)	(0.030)	(0.044)	(0.013)	(0.032)	(0.017)	(0.019)	(0.035)	(0.036)
Lag 2 ($t-2$)	0.020	-0.028	0.023	0.067	0.030*	0.031	-0.018	0.002	0.027	0.002
	(0.018)	(0.029)	(0.030)	(0.044)	(0.013)	(0.032)	(0.017)	(0.019)	(0.035)	(0.036)
Lag 3 ($t-3$)	0.022	0.003	-0.011	-0.024	-0.000	-0.004	0.013	0.005	-0.021	0.023
	(0.018)	(0.029)	(0.031)	(0.04)	(0.013)	(0.032)	(0.017)	(0.019)	(0.036)	(0.035)
Lag 4 ($t-4$)	0.001	0.081**	-0.040	-0.037	0.018	-0.029	0.004	0.002	-0.020	0.011
	(0.018)	(0.029)	(0.030)	(0.044)	(0.013)	(0.032)	(0.017)	(0.019)	(0.035)	(0.035)
Lag 5 ($t-5$)	-0.001	0.010	0.048*	0.058	0.011	0.003	-0.007	0.013	-0.047	0.060*
	(0.017)	(0.029)	(0.029)	(0.042)	(0.013)	(0.030)	(0.017)	(0.018)	(0.036)	(0.035)
Observations	543	543	543	543	543	543	543	543	543	543
BIC:	-5.48928	3.98844	-11.4447	-5.67140	-0.914342	-6.50154	-0.774805	-0.172052	0.478	-5.176
AIC:	-6.51805	2.95967	-12.4735	-6.70018	-1.94312	-7.53031	-1.80358	-1.20083	-0.550575	-6.20503
FPE:	0.001477	19.2986	3.82807e-06	0.00123	0.143309	0.000536	0.164769	0.301056	0.576830	0.002
Log likelihood:	-1952.77	-4525.97	-335.858	-1903.32	-3194.86	-1677.94	-3232.75	-3396.39	-3572.94	-2037.75

*p<0.1; **p<0.05; ***p<0.01

Note: Standard errors presented in parentheses. Each lagged row represents the statistical influence of a shift in NGO issue attention on party attention n days later.

Table 2.3. Media Influence on Conservative and Labour Party Issue Attention

	Economy	Immigration	Health	Education	Housing	Welfare	Defense	Crime	Environment	Brexit
Media → Labour Party										
Lag 1 ($t-1$)	0.082	0.057	0.182***	0.165***	0.041*	0.042	-0.020	0.146*	0.168***	0.216***
	(0.078)	(0.075)	(0.039)	(0.056)	(0.025)	(0.050)	(0.097)	(0.076)	(0.059)	(0.072)
Lag 2 ($t-2$)	-0.084	-0.021	-0.005	-0.007	-0.019	-0.023	0.246**	0.173**	-0.131	-0.015
	(0.078)	(0.076)	(0.043)	(0.060)	(0.025)	(0.051)	(0.099)	(0.081)	(0.063)	(0.076)
Lag 3 ($t-3$)	-0.128	0.000	-0.095	0.037	0.015	0.002	-0.015	-0.054	0.006	0.052
	(0.080)	(0.075)	(0.043)	(0.060)	(0.025)	(0.051)	(0.100)	(0.081)	(0.063)	(0.076)
Lag 4 ($t-4$)	-0.001	0.082	0.018	0.023	-0.071	0.077	0.064	-0.092	-0.046	0.043
	(0.080)	(0.076)	(0.043)	(0.060)	(0.025)	(0.051)	(0.100)	(0.081)	(0.063)	(0.076)
Lag 5 ($t-5$)	0.005	0.023	0.087**	-0.057	-0.011	0.039	0.083	0.064	0.085	0.056
	(0.077)	(0.075)	(0.040)	(0.057)	(0.025)	(0.050)	(0.098)	(0.077)	(0.060)	(0.072)
Media → Conservative Party										
Lag 1 ($t-1$)	0.083	-0.008	0.103***	0.147**	0.001	0.094*	0.071	0.199**	0.055	0.269***
	(0.075)	(0.098)	(0.034)	(0.057)	(0.027)	(0.050)	(0.079)	(0.081)	(0.065)	(0.081)
Lag 2 ($t-2$)	-0.252***	0.053	0.008	-0.014	-0.016	0.044	0.054	-0.026	0.041	0.084
	(0.075)	(0.099)	(0.037)	(0.061)	(0.027)	(0.050)	(0.081)	(0.086)	(0.069)	(0.086)
Lag 3 ($t-3$)	-0.098	-0.045	-0.020	-0.042	-0.022	-0.089	0.032	-0.151*	0.102	-0.038
	(0.077)	(0.098)	(0.037)	(0.061)	(0.027)	(0.050)	(0.082)	(0.086)	(0.069)	(0.086)
Lag 4 ($t-4$)	0.160**	0.106	-0.009	-0.060	-0.048	-0.036	-0.027	-0.064	-0.002	0.106
	(0.077)	(0.099)	(0.037)	(0.061)	(0.027)	(0.051)	(0.082)	(0.087)	(0.069)	(0.086)
Lag 5 ($t-5$)	-0.068	0.101	0.038	-0.074	-0.005	-0.018	0.001	0.134	-0.003	-0.120
	(0.075)	(0.098)	(0.034)	(0.058)	(0.027)	(0.050)	(0.080)	(0.083)	(0.066)	(0.081)
Observations	543	543	543	543	543	543	543	543	543	543
BIC:	-5.48928	3.98844	-11.4447	-5.67140	-0.914342	-6.50154	-0.774805	-0.172052	0.478	-5.176
AIC:	-6.51805	2.95967	-12.4735	-6.70018	-1.94312	-7.53031	-1.80358	-1.20083	-0.550575	-6.20503
FPE:	0.001477	19.2986	3.82807e-06	0.00123	0.143309	0.000536	0.164769	0.301056	0.576830	0.002
Log likelihood:	-1952.77	-4525.97	-335.858	-1903.32	-3194.86	-1677.94	-3232.75	-3396.39	-3572.94	-2037.75

*p<0.1; **p<0.05; ***p<0.01

Note: Standard errors presented in parentheses. Each lagged row represents the statistical influence of a shift in media issue attention on party attention n days later.

small, it is important to keep in mind that issue attention is a proportional measurement, which means a simulated ten percent increase is different from a ten percentage-point increase.

There are several takeaways to consider from the IRF plots. First, the media has significant sway over MPs' issue attention. An increase in attention from the media leads not only to a larger increase in attention compared to the other two actors, it also has a considerable cumulative effect, indicating that MPs maintain greater cumulative attention over the days following a spike in media attention. Second, the cumulative effects from a spike in attention from cause groups is comparably less than the other two actors, which is reflected in the statistical results in Table 2.2 as well. MPs are not as responsive to the issue attention of NGOs as they are to corporations and the media. Finally, it is noteworthy that the simulated effect of an increase in attention from FTSE corporations on the issue of crime has a negative effect on MPs' attention over the following days. This indicates that in the case that corporations increase attention to crime, MPs actively ignore this increase by tweeting less about crime.

Fig. 2.2. Simulated Effect of Ten Percent Increase in Issue Attention on Labour and Conservative MPs from the Media, Corporations and NGOs
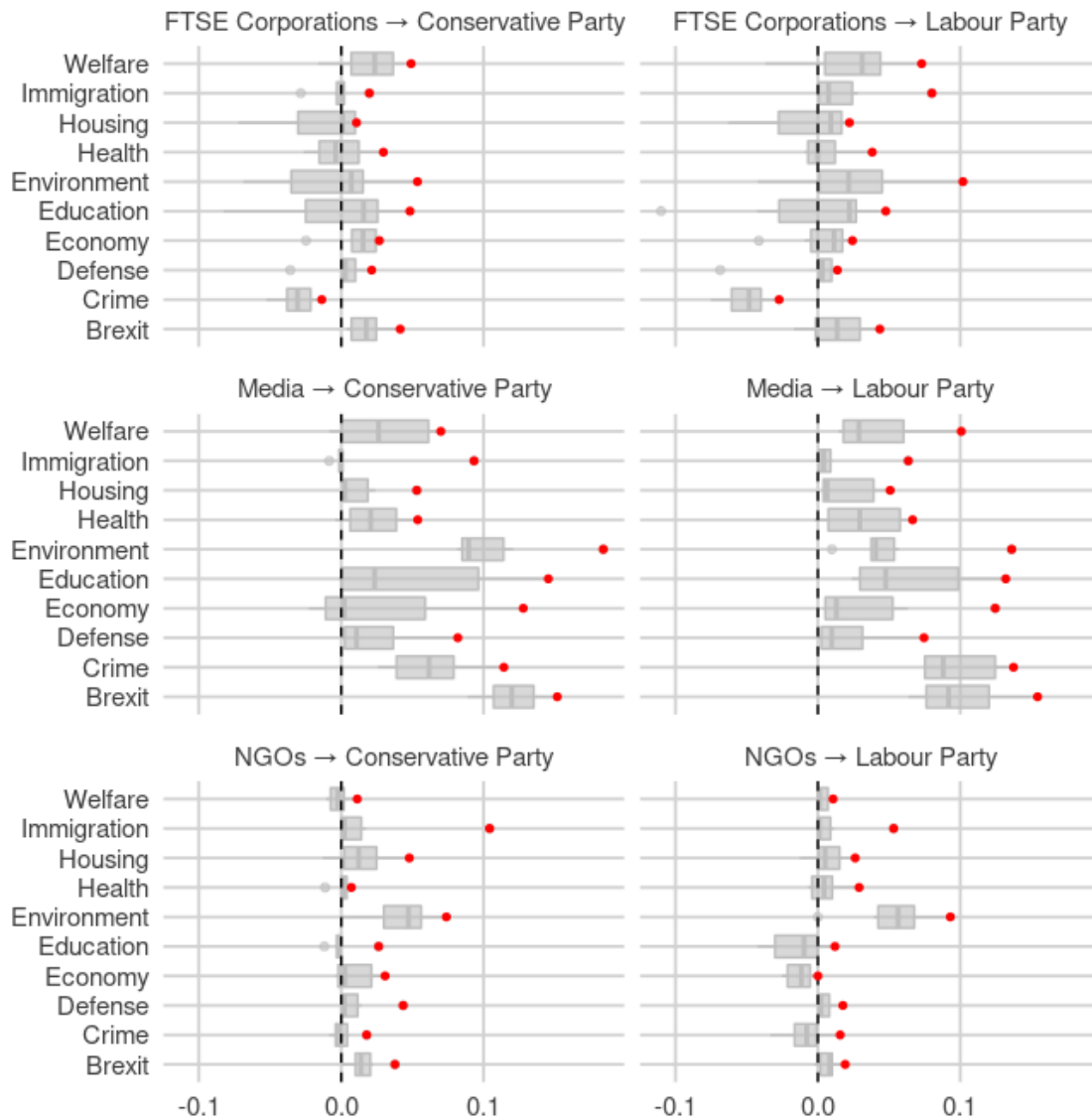
Note: Each boxplot represents the 5-day cumulative effect of actor X on actor Y. The points represent the maximum daily value of the cumulative effect. Keep in mind that IRF plots are simply forecasts based on the fitted linear models – they are not statistical tests of whether one actor leads another actor and are therefore mostly illustrative in that the forecasts do not take into account exogenous factors that may cause shifts in issue attention.

2.5.2   Do any Actors Lead more than they are Led?

In addition to influencing MPs' attention, cause groups, corporations and the media may have an interest in influencing each other. For example, Van Huijstee and Glasbergen (2010) show that NGOs use a number of strategies to influence corporations to adopt various corporate social responsibility (CSR) policies. Strategies can be wide-ranging, from direct confrontation to collaboration, and can target different aspects of the corporation's operations, from the boardroom to the factory floor. Moreover, NGOs have clear incentives to gain the attention of the media, which can amount to mobilizing the public behind a policy (Dür and Mateo 2014).

In a final analysis, I consider the recent proposition made by Gilardi et al. (2022, p. 39) that "no agenda influences the others more than it is led by them." Though the authors only examine the agendas of the media and politicians, I put this proposition to the test using the five actors examined throughout this current analysis. The same equation and VAR models described above are used, and I applied a Granger causality framework (at a p-value threshold of 0.05) to show the influence of one actor on another. Rightward facing arrows denote an effect from one actor on another using Granger causality, which is reported in Table 2.4. We might expect Conservative Party MPs to have the greatest capacity to set the agenda given their positions in the governing party, however, that does not appear to be the case. Conservative Party MPs lead at least one of the other actors on six issues, while Labour Party MPs lead on seven of the ten issues. Additionally, Labour Party MPs lead Conservative Party MPs on more issues than the reverse.

Cause groups also appear to influence the media and corporations on several issues. Here, we see NGOs leading the media on housing, crime and the environment; and leading corporations on health, the economy, defense and the environment. This creates a clear differential in the issues and actors led by NGOs and those same actors' ability to also lead NGOs. However, a likely explanation for this is that many of the charity and cause groups

that make up the measure are focused narrowly on specialized causes, meaning that they are unlikely to adjust their issue attention with the ebbs and flows of issue salience. Considering this, the findings presented in Table 2.4 are mostly inline with the assumptions made in Gilardi et al. (2022) that no actor leads more than they are led, with the caveat of cause groups and their specialized causes.

Table 2.4. Statistically Measurable Agenda Leaders for Given Issues

	Health	Immigration	Economy	Education	Housing	Welfare	Defence	Crime	Environment	Brexit
Labour → Conservatives	→		→	→		→		→		
Conservatives → Labour		→		→						→
Conservatives → Media			→	→		→				→
Labour → Media	→		→	→						
NGOs → Media					→			→	→	
Corporations → Media										→
Conservatives → Corporations					→					→
Labour → Corporations	→				→		→			
Media → Corporations	→			→						→
NGOs → Corporations	→		→				→		→	
Conservatives → NGOs				→		→				
Labour → NGOs	→					→				
Corporations → NGOs		→								
Media → NGOs										

Note: Each rightward facing arrow denotes an effect from actor *X* on actor *Y* that meets the threshold for Granger causality at a p-value of 0.05.

2.6   Discussion and Conclusions

Who has the ability to shape the political agenda holds the keys to power in a democracy. This chapter aimed to test the relative influence of different political actors in the United Kingdom on the political agenda. Using a novel dataset of over two million tweets from

five different political actors, I examined the extent to which the media, political party MPs, corporations and cause groups influence the issue attention of each other. The findings show that the media wields significant control over the attention of MPs, and that corporations have a greater influence on the online attention of MPs than previously expected. Moreover, the findings indicate that cause groups have a limited ability to influence the issue attention of MPs via social media.

There are three key contributions of this chapter. First, the chapter highlights the role of corporations in influencing MPs' issue attention through social media. While it is well-established that corporations and private interests more broadly attempt to influence the issues and the salience of such issue (Bachrach and Baratz 1962; Schattschneider 1960), the extent to which these groups engage on social media in order to achieve strategic political objectives has been under-explored.

Second, the chapter contributes to the literature on agenda setting by examining the relative influence of multiple actors on the political agenda. While several studies have shown that each of the actors examined in this chapter – the media, political parties, interest groups and corporations – have the ability to influence the political agenda, this chapter takes advantage of social media in order to assess the relative influence of each of the actors on a level playing field.

Third, the chapter develops and validates a method for measuring the attention of different actors to different issues. The method is not only accessible and relatively easy to implement, it also performs well in terms of accuracy and precision. The method is also flexible and can likely be applied to other text-based data, including news articles, parliamentary speeches and social media posts.

There are several limitations to this study that are worth considering. First, the use of social media data is not without its drawbacks. While social media data are a useful tool for studying the attention of different actors, the extent to which the issues emphasized by

the various actors studied within this analysis are reflective of their actual political interests is unclear. For example, it is possible that corporations tweet about issues that are not of strategic importance to them in order to appear socially responsible without having strong preferences on the issue. A similar caveat applies to other actors examined.

Second, the analysis is limited to a single country and a relatively short period of time. Although the findings are consistent with previous research on agenda setting, the extent to which the findings generalize to other countries and time periods is unclear. Future research could employ similar methods to examine the relative influence of different actors on politicians' attention in other countries and over longer time periods.

Third, the analysis may miss important variation in the attention of subcategories within each of the distinct groups of political actors in the study. For example, NGOs have different priorities that may contrast with the priorities of other NGOs. Consequently, by grouping different cause groups together to make up "NGO" attention, the influence of each of the separate entities my be diluted. Future studies may benefit from either employing methods that allow for assessing the influence of each different NGO (or subcategory of NGOs), or from examining only a smaller number of different entities.

Chapter 3

Elite Legislators and Unequal Representation in the UK

Studies identifying inequality in political representation in liberal democracies have become increasingly common. Yet, the extent to which this deficit is driven by the social class of elected representatives remains unclear. In this chapter, I study the effects of social class on legislative responsiveness in the United Kingdom by utilizing MPs' attendance at one of the two Oxbridge universities – Oxford and Cambridge – as a multifaceted proxy for social class. After combining 284 repeated public opinion surveys and classifying the universe of MPs' questions and early day motions in the House of Commons, I rely on an IV design and several estimation strategies to examine dynamic responsiveness from individual MPs. The results suggest that social class indeed constrains responsiveness to the public, with Oxbridge MPs lagging their parliamentary peers. The results provide further evidence of unequal responsiveness and contribute to the literature on inequality in political representation.

3.1   Introduction

Since the seminal work of Gilens (2005) and Bartels (2008), both of whom similarly concluded that policy tends to favor the preferences of higher class individuals with much less regard for the preference of the poor, scholars have drawn similar conclusions in democracies around the world (Traber et al. 2022; Elkjaer and Klitgaard 2021; Schakel, Burgoon, and Hakhverdian 2020; Elsässer, Hense, and Schäfer 2018; Flavin and Franko 2017). While many of these studies touch on some of the various potential mechanisms that drive differential responsiveness, there is still a lack of agreement on the factors that lead to differential responsiveness to the public.

One compelling answer suggests that certain voters are disregarded because of a lack of descriptive representation (Carnes and Lupu 2015; Elsässer and Schäfer 2022; O'Grady 2019; Alexiadou 2022). As representatives increasingly come from higher social classes than the members they represent, there is a growing disconnect between the issues taken up in legislatures and the issues that matter to the public. The logic is that an MP's social class plays a key role in how that MP then navigates her representational duties once elected. Many of these studies focus on the occupational backgrounds of MPs, arguing that MPs from certain occupations associated with higher social classes are less likely to represent the interests of working class voters (Carnes 2013; O'Grady 2019; Alexiadou 2022; Carnes and Lupu 2023).

Yet, a focus on MPs' occupational backgrounds may only capture part of the story when examining the ways in which social class shapes legislative behavior. In the UK in particular, class cleavages are deeply entrenched in the social fabric of society (Heath 2015, 2018; Evans and Tilley 2017), and one strong marker of membership in the highest social strata is attendance at one of the two "Oxbridge" universities – Oxford and Cambridge. Oxbridge graduates are not only overrepresented in many of the most sought after positions in British society, they are also overrepresented in the House of Commons, with more than 1 in 5

sharing an Oxbridge background compared to fewer than 1% of the general population (Trust 2019). I argue that three class sorting mechanisms – self-selection, socialization, and value signalling – make Oxbridge attendance a useful proxy for social class in the UK. I then build on existing research that points to the role of MPs' social class as a driver of unequal representation (Alexiadou 2022; Carnes and Lupu 2015; Borwein 2020) by showing that social class – proxied by attendance at one of the two Oxbridge universities – constrains the degree to which MPs represent and respond to the issue priorities of the public.

Throughout the chapter, I rely on a newly created dataset that includes the universe of parliamentary questions and early day motions put forward by MPs in the House of Commons from 2015–2023. After classifying each item according to the issue domain it addresses with machine learning, I pair the longitudinal data with 284 repeated public opinion surveys that ask the national public what they believe to be the most important issue facing the nation. Using a close elections regression discontinuity design (Lee 2008), I first identify a local average "Oxbridge effect" on parliamentary responsiveness to public salience. I then consider the full sample of MPs in the House of Commons to empirically describe the differences in how Oxbridge MPs perform in relation to their parliamentary peers.

The results of Bayesian and frequentist estimation strategies lend strong support for the idea that social class – proxied by an Oxbridge education – contributes to unequal representation of public preferences. In close elections, successful Oxbridge MPs lag their successful non-Oxbridge peers in parliament by nearly 60 percent when it comes to responsiveness to an increase in public salience for a given issue. The responsiveness gap is smaller in magnitude but still present when considering the full sample of MPs in the House of Commons in a secondary analysis. Taken in combination, the results of the chapter thus shed light on the extent to which social class shapes legislative behavior, contributing to literature on descriptive representation in the United Kingdom in several ways.

Building on existing studies that highlight the role of social class as an influence on legislative behavior (Alexiadou 2022; Carnes and Lupu 2015; Borwein 2020), the chapter also takes an important step in the direction of causality by exploiting a source of random variation in the selection of MPs to parliament. The close elections design effectively creates a scenario in which selection of MPs is close to as "as-good-as-random", allowing for more credible claims to be made about the ways in which social class influences representation. The chapter additionally contributes empirically by taking into consideration a wide range of issues, multiple outcomes and hundreds of repeated public opinion surveys. When combined, the data used throughout the analysis provide a dynamic understanding of the ways in which parliamentarians respond to the issue priorities of the electorate, allowing for a nuanced portrait of dynamic representation.

The rest of the chapter proceeds as follows. The next section reviews current understandings of unequal responsiveness and highlights the suggested underlying mechanisms. I then describe the UK case and outline theoretical expectations for the ways in which social class conditions representation. The third section provides the research design and methods, and is followed by the results section. The final section offers a discussion and concludes.

3.2 Unequal Responsiveness

Legislative responsiveness to the interests of the public is a hallmark of representative democracy. The representation relationship includes voters, treated as political equals, who select individuals to act on their interests in government. Because it is the public that ultimately decides on the electoral fate of representatives, legislators are incentivized to respond to and represent the dynamic interests of their constituents (Powell Jr. 2000; Dahl 1971; Stimson, MacKuen, and Erikson 1995). Though responsiveness between representatives and the public is not perfect, a number of studies conclude that representatives are indeed responsive to the public's concerns to at least some extent (Gilens 2012; Enns 2015). Within many studies, it

is often assumed that the main recipient of legislative responsiveness is the median voter, as representatives in two-party systems seeking to benefit electorally from responding to the electorate aim to target the greatest number of voters (Downs 1957).

Yet, a growing number of studies investigating representation have shown that responsiveness depends on voters' affluence or wealth (Gilens 2005; Bartels 2008). This research was first highlighted by Gilens (2005), who used nearly 2,000 survey responses from American voters spanning two decades to show that the likelihood that government enacts specific policies is greatest when the policies are preferred by the wealthy. Gilens highlighted a strong status quo bias and admitted that preferences between the wealthy and the poor were rarely at odds, but he concluded that in the case that differences in preferences did indeed exist, government policy appeared to respond to the wealthy while lacking any meaningful association with the desires of the poor.

Although Gilens' 2005 findings were limited to the United States, similar patterns of unequal representation have since been identified in other wealthy democracies (Lupu and Tirado Castro 2022; Mathisen et al. 2021). For example, Traber et al. (2022) examine the impact of public issue priorities on bill proposals in the United Kingdom, Germany and Spain, and find that higher status voters have a greater impact than lower status voters. Focusing on the Netherlands, Schakel (2021) finds that policy representation is much stronger for higher income earners in relation to middle and lower income earners. Moreover, not even the notoriously egalitarian Scandinavian democracies are free from representation asymmetries; Elkjær (2020) observes greater policy responsiveness to the preferences of the affluent in Denmark as well.[1]

Despite several studies presenting strong evidence for unequal responsiveness, the mechanisms remain elusive. Of the existent explanations, there are supply and demand side propositions. One of the popular demand-side explanations in the US is the idea that eco-

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1. To be clear, Elkjær (2020) argues that differential representation is coincidental and the result of information asymmetries rather that representational inequality.

nomic inequality begets participatory inequality (Bartels 2008; Gilens 2012; Schlozman, Verba, and Brady 2012). This hypothesis follows the idea that the concerns of the wealthy gain more attention from government because of the political influence associated with wealth and the ability to donate large sums of money to parties, candidates and interest organizations. In the US, congressional elections are multi-million dollar ventures (Responsive Politics 2018). Consequently, the vast majority of legislators are themselves wealthy and are disproportionately funded by other wealthy individuals in society (Gilens 2015). It is through such outsized campaign contributions, as well as donations to pro-business lobby groups, that affluent individuals effectively "buy" increased attention to their problems (Traber et al. 2022; Gilens 2015).

Yet, while money undoubtedly plays a role in electoral politics in the US where campaign donations are equated with "speech" and campaigns cost millions, campaign finance laws are more restrictive in many other Western democracies and average campaign costs often pale in comparison. In the same vein, the level of economic inequality in the US stands in stark contrast to other Western democracies as well, leaving the question of why similar patterns of unequal representation exist in more equal societies such as the Netherlands (Schakel 2021), Denmark (Elsässer, Hense, and Schäfer 2018) and Spain (Lupu and Tirado Castro 2022). One alternative explanation for unequal representation highlights the composition of the parliament itself. Specifically, descriptive representation – or the lack thereof – of specific segments of the electorate such as the working class can play a crucial role in the degree to which representatives take up and respond to the public's preferences (Elsässer and Schäfer 2022; Carnes and Lupu 2023; Alexiadou 2022).

Central to explanations that focus on the composition of parliament is the idea that the backgrounds of representatives shape the extent to which they equally represent the varied preferences of different groups in society. At the heart of such explanations is social class, which is often proxied by occupation prior to entering politics (Carnes 2013;

Elsässer and Schäfer 2022; O'Grady 2019; Alexiadou 2022). For example, Alexiadou (2022) points to the class composition of government cabinet ministers and shows that responsiveness to working class preferences varies by the professional background of cabinet ministers. Cabinets with a greater proportion of ministers with working class backgrounds are associated with an increase in welfare generosity, while cabinet ministers from liberal professional occupations are consistently associated with cuts in welfare spending. Similarly, O'Grady (2019) highlights the role of MPs' backgrounds while arguing that career politicians face incentives that distinguish them from representatives with working class backgrounds. Whereas career politicians are motivated by winning elections and furthering their careers in politics, working class representatives enter politics with the ambition of improving things for the populations with which they share a common background.

3.2.1   Oxbridge and the UK Case

In the United Kingdom, one of the pinnacles of elite status and social class is symbolically portrayed through attendance at one of the two "Oxbridge" institutions: Oxford and Cambridge. Warikoo and Fuhr (2014, p. 700) argue that "[T]he notion of an Oxbridge graduate's intellectual qualities and qualifications for leadership in society extend well beyond the campus walls to the larger society, and hence matriculation symbolically endows students with membership in that high status group." Consequently, with an Oxbridge education often comes an exclusive invitation into some of the highest strata of society, as Oxbridge graduates often go on to disproportionately dominate in some of the most sought-after roles as CEOs, national politicians and media executives (Trust 2019).

There are several aspects of an Oxbridge education that position attendees as more likely to be members of a higher social strata and therefore make Oxbridge attendance a multifaceted proxy for social class. An initial class sorting mechanism is selection into Oxbridge. The selection process is highly competitive, with only about 1 in 6 applicants

receiving an offer of admission.[2] The selection process is also skewed toward applicants from higher social classes. For example, as of 2019, 39% of Oxbridge students had attended private schools, which represents more than five times the population of private school attendees in the UK population (Trust 2019). Moreover, student applicants are conscious of the class sorting that occurs during the selection process, and therefore may be less likely to apply to Oxbridge if they are from a lower social class. Several studies find that "self-exclusion" plays a role in whether students from working class or other minority backgrounds apply to Oxbridge in the first place (Shiner and Noden 2015; Stubbs and Murphy 2020; Warikoo and Fuhr 2014). Consequently, selection into Oxbridge serves as a first stage class sorting mechanism by narrowing the pool of potential future Oxbridge graduates to those who are more likely to be privately educated, academically endowed and already possessing some sense of belonging with a higher social strata.

The role of education as a socialization process is well documented (Bourdieu and Passeron 1977; Nie, Junn, and Stehlik-Barry 1996; Lipset and Bendix 1991). For example, Nie, Junn, and Stehlik-Barry (1996, p. 2) go as far as arguing that one of the most formative socialization processes occurs in the classroom through formal education, which the authors describe as "the strongest factor influencing what citizens do in politics and how they think about politics." Beyond the quality of education, however, socialization *at* Oxbridge serves as a second stage class sorting mechanism by acclimating students to the norms and values of members from higher social classes. In addition to the curriculum itself and education more generally, Oxbridge students are socialized through social rituals and institutional traditions within the colleges. Studies focusing specifically on the Oxbridge experience point to customs and protocols such as formal dining traditions and other organizational rituals that serve as important socializing experiences for students at Oxbridge colleges (Di Domenico and Phillips 2009; Dacin, Munir, and Tracey 2010). For example, ethnographic work from

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2. Author's calculation based on information from each of the University websites in 2022. Cambridge gives the estimate of "1 in 6" and Oxford admitted 9,300 of 61,000 applicants.

Di Domenico and Phillips (2009) highlights the ways in which "formal hall" dining rituals at Oxford and Cambridge colleges perpetuate social hierarchy and maintain social status divisions. These rituals are important because they serve to create a shared understanding and class consciousness among students at Oxbridge. They also serve to reinforce the idea that Oxbridge students are part of an elite group that is set apart from the rest of society (Reay, David, and Ball 2005).

A third mechanism of class sorting occurs beyond both the classroom and the college campus. With a degree from one of the two Oxbridge academies, graduates signal that they possess the skills and abilities that are valued by prestigious institutions around the world. This signalling value is important because it is the basis for the social and economic returns that Oxbridge graduates receive from their degree. At nearly every stage of the life course, Oxbridge graduates are rewarded for their elite status. According to a 2019 study by *The Sutton Trust*, Oxbridge graduates are overrepresented in the highest paying professions, such as law, tech, medicine and finance. Compared to fewer than 1% of the UK population that graduates from an Oxbridge university, 71% of the UK's top judges, 56% of Permanent Secretaries in Whitehall, 51% of Diplomats and 40% of Public Body Chairs are Oxbridge graduates. In elected politics, over half of the current Cabinet and a third of junior ministers are Oxbridge educated (The Sutton Trust 2022). The House of Lords also has a disproportionate number of Oxbridge graduates, with more than one in three Lords having attended Oxbridge (Trust 2019). And since WWII, only a single Prime Minister – Gordon Brown – did *not* attend Oxford specifically. Consequently, it is therefore perhaps an understatement to say that Oxbridge graduates are overrepresented in elite positions in the UK.

Each of the three mechanisms of class sorting – self-selection, socialization, and value signalling – work together to reinforce a class system in which an Oxbridge education epitomizes the highest social strata in Britain. This class system is self-perpetuating because

Oxbridge graduates go on to serve as elected parliamentarians, judges, and in other high-status occupations. In turn, these Oxbridge graduates are responsible for making decisions that affect the rest of society. Despite potential normative considerations, Oxbridge makes for an ideal proxy for social class in the UK because attendance encompasses so many characteristics of social class that are not likely to be captured by occupation or income alone.

3.2.2 Social Class and Political Representation

Does it matter if representatives are of a higher social class than the individuals they represent? Extant research on the relationship between social class and political representation suggests that it does (Carnes 2012; O'Grady 2019; Alexiadou 2022; Borwein 2020). For example, Carnes (2012) finds that members of the US Congress are disproportionately drawn from the upper class, and that this class bias leads to a lack of substantive representation of the interests of the working class. Similarly, Alexiadou (2022) shows that parliamentary cabinets consisting of individuals from higher social classes results in lower welfare generosity. The author finds that responsiveness to lower class voters varies according to the class associations of MPs, with cabinets comprised of members from higher social class backgrounds less responsive.

There are three ways a class gap between representatives and the represented may contribute to unequal representation. First, elites may be unfamiliar with—or at least lack an adequate understanding of—public preferences. This may be because elites are less likely to share similar experiences with individuals of a lower social classes, and therefore may be less likely to understand the issues that matter to these groups. Previous research suggests that perceptions of the world are shaped by social class (Easterbrook, Kuppens, and Manstead 2016; Manstead 2018). For example, Manstead (2018) argues that working class individuals tend to score higher on measures of empathy and demonstrate a greater

willingness to help others in need. In contrast, individuals from higher social classes tend to be more individualistic and less empathetic. Therefore, even well-intentioned elites from higher social class backgrounds may be constrained in their ability to represent the interests of the public because they lack the necessary information to do so.

Second, elites may simply hold different preferences from members of lower social class groups when they enter parliament, and therefore may pursue policies that reflect these preferences regardless of public opinion. For example, political economy models suggest that preferences for redistributive welfare policies are associated with income (Meltzer and Richard 1981). Given strong associations between social class and income, representatives from higher social classes may be less supportive of specific policies such as redistributive policies that tend to be more popular with members of a lower social class (Guillaud 2013). Unequal representation in this scenario therefore can be the result of MPs pursuing certain policies irrespective of the preferences of the public.

Third, social class may contribute to unequal representation when elites discount the opinions of constituents from lower social classes. A number of studies show that representatives are more likely to respond to the preferences of constituents with whom they agree (Walgrave et al. 2022; Broockman and Skovron 2018; Pereira and Öhberg 2020). One reason for this is that representatives are more likely to believe that constituents with whom they agree are better informed on political issues (Broockman and Skovron 2018). With this in mind, elites from higher social classes may to be less responsive because they attribute less weight to the preferences of lower class voters.

A similar logic is articulated by Pereira and Öhberg (2020), who show that elites are less responsive when they perceive higher personal expertise than their constituents. The authors find that inducing perceptions of expertise further increases elites' self-confidence, which in turn makes them more resistent to the idea that the public may hold preferences that differ from their own. Consequently, to the extent that elites from higher social classes believe

that they are more competent than the public – a belief that may be more common in elites from higher social class backgrounds and among Oxbridge graduates in particular – they may discount the preferences of the public in exchange for either their personal preferences or the preferences of individuals with whom they share a common class background.

Each of three articulated mechanisms may act individually or combine to constrain the degree to which elites from higher social classes represent the interests of the public. Whether a result of not knowing, not caring or not believing, elites from a higher social class are likely to lag their parliamentary peers as a result of their class backgrounds. This expectation is formalized in the following hypothesis:

> *Hypothesis 1: Oxbridge MPs are less responsive to public preferences.*

3.3   Research Design

Isolating the influence of politicians' personal characteristics is a challenging task given that many attributes as encompassing as education and class are endogenous to many other aspects of legislative behavior. The ideal experiment to test whether Oxbridge MPs respond to public preferences differently would be to randomize the assignment of Oxbridge and non-Oxbridge MPs to parliament and observe their behavior. This is obviously not possible, but an alternative includes similarly exploiting a source of exogenous variation in the selection of MPs to parliament. One way this can be accomplished is through a close-election regression discontinuity design (Imbens and Lemieux 2008; Cattaneo and Titiunik 2022; Lee 2008). The design, also commonly referred to as a politician characteristic regression discontinuity (PCRD) design (Marshall 2022), exploits close elections as an instrument in order to identify the effects of candidates' personal characteristics once elected. The intuition behind this strategy is that extremely close elections effectively create a scenario in which the outcome is close to as-good-as random (Lee 2008; Cattaneo and Titiunik 2022). Therefore, when

comparing only elections in which an Oxbridge MP faces off with a non-Oxbridge MP in a close election, the non-Oxbridge winners create a counterfactual outcome against which the behavior of the electorally successful Oxbridge candidates can be compared. Similar designs have been used to study the effects of other personal characteristics of politicians such as gender (Nzabonimpa 2023; Broockman 2014; Daniele, Dipoppa, and Pulejo 2023), college education levels (Sørensen 2023) and public sector employment (Geys, Murdoch, and Sørensen 2023).

PCRD designs are particularly well-suited for studying the effects of personal characteristics on legislative behavior because they allow for the recovery of a local average effect. However, PCRD designs are not without their limitations. Despite high levels of internal validity (Lee 2008), PCRD designs are only able to identify the effects of personal characteristics on legislative behavior for politicians who are elected by a close margin, which narrows the possible sample size of the analysis and limits the generalizability of the results. One way I address this concern is by adopting two separate estimation strategies, with one relying on a subset of the data that only includes close elections and the other relying on regressions using the full sample of MPs in the House of Commons.

An additional concern with PCRD designs arises when a personal characteristic is correlated with the margin of victory (Marshall 2022). In this case, the design identifies a compound treatment effect (e.g. the effect of the characteristic as a *condition* of being elected) rather than a local average treatment effect (LATE). This concern is warranted in cases in which characteristics such as gender or party affiliation are the focus; however, there is reason to believe that where an MP receives her degree is not as likely to be as salient of a factor for voters. Previous studies suggest that voter evaluations are driven by candidates' issue positions more than by identity concerns or social characteristics (Arnesen, Duell, and Johannesson 2019; Costa 2021).[3] Furthermore, I show that Oxbridge-educated members do not differ in other observable characteristics such as party affiliation and gender from other

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3. Although see Heath (2015) for an alternative perspective.

members elected in close elections. Balance between the two groups using the PCRD design is presented in Appendix B.4.

The key assumption that must be met in order to identify a local average effect of Oxbridge education on legislative behavior is that at the cutoff point, winners of close elections are as-good-as random (Cattaneo and Titiunik 2022). This requires that candidates in close elections must not be able to control the electoral outcome. This assumption is likely to be met barring electoral fraud or other forms of strategic manipulation, and winners of close elections are commonly used in similar designs (Dinas and Foos 2017; Valentim and Dinas 2020; Abou-Chadi and Krause 2020).

3.3.1 Dynamic Issue Responsiveness

Throughout the analysis, I focus on a specific element of substantive representation: dynamic responsiveness to public issue salience. I focus on dynamic responsiveness for two reasons. First, voters place a high value on responsiveness, and previous studies find that voters associate politicians' emphasis of their issue priorities with satisfaction with democracy (Reher 2016). Second, responsiveness to shifts in public salience is often the first indication that representatives are acting on the behalf of their constituents (Baumgartner and Jones 2010). As previous findings suggest that representational inequality may be "infused earlier in the policymaking process at the agenda-setting stage" (Flavin and Franko 2017, p. 659), focusing on the degree to which representatives shift their attention in line with the public's issue priorities may provide an early indication of representational inequality.

To understand dynamic responsiveness to public issue salience, data on both the issues prioritized by the public and the issue attention of representatives are required. To capture issue salience, I rely on repeated surveys from YouGov (2021) asking respondents to identify the most important issue facing the country. Although "most important issue" surveys are not without their limitations (Wlezien 2005; Dennison 2019), they are widely used to measure

issue salience in the literature on public opinion and political behavior (Soroka and Wlezien 2010; Klüver and Spoon 2016; Yildirim 2022; Traber et al. 2022). Moreover, given that the surveys are fielded nearly once a week, combining the surveys ensures that the analysis captures changes in public salience rather than absolute levels of salience at a given point in time.

Past studies have assessed the representation quality of MPs by examining individual parliamentary contributions such as questions (Saalfeld 2014). I therefore considered two separate but similarly individual level outcomes to assess responsiveness to public salience. First, I consider questions delivered in the House of Commons. Written and oral questions are a common form of parliamentary scrutiny in which MPs ask the government for information on a specific issue. MPs can ask questions to any government department and the government is required to respond within a certain time frame. Questions are a useful measure of parliamentary behavior because they are a common form of scrutiny that is available to all MPs – government MPs and opposition MPs alike. Whereas opposition MPs may use questions to raise the government's attention to certain issues, government MPs can use questions to share information on the government's actions with the public and with other members of the House, both of which indicate an MP's attention to a given issue.

Second, I consider Early Day Motions (EDMs). EDMs are used to put on-record a member's views on a particular issue. Members raise EDMs in order to raise attention to a given issue and to propose further debate on the issue. Although only a small number of EDMs are taken up for formal debate, members often propose hundreds of EDMs and sign on to many more. Moreover, even in the case that EDMs are not taken up for debate, they are a useful measure of parliamentary behavior because they are a common means by which members demonstrate their interests and priorities, and can often receive further media and public attention (Hansard 2021).

Importantly, both questions and motions are dynamic and organic. MPs can raise questions and motions on any issue at any time, and the issues that MPs choose to raise are therefore a reflection of their own priorities. Moreover, the issues that MPs choose to raise are not limited to the issues that are currently being debated in the House of Commons. Consequently, questions and motions are a useful measure of the issues that MPs prioritize in their parliamentary duties.

3.3.2   Data Collection and Measurement

The analysis focuses on the House of Commons, which is the primary legislative body in the United Kingdom. The House of Commons is comprised of 650 members elected from single-member districts using a first-past-the-post electoral system. In both estimation strategies, the time period includes 2015–2023. This time period includes three UK Elections – 2015, 2017 and 2019 – and these elections present the most recent UK elections while allowing for three occasions on which the PRCD design can be applied.

Measuring Public Issue Salience

To measure public salience, I rely on repeated surveys asking the national public what they believe to be the most important issue facing the nation. These nationally representative, high-quality surveys are available approximately every week from 2015–current from YouGov (2021). In the surveys, respondents select up to three issues out of 14 that they perceive to be a top political priority.

From the time of the 2015 General Election until the end of 2022, YouGov fielded 284 separate surveys asking respondents to identify the most important issue facing the country. I combined each separate survey to measure the salience of a different issues using the percentage of the population that selected an issue as the most important issue facing the country. For example, if 18% of respondents identify immigration as the most important

issue, then the level of salience for immigration at the point of that survey is 18%. This measurement is similarly used in other studies of responsiveness using similar surveys (Traber et al. 2022; Klüver and Spoon 2016). Figure 3.1 presents the results of combining each of the surveys from 2015-2023 to each issue using the 3-month moving average.

Fig. 3.1. Dynamic Public Issue Salience
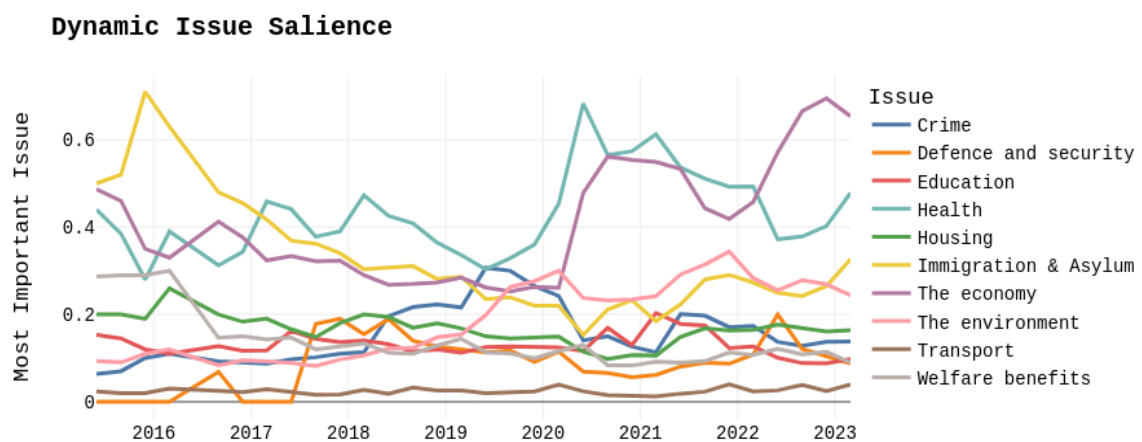
Note: Values are presented as a three-month moving average. Respondents select up to three different issues so issue total do not sum to 1. Descriptive statistics are provided in Appendix B.3. Data source: YouGov (2021).

Measuring Parliamentary Behavior

To measure the levels of attention MPs devote to different issues in the House of Commons, I rely on two separate measures of parliamentary behavior: questions and Early Day Motions (EDMs). All parliamentary data were collected from the UK Parliament API, which includes all questions and EDMs raised in the House of Commons from 2015–2023 by all elected MPs, as well as election statistics.

Each of the questions and EDMs address a specific issue and therefore signals the MP's attention to that issue. For example, the following question from Steve Baker in 2021 addresses the issue of health:

> To ask the Secretary of State for Health and Social Care, with reference to the Royal College of Physicians' position statement, NHS Workforce Planning: the case for transparency and accountability, what steps he is taking to increase the number of places.

Although taking a different form, EDMs similarly address a specific issue. The title of a motion is often just a single sentence. For example, Karen Buck raised a motion titled as follows in 2018 that addresses immigration:

Independent Review of Home Office Immigration Policy and Practice

For classification of each of the questions and EDMs, I relied on a large language model trained to predict the issues of political text (Dickson 2023). The language model is based on the BERT transformers architecture (Devlin et al. 2018) and trained on a large corpus of over 100,000 political texts in various languages that have been annotated with policy issues by the Comparative Agendas Project (CAP 2023). I validated the model's accuracy for the task at hand by comparing the model's predictions to an annotated sample of 1,000 questions and 1,000 EDMs. The model achieves a weighted F1 score of 0.78 for the questions data and 0.69 for the EDM data, placing it in line with other similar methods (Gilardi et al. 2022). Full results of the validation, including multi-label confusion matrices, are presented in Appendix B.5 and Appendix B.6.

Data from the Questions and EDMs are combined with the public issue salience data by merging on date and issue for each MP. Because the questions and issues data are coded according to the Comparative Agendas Codebook, I match only on issues for which public opinion data are available. The exception to this is on the issue of the economy. CAP

identifies both "macroeconomics" and "domestic commerce", which I combine and map to "The economy" given the similarity. The final full dataset includes 621 MPs[4] with 182,838 questions and 74,072 EDMs. The issue composition of questions and EDMs is presented below in Figure 3.2, and descriptive statistics for the data are presented in Appendix B.1 and Appendix B.2.

Fig. 3.2. Issue Composition of Questions and EDMs
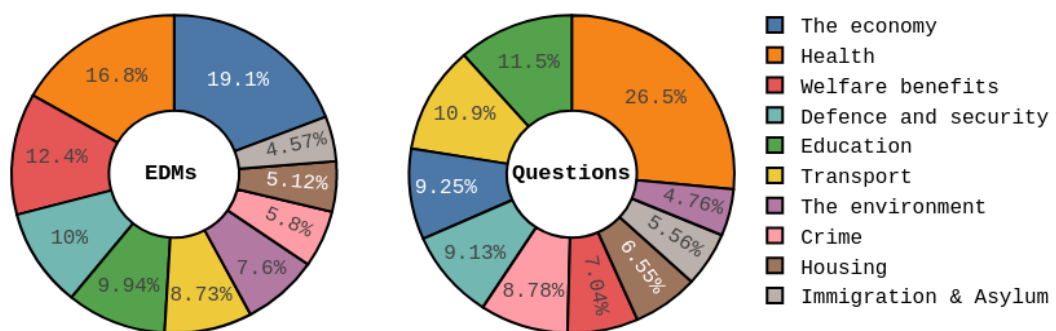
Note: Issue composition figures include only questions and EDMs that address policies for which public opinion data are available.

MPs' Social Class Backgrounds

As argued throughout, Oxbridge captures many aspects of social class. I use attendance at one of the two Oxbridge universities – Cambridge and Oxford – as a proxy for MPs' social class background. Data on MPs' education backgrounds were collected primarily from three

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4. MPs who did not ask a single question or put forward a single motion are not included in the analysis.

sources: the Wikidata API (Vrandečić and Krötzsch 2014), the LinkedIn API (*LinkedIn API*) and MPs' personal websites.

Estimation Strategy

Responsiveness is conceptualized as a change in the level of prioritization the public places on an issue that is followed by a change in the level of attention parliamentarians devote to that issue via questions or motions. Therefore, responsiveness is measured as the statistical "effect" of public issue salience on corresponding parliamentary behavior. I rely on two separate estimation strategies to examine the degree to which MPs use motions or questions to respond to public issue salience.

In the first strategy, I estimate the effect of public issue salience on parliamentary behavior using the PCRD design. In these estimations, I focus only on elections in which one of the top-two candidates in a given constituency received their degree from Oxford or Cambridge and the other did not. As with other PCRD designs, I do not include elections in which both candidates are Oxbridge educated or neither candidate was Oxbridge educated. I consider close elections as elections in which the top-two candidates' total number of votes places each candidate within the 40–60 percent margin. For example, if the top-two candidates receive a combined total of 10,000 votes, each of the two candidates must receive between 4,000 and 6,000 votes in order for the election to be considered close. This narrows the dataset to 148 separate elections,[5] which is a limitation of the analysis. However, I also consider the full sample of MPs during the same time period as a secondary strategy.

Because there are multiple observations for each MP and according to each issue domain, fixed effects regressions would not be the most appropriate. Therefore, for estimation, I rely on a Bayesian hierarchical model with random intercepts for MP and issue domain. This follows the logic that each individual observation – either a question or an EDM – pertains to a specific issue, and each of the ten separate issues within which observations are nested

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5. Balance statistics for the MPs of these elections are presented in Appendix B.4.

correspond to a specific representative. Using a Poisson likelihood, I estimate the following model:

$$Y_{i,j,t} \sim \text{Poisson}(\lambda_n)$$

$$
\begin{aligned}
\log(\lambda_n) = &\alpha_{MP[i]} + \alpha_{IssueDomain[j]} + \\
&Oxbridge_{[i]} + PublicIssueSalience_{[j,t]} + f(ElectoralMargin_{[i,t]}) \\
&\theta Oxbridge_{[i]} \times PublicIssueSalience_{[j,t]}
\end{aligned}
\quad (3.1)
$$

Where $Y_{i,j,t}$ is the number of questions or motions for MP i about issue j at time t. $\alpha_{MP[i]}$ is the MP specific intercept and $\alpha_{IssueDomain[j]}$ is the issue specific intercept. *Oxbridge* is a binary variable that is one in the case that the MP attended Oxford or Cambridge and zero in all other cases. *PublicIssueSalience* is the level of salience attributed to each issue by the public. $f(ElectoralMargin)$ is electoral margin, which is the difference in vote share between the top two candidates in a given election. The function is a quadratic piecewise polynomial, which is common in PCRD designs (Lee 2008). The coefficient of interest is θ, which captures the interaction between Oxbridge education and public issue salience. Theta (θ) can be interpreted as the marginal effect of Oxbridge on the logs of the expected number of questions/motions in response to a 1 percentage point increase in the salience of an issue according to the public.

For all estimations, I use minimally informative priors (see Appendix B.8). All models are estimated using the PyMC3 library in Python (Salvatier, Wiecki, and Fonnesbeck 2016), which relies on No-U-Turn Sampling (NUTS) (Hoffman and Gelman 2014). Full details of the model and its assumptions are provided in Appendix B.8.[6]

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6. I also provide estimates for all models using frequentist methods in the appendices for comparison. The point estimates and substantive results are very similar and are available in the appendix sections highlighted throughout the results section within the text.

3.4   Results

I first consider the degree to which MPs are responsive to public issue salience in a general sense. Specifically, I estimate regressions without the interaction between MPs' education background and public salience in order to provide a sense of the overall relationship between public issue salience and parliamentary behavior. Figure 3.3 displays the posterior estimates with 94% credible intervals for the effect of public issue salience on MPs' issue attention in parliament. In the models, there is a random intercept for issue domain. Each of the two sets of coefficient estimates are from two respective models, and each of the four separate coefficient estimates for each model are derived for an MCMC chain. The full table results for the models are available in Appendix B.7.[7]

The estimates indicate that changes in public salience explain variation in the issues that MPs address via parliamentary questions and early day motions. In other words, MPs are responsive to public issue salience in a broad sense. There is some indication that MPs are more responsive to public issue salience via questions than via EDMs, but the difference is small.

To interpret the estimates in substantive terms, we have to reverse the log transformation. This is done by exponentiating the coefficients and then multiplying the result by the mean of the outcome variable. For example, the mean number of questions and motions for all issues per time period is about 0.43 and 0.17, respectively (see Appendix B.2). Therefore, the expected value of questions and motions in response to a one percentage point change in salience is approximately 1.42 questions ($e^{1.2} \times 0.43$) and 0.49 motions ($e^{1.05} \times 0.17$). Taken together, the estimates provide a strong indication that the issues that are important to the public similarly receive attention from MPs in parliament.

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7. Frequentist estimates are provided in Appendix B.11.

Fig. 3.3. Parliamentary Responsiveness to Public Issue Salience
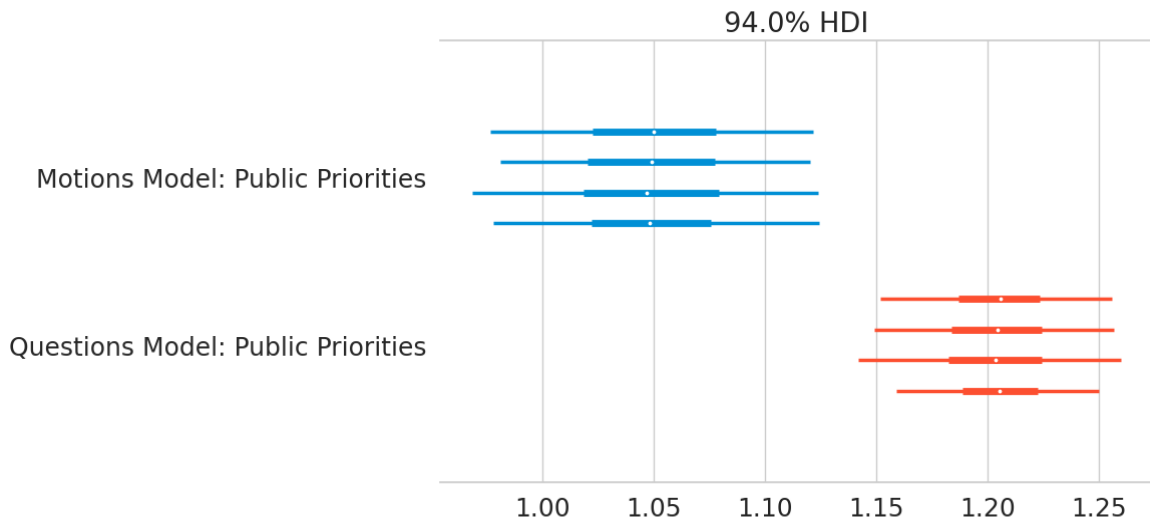
Note: 94% Highest Density Interval for the effect of public salience on motions and questions. Models use random intercepts for issue domain. Each model uses 1,000 samples from the posterior distributions in addition to tuning with the first 500 samples. Full results in table form are available in Appendix B.7.

3.4.1   Responsiveness in Close Elections

Using the PCRD design that uses a narrow subset of MPs who were elected by a close margin in one of the three UK elections examined, I estimate two hierarchical models: one for each of the two outcomes. I present the results in several ways. Figure 3.4 presents the posterior distributions of the coefficients of interest: the interaction between Oxbridge and public issue salience. The figure contains the results from both models, and includes the estimated samples from the posterior, as well as the mean and standard deviation. I additionally present the results in table format in Appendix B.9. MCMC chains and plot traces are also available in Appendix B.9.

From the posterior distributions in Figure 3.4, we can see that the coefficient of interest – the interaction between Oxbridge and public issue salience – is negative in both models. Interestingly, the point estimates from the two models are very similar, however, there is

Fig. 3.4. Close Elections: Responsiveness to Public Salience from Oxbridge MPs
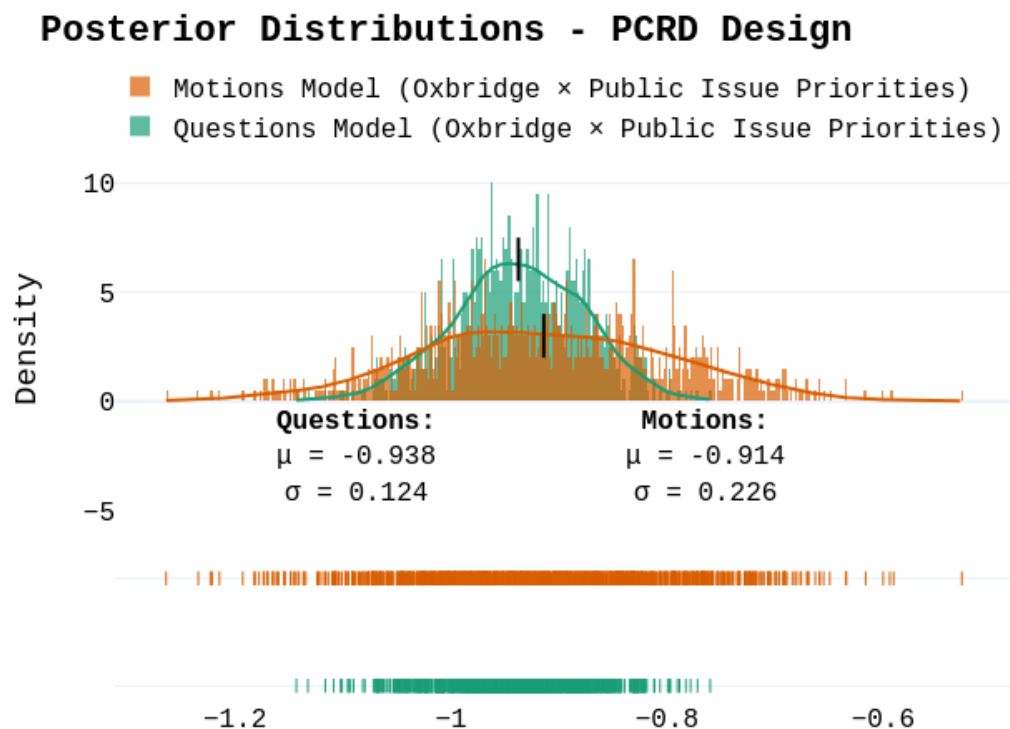
Note: Posterior samples from interaction between Oxbridge MP and public issue salience. Full results in table form are available in Appendix B.9.

more variation in motions estimate in relation to questions. The estimates indicate a marginal difference between Oxbridge and non-Oxbridge MPs of nearly 1 in the rate ratio for both questions and motions in response to a one percentage point change in the importance of an issue according to the public.

To understand the marginal effect in substantive terms, the estimates have to be exponentiated and multiplied by the mean of the outcome variable. The mean number of questions per MP in the PCRD dataset is about 0.40 and about 0.09 motions (Appendix B.1). Therefore, the marginal effect of Oxbridge on responsiveness to a one percentage point increase in the

salience of an issue is approximately 0.25 fewer questions and about 0.05 fewer motions. In other words, the expected value of questions and motions from Oxbridge MPs is 0.15 ($e^{-0.93}$) and 0.04 ($e^{-0.91}$). This difference is not trivial, and suggests that the expected number of questions and motions from an Oxbridge MP is approximately 60% lower ($e^{\theta} = 0.4$) than the expected number of questions or motions from a non-Oxbridge MP.[8] Taken together, the estimates suggest that Oxbridge MPs are less responsive to public issue salience compared to non-Oxbridge MPs.

3.4.2   Responsiveness by all MPs

The results thus far suggest that Oxbridge MPs lag their peers in Parliament when it comes to responding to public issue salience via EDMs and Questions. Yet, these findings are specific to MPs in close elections, which may cast too narrow of a net when examining differential responsiveness to public salience more broadly. Consequently, I now consider the degree to which differences between the two groups occur across all MPs in Parliament rather than just in close elections. Although the results are not causally identified, they provide descriptive evidence of the differences between the two groups of MPs when considering the entire House of Commons.

I use a similar model specification to estimate responsiveness for the entire sample. The model differs in that the polynomial functions for the margin of victory are no longer included, and I also condition on party affiliation, incumbency and gender as control variables. Following the same format as the close elections results, Figure 3.5 presents the posterior samples from the interaction between Oxbridge MPs and public issue salience. The full results are similarly presented in Appendix B.10.

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8. Marginal effect calculation in percentage terms includes subtracting 1 from the exponentiated coefficient and multiplying it by 100 (i.e. $(e^{\theta} - 1) \times 100$). The credible interval indicates that 94% of the samples fall between -1.32 and -0.46 in the motions model. In the questions models, the credible interval indicates a range of -1.17 and -0.69 (see Appendix B.9 for full results).

In the questions model, the interaction estimate suggests that Oxbridge MPs lag their peers by nearly 49 percent in responding to the electorate's issue salience. All samples fall below -0.5, and the credible interval indicates that posterior samples within two standard deviations of the point estimate fall between -0.7 and -0.6.

In the motions model, the interaction estimate suggests that Oxbridge MPs lag their peers by approximately 10% in motions for a one percentage point change in the importance of an issue according to the public. Yet, differing from the questions estimates, all samples *do not* fall below zero, indicating that the difference between the two groups is not differentiable from zero at conventional levels (94% credible interval: -0.260–0.047). Nonetheless, the results similarly indicate that a difference exists, but that it is much smaller than the difference in the questions model. The full results for both models, including priors and regression tables, are provided in Appendix B.10.

In substantive terms, the estimates amount to a difference of approximately 0.22 fewer questions ($questions_\mu = 0.43$) and 0.02 fewer motions ($motions_\mu = .17$) from Oxbridge MPs in response to a 1 percentage point increase in public issue salience. Taken in full, the results presented lend additional support for the hypothesized expectation that representatives' social class acts as a constraint on responsiveness to the public.

3.4.3 Alternative Explanations and Robustness Checks

Using both the close elections PCRD design and the full sample of elected MPs in the House of Commons, the results thus far have provided strong evidence that Oxbridge MPs are less responsive to public issue salience than their non-Oxbridge peers. When observing legislative behavior via oral and written questions, and to a slightly lessor extent, with early day motions, Oxbridge MPs trail their parliamentary colleagues in responding to the public. There are, however, alternative possibilities that might explain these results. In the following

Fig. 3.5. Full Sample: Responsiveness to Public Salience from Oxbridge MPs
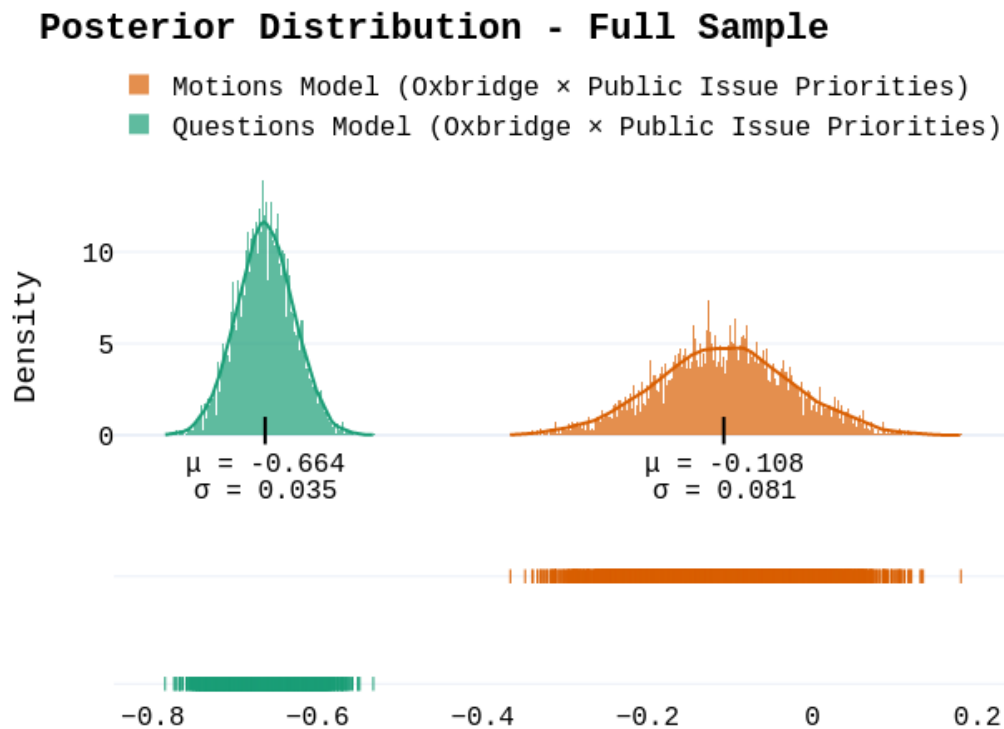
Note: Posterior samples from interaction between Oxbridge MP and public issue salience. Full results in table form are available in Appendix B.9.

section, I consider alternative explanations to reduce the possibility that the results are driven by statistical artifacts or modelling assumptions.

Alternative Model Specifications

The estimation strategies throughout the analysis have relied on Bayesian statistics. However, Bayesian methods are less common and are certainly not the only way to model the data. I therefore consider two additional estimation strategies in order to test the robustness of the results. Both strategies diverge from Bayesian methods and instead use frequentist methods.

First, I consider two-way fixed effects regressions. Although these models do not take into account the nested structure of the data, they provide more conservative estimates, which amounts to a hard test for the results presented thus far. In Appendix B.12, I re-specify all estimations made throughout the analysis using fixed effects regressions. The estimations are made using the `fixest` library in R (Bergé et al. 2018).

In the close elections sample, the fixed effects estimates are very similar. For both questions and EDMs, the estimates indicate that Oxbridge MPs lag their peers in the House of Commons by about 60 percent in the number of questions and motions put forward in response to a one percentage point increase in the importance of an issue according to the public. In the full sample, the estimates are also similar to the Bayesian estimates and indicate that Oxbridge MPs are about 45% less responsive via questions. In the motions estimates, the difference between the two groups is not statistically significant at conventional levels, however, the point estimate is nearly identical to the Bayesian models.

I additionally considered a third estimation strategy that relies on hierarchical mixed effects models. This strategy accommodates the hierarchical nature of the data and makes for a closer comparison to the Bayesian estimates. In Appendix B.11, I replicate the entire analysis using the hierarchical mixed effects models. For estimation, I used the `lme4` Library in R (Bates et al. 2014). As with both the fixed effects models and the Bayesian models, all estimates are very similar and confirm the results of the other models.

Taken in combination, the results from the fixed effects models and the hierarchical mixed effects models confirm the results and suggest that they are not driven by modelling decisions made in the primary analysis. Substantively, these results lend additional support for the hypothesized relationship between social class and responsiveness to public issue salience.

Trustee vs. Delegate Models of Representation

One alternative explanation for the results could be that Oxbridge MPs take on different representative role orientations compared to their peers. For example, Oxbridge MPs may be more likely to act as trustee style representatives rather than as delegates. Indeed, existing research has shown that voters have different preferences regarding the degree to which they expect their representatives to follow public preferences (Bowler 2017; Carman 2007). Therefore, a potential explanation for the finding that Oxbridge MPs lag their colleagues in responding to public preferences could be that Oxbridge MPs may be more likely to act as trustees and pay little attention to changes in public preferences.

Although the data do not allow for a direct test of this hypothesis, I consider the degree to which Oxbridge MPs differ in the number of questions asked and motions put forward *regardless* of the issue domain. If Oxbridge MPs are indeed more likely to act as trustees, then we would expect them to contribute at similar levels, but independently of public preferences.

I test this proposition by estimating the marginal difference in the number of questions and motions put forward by Oxbridge and non-Oxbridge MPs. The results, presented in Appendix B.13, suggest that Oxbridge MPs indeed participate differently than their peers. Oxbridge MPs ask slightly fewer questions (though not statistically significant at conventional levels) and average far fewer motions than their peers. This result indicates that it is unlikely that Oxbridge MPs focus on different issues but with the same levels of participation as non-Oxbridge MPs.

3.5   Discussion and Conclusion

Legislative responsiveness to public preferences is a central component of democratic representation. Yet, several studies in the past decades have empirically demonstrated that representatives are not equally responsive to the electorate. These findings have been concen-

trated mainly in the United States (Bartels 2016; Flavin and Franko 2017); however, more recent findings have confirmed a similar result in Western European democracies as well (Elkjær 2020; Mathisen et al. 2021; Traber et al. 2022; Elsässer, Hense, and Schäfer 2021; Lupu and Tirado Castro 2022).

Although there are several potential explanations offered by representation scholars, it has become increasingly clear that representatives' social class plays a role in representation quality. Building on existing studies that use occupation as a proxy for social class (Alexiadou 2022; O'Grady 2019), I argued that an Oxbridge education is a comprehensive proxy for social class in the UK. Three aspects of an Oxbridge education – self-selection, socialization, and value signalling – work together to create class sorting mechanisms that result in a disproportionate number of Oxbridge graduates in the highest social classes in the UK.

Focusing on Oxbridge MPs, the findings of the analysis suggest that Oxbridge MPs are less responsive to public issue salience than their peers. This finding is consistent across multiple research designs and estimation strategies. The results also remain similar when examining the ways in which MPs respond to public salience using two different outcomes: oral and written questions and early day motions. In robustness checks, I show that the results are not likely to be driven by modelling decisions or different role orientations between the two groups of MPs. Taken together, the results suggest that Oxbridge MPs are indeed less responsive to public issue salience than their peers, highlighting the role of social class in shaping representation.

This chapter thus contributes to the literature on unequal representation in several ways. First, it moves in the direction of causality by exploiting a source of exogenous variation in the election of Oxbridge MPs. Social class is a notoriously difficult factor to identify due to endogeneity concerns. However, by comparing only close elections in which one of the top-two candidates is Oxbridge educated and the other is not, the design identifies a credible counterfactual in narrow winners who are not Oxbridge educated. Although the design is not

without its limitations, the analysis provides a strong test of the effects of Oxbridge education on legislative behavior.

Second, this chapter makes several empirical contributions to the representation literature. First, the analysis relies on high interval data to examine dynamic responsiveness to dynamic public salience. Where previous studies have examined responsiveness to public opinion, the public opinion data used is often static or is only measured at infrequent intervals, raising the potential of missing important variation in how voters shift their attention to different issue domains and therefore the ways in which representatives respond. By considering nearly 300 separate, repeated surveys asking the British public about their issue priorities, the findings of the chapter offer an authoritative assessment of dynamic responsiveness by capturing temporal variation in public preferences *and* parliamentary behavior. In a similar vein, this chapter contributes to the empirical literature by considering multiple issues and outcomes. Building on the work of previous studies that examines only one or a few issues and looks at speeches or collective policy outcomes, this current study contributes by considering responsiveness to 10 separate issues and two separate behavioral outcomes measured at the level of the individual MP.

Despite the efforts made at identifying the causal effect of Oxbridge education on legislative responsiveness, the analysis is not without its limitations. First, the analysis relies on a relatively small sample of Oxbridge MPs. Although the sample in the PCRD design is large enough to estimate marginal differences between two different groups (e.g. Oxbridge vs. non-Oxbridge MPs), the small sample size raises questions about the extent to which credible causal claims can be made. Moreover, given the small sample, I was unable to examine extremely close elections (e.g. elections within only a few percentage points) which are often common practice in similar designs. I tried to address this shortcoming by including results that considered the entire sample of MPs, but the results were not as strong as those presented in the close elections analysis. Consequently, future research should consider other

methods of identifying the effects of social class on representatives' behavior that can be applied to a larger sample of MPs.

Second, the analysis relies on a single measure of social class – Oxbridge education. Although Oxbridge education is a strong proxy for social class in the UK, it is not without its limitations. Future research should consider other measures of social class to further understand the effects of social class on representation.

There are also limitations in the degree to which the analysis can speak to differences in responsiveness to the *preferences* of voters. Although the analysis considers responsiveness to public issue salience, the ways in which representatives speak to the issues that are important to voters is only one aspect of representation and may be less important to some voters who prefer their representatives either take on alternative role orientations or offer other forms of representation such as constituency service. Future research should consider other measures of parliamentary behavior to further study the effects of social class on representation.

A final limitation of the analysis is on external validity. Although PCRD designs have high levels of internal validity (Lee 2008), the extent to which we can generalize the findings in this chapter to another context is reduced by the fact that the analysis focuses on two specific universities and their social class associations within the United Kingdom. Future research should continue to consider additional contexts and empirical strategies to further examine the extent to which social class acts as a constraint on the quality of representation parliamentarians provide.

Chapter 4

The Gender Gap in Elite-Constituent Responsiveness Online

The extent to which women's descriptive representation furthers the substantive representation of women have been demonstrated in countless contexts. Yet, we know less about how female representatives act as individuals to respond dynamically to the changing priorities of the electorate. In this chapter, I examine representatives' dynamic responsiveness to public issue salience in the United States and United Kingdom. After combining hundreds of repeated public opinion surveys asking voters about their issue priorities, I train a large language model to classify the universe of representatives' social media messages on Twitter to the same issues. Findings of the analysis illustrate that women's issue priorities receive less attention from representatives in aggregate in both countries, that female representatives are more responsive than their male colleagues to women's priorities in both countries, and that a gender gap similarly exists in responsiveness to men's issue priorities, with women leading the way in both countries. Results provide evidence of the link between descriptive and substantive representation and suggest that women representatives may go beyond furthering "women's issues" by displaying greater dynamic responsiveness to the public's changing issue demands.

4.1 Introduction

The extent to which descriptive representation – representation by members who share a common background or physical characteristics with the represented – leads to greater substantive representation – representation whereby members act in the interest of the represented – is the subject of decades of thoughtful scholarly literature on democratic representation (Pitkin 1967; Mansbridge 1999; Phillips 1998; Campbell, Childs, and Lovenduski 2010; Celis and Childs 2012; Reingold 2008; Barnes 2016; Anzia and Berry 2011; Bratton and Ray 2002; Dovi 2007; Clayton and Zetterberg 2018; Wängnerud 2009; Kittilson 2008; Thomas 1991; Lowande, Ritchie, and Lauterbach 2019; Carroll 2003). Yet, there is still a lack of consensus about when and to what extent descriptive representation furthers the substantive representation of women.

While many studies find support for the link between descriptive and substantive representation (Bratton and Ray 2002; Clayton and Zetterberg 2018; Reingold 2008; Kittilson 2008; Funk and Philips 2019; Osborn 2012; Ferland 2020), several recent studies find that the share of women in parliament (Dingler, Kroeber, and Fortin-Rittberger 2019; Reher 2018) or political parties (Homola 2019) is not positively associated with greater substantive representation of women. These mixed findings may not be surprising given different conceptualizations of descriptive representation, as well as a number of institutional factors that moderate the degree to which representatives can act in an individual capacity (Höhmann 2020; Franceschet and Piscopo 2008). Moreover, studies often treat women's preferences as a monolith, searching for evidence of substantive representation by focusing on issues that are assumed to align with women's interests.

In this chapter, I offer an alternative perspective on the link between descriptive and substantive representation by focusing on the individual behavior of women representatives in the US Congress and the UK House of Commons. By focusing on a specific element of representation – responsiveness to public issue priorities via representatives' communication – the

study provides a direct test for correspondence between representatives and voters. Moving beyond *a priori* assumptions about "women's interests" (Campbell, Childs, and Lovenduski 2010; Yildirim 2022; Celis et al. 2014), I rely on hundreds of bi-weekly repeated public opinion surveys that ask women about the issues that matter most to them. After constructing a dynamic measure of women's issue salience from 2018–2022 with the combined surveys, I train a large language model to classify every message sent by representatives in both countries according to the issues that match the surveys. The new dataset provides a temporal understanding of changes in the salience of different issues in the eyes of constituents and representatives alike, and ultimately allows for estimating the degree to which changes in issue salience reflect changes in the levels of attention individual representatives devote to the same issues during the same time periods and for both countries.

There are three key findings of the analysis of dynamic responsiveness by individual representatives that contribute to the literature on the link between women's descriptive and substantive representation. First, I find that in both countries, men's issue priorities receive greater attention from representatives in aggregate. This finding suggests that even when representatives act outside the institutional constraints of the legislature, the importance of different issue according to male constituents still takes precedent. Second, I find that there is a considerable gender gap in how male and female representatives respond to the issue priorities of female constituents. In both countries, female representatives are more responsive than their male colleagues to the changing priorities of the women they represent. In line with previous studies that show that women in power advance women's interests when they are able to act in an individual capacity (Funk and Philips 2019; Holman 2014; Anzia and Berry 2011; Smith 2014; Lowande, Ritchie, and Lauterbach 2019), this finding provides further evidence that women representatives individually further the substantive interests of women.

Third, I find that women representatives are not only more responsive than men to women constituents, they are also more responsive to male constituents as well. Although the gap is not nearly as large, women representatives in both countries shift their attention in line with the dynamic issue salience of male constituents more so than their male colleagues in Congress and in the House of Commons. This difference is not driven by differences in online participation and includes responsiveness to a number of issue traditionally favored by male constituents, such as defense, taxes and the economy. This finding helps to illustrate that female representatives may not be furthering the substantive representation of women solely because they share a common identity, but rather that women representatives may be more likely to take an active role in responding to the changing issue priorities of *all* constituents.

The remainder of the chapter proceeds as follows. In the next section, I review the literature on the link between descriptive and substantive representation, and outline expectations for dynamic responsiveness. The following section provides the research design, which is followed by the results as well as a discussion and concluding section.

4.2   Theoretical Background

There are four common arguments made in favor of women's descriptive representation – two of which can lead to substantive representational benefits for women. Arguments in favor of descriptive representation that are not necessarily pre-requisites for substantive representation include increasing "de facto legitimacy in contexts of past discrimination" and demonstrating an "ability to rule" by members of a group whose ability has been questioned in the past (Mansbridge 1999, p. 628). Accordingly, a vast body of literature highlights the symbolic value of increasing the presence of women in positions of power (Phillips 1998; Mansbridge 1999; Wängnerud 2009; Lawless 2004; Alexander 2012; Verge and Pastor 2018; Schwindt-Bayer 2010; Childs 2008; Stokes-Brown and Dolan 2010; O'Brien and Rickne

2016). Namely, women are shown to add legitimacy to institutional decisions (Clayton, O'Brien, and Piscopo 2019) and improve trust in the democratic process (Ulbig 2007), often serving as role models for their constituents (Wolbrecht and Campbell 2007; Campbell and Wolbrecht 2006) and family members (Gidengil, O'Neill, and Young 2010), and increasing other women's political participation (Liu and Banaszak 2017; Pyeatt and Yanus 2017; Bühlmann and Schädel 2012; Karp and Banducci 2008), even if only temporarily (Gilardi 2015).

When it comes to the link between women's descriptive representation and the substantive representation of women, Mansbridge (1999) argues that through policy innovation and enhanced deliberation, as well as through improved communication between representatives and constituents who otherwise may be overlooked, descriptive representation may enhance substantive representation. In line with the first of these two substantive mechanisms, research has shown that descriptive representation indeed enhances both policy innovation and deliberation quality (Dodson 2006; Gerrity, Osborn, and Mendez 2007; Holman 2014; Bratton and Ray 2002; Lovenduski and Norris 2003; Wolbrecht 2002; Barnes, Beall, and Holman 2021; Hessami and Fonseca 2020; Mechkova and Carlitz 2021; Osborn 2012; Smith 2014; Volden, Wiseman, and Wittmer 2013; Anzia and Berry 2011).

For example, Greene and O'Brien (2016) show that the presence of women in political parties leads to greater issue diversity in parties' election campaigns, highlighting the value of women as issue entrepreneurs (Hobolt and De Vries 2015). Additional studies point to the policies women enact that demonstrate innovation and the representation of issues important to women in the electorate. For example, a number of studies show that women in politics influence policies that disproportionately affect women, such as childcare (Bratton and Ray 2002; Kittilson 2008; Bonoli and Reber 2010; Swiss, Fallon, and Burgos 2012), healthcare (Dodson 2006; Mavisakalyan 2014) and welfare and public spending more broadly (Hessami

and Fonseca 2020; Svaleryd 2009; Funk and Philips 2019; Clayton and Zetterberg 2018; Bolzendahl and Brooks 2007).

In research focusing on the mechanism of enhanced communication between women in politics and constituents as furthering women's substantive representation, extant studies show that women receive more requests from constituents (Butler, Naurin, and Öhberg 2022) and that women tend to be both more responsive and more effective communicators when engaging with such requests (Thomsen and Sanders 2020). This literature is also in line with a wider body of literature suggesting that descriptive representatives are more likely to engage in forms constituency service (Rhinehart 2020; Richardson Jr and Freeman 1995; Reingold 2003).

4.2.1 Are Women and Men's Preferences Distinct?

One of the key assumptions in arguments in favor of increasing the substantive representation of women by increasing the number of women in politics is that women and men's preferences are sufficiently different (Bratton and Ray 2002). To the extent that women and men have the same preferences, substantive representation of either group would similarly look the same. Indeed, this argument is sometimes made in the literature on unequal representation due to income or wealth (Enns 2015; Soroka and Wlezien 2008). The logic is that if the preferences of the rich and the poor are the same, then the substantive representation of the rich results in the coincidental representation of the poor. Consequently, the substantive representation of poorer constituents only suffers to the degree that the two groups hold differential preferences *and* policy more closely tracks the preferences of wealthier voters.[1]

In the context of gender differences amongst the electorate, extant research suggests that men and women's preferences are in fact distinct. For example, Yildirim (2022, p. 1240) considers nearly 700 US public opinion surveys from 1939-2015 and concludes that "there

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1. This proposition is disputed. See, for example, Gilens (2012) or Bartels (2016).

are consistent gender gaps across a large number of policy categories." Moreover, the gender gap in policy preferences is not limited to the US. Other studies point to gender differences in political preferences in industrialized democracies around the world (Inglehart and Norris 2000; Norris 2003).

A gender gap in women and men's preferences motivates the reasoning behind arguments in favor of descriptive representation and its potential for increasing the substantive representation of women. Because women and men tend to have different political preferences (Yildirim 2022), and politicians tend to prioritize the preferences of men over women (Homola 2019), increasing the presence of women in parliament who tend to share these under-represented preferences will close the gap in substantive representation.

4.2.2 What about Responsiveness?

Many of the studies linking women's descriptive and substantive representation have examined the proactive behaviors of women in power. For example, congresswomen are shown to give more speeches on the US House floor (Pearson and Dancey 2011), to be more effective at keeping their sponsored bills alive (Volden, Wiseman, and Wittmer 2013), and to be more effective at delivering funding for their constituents (Anzia and Berry 2011; Funk and Philips 2019; Holman 2014; Smith 2014). These studies take a broad view of representation, and focus on the proactive behaviors of representatives by showing that women are more likely to champion policies that benefit women.

However, the wider literature on representation has also highlighted the importance of the reactive behaviors of representatives, and the extent to which representatives are responsive to the preferences of their constituents (Stimson, MacKuen, and Erikson 1995; Erikson, MacKuen, Stimson, et al. 2002; Burstein 2003; Soroka and Wlezien 2010; Pitkin 1967; Powell Jr. 2000). Although responsiveness is only one element of substantive representation, it is nonetheless an important condition and features prominently in Pitkin's definition of

substantive representation. Moreover, voters value responsiveness from their representatives, and tend to associate satisfaction with democracy with the degree to which representatives emphasize the issues that matter to them (Reher 2016).

Despite the importance of responsiveness as a key component of substantive representation, studies that examine responsiveness from women representatives to women constituents are limited. While several studies examine congruence between parties (Dingler, Kroeber, and Fortin-Rittberger 2019) or representatives (Griffin, Newman, and Wolbrecht 2012; Höhmann 2020) and constituents, these studies reach somewhat mixed conclusions. Whereas Griffin, Newman, and Wolbrecht (2012) do not find a gender gap in congruence between representatives and their male and female constituents, Dingler, Kroeber, and Fortin-Rittberger (2019) finds a gender gap in the opposite direction, with policy favoring the preferences of women across 21 European countries.

When it comes to studies on responsiveness specifically, the literature is similarly mixed. Homola (2019) finds that a gender gap indeed exists in how parties in a dozen Western democracies respond to men and women's preferences, however, differences in responsiveness are not found to be a function of the share of female politicians in parliament. Differing from Homola (2019), Ferland (2020) finds that parties are equally responsive to the preferences of both male and female party supporters, but concludes that congruence increases with the proportion of women elected to a party.

Despite a lack of consensus in the literature on responsiveness from female representatives to female constituents, the broader literature on women's descriptive representation is quite clear in its expectations. When women in politics able to act in an individual capacity, they act in a way that furthers the interests of other women (Funk and Philips 2019; Holman 2014; Anzia and Berry 2011; Smith 2014; Lowande, Ritchie, and Lauterbach 2019). Building on these studies and the literature linking women's descriptive and substantive representation, I expect that women representatives will be more responsive than their male counterparts to the

changing preferences of the women they represent. Moreover, I expect that responsiveness will be dynamic, and that women representatives will shift their attention on different issues in line with shifts in the preferences of their constituents. These expectations are formalized in the following hypothesis:

Hypothesis 1: *Women representatives are more responsive than men to the priorities of women constituents.*

4.3   Research Design

Differing from previous studies on descriptive representation, I focus on the behavior of individual representatives, rather than the collective output of political parties or legislatures. Moreover, I focus on such behavior in response to changes in issue priorities, examining the degree to which representatives respond to shifts in the salience attributed to different issues by the public. This conceptualization of responsiveness is also referred to as dynamic agenda responsiveness or issue responsiveness in the representation literature (Traber et al. 2022; Klüver and Spoon 2016).

To understand dynamic responsiveness, data on both the salience of different issues and the amount of attention payed to such issue by representatives are required. To capture public issue priorities, I rely on repeated surveys asking respondents to identify the most important issue facing the country.

Although such surveys are not without their limitations (Wlezien 2005; Dennison 2019), they are widely used to measure issue salience in the literature on public opinion and political behavior (Soroka and Wlezien 2010; Klüver and Spoon 2016; Yildirim 2022; Traber et al. 2022; Reher 2018). Moreover, motivation for the use of such surveys is driven by the desire to capture *changes* in public salience, rather than the absolute salience of an issue. As

such, the surveys are well-suited to the task of examining dynamic responsiveness because they allow for the identification of shifts in public salience over time.

To measure the attention of representatives, I relied on data from Twitter (Twitter 2021). There are several advantages of using the social media messages of representatives to understand their attention. First, tweets are concise declarations of interests and focus. Due to the character limits on tweets, users are required to convey clear statements that leave little room for ambiguity. Second, tweets—and social media more broadly—give representatives the opportunity to signal their preferences outside of the institutional constraints of parliament (Sältzer 2020; Peeters, Van Aelst, and Praet 2021). Moreover, past research has shown that voters prefer their representatives address policy issues on Twitter (Giger et al. 2021) and that MPs in turn use Twitter to build policy reputations with constituents (Russell 2021a). A third advantage of using communication data from Twitter is that it allows for capturing the dynamic attention of legislators over time to the same issues that are prioritized by voters. Whereas legislative bills or roll call votes occur sporadically and may be planned long before a shift in the electorate's attention, representatives can use social media to signal to the electorate that they are aware of and responding to the issues that are most important to them in real time.

4.3.1   Public Issue Priorities

Data collection for public issue priorities included collecting and combining a series of nationally-representative surveys fielded by YouGov (YouGov 2021) in the US and UK that asks voters what they believed to be the most important issue facing the country. Between 2018 and 2022, YouGov fielded 172 surveys in the US and 179 surveys in the UK. Sample size in the US surveys ranged from 627 to 4,082 adults, and the UK surveys ranged from 971 to 5,226 adults. All surveys are publicly available and were downloaded directly from the YouGov website (YouGov 2021). The surveys vary in the frequency with which they

were conducted, but many were conducted every 1–2 weeks. The exception to this is that there are two six-month periods in which surveys were not conducted in each country. In the UK, surveys were not conducted from December 2018 – June 2019, and in the US, there is a six-month gap from July 2021 onward. The surveys also differ in that the UK surveys allow respondents to select up to three issues as the most important, while the US surveys require respondents select only one. As the focus is on changes in public salience, I address this issue simply by analyzing the two countries separately in the statistical analysis. Further details of the surveys are available in Appendix C.1.

Following similar studies of dynamic responsiveness (Traber et al. 2022; Klüver and Spoon 2016), measurement of the public's issue salience for different issue priorities is based on the percentage of respondents who select each of the issues to be the most important issue, excluding respondents who replied with "don't know". For example, if 15% of respondents selected immigration as the most important issue, then the level of salience for that issue would be 0.15. This measurement is used for each of the issues in the surveys, and for both of the countries in the analysis according to gender of the respondent.

Figure 4.2 and Figure 4.1 present public issue priorities by salience resulting from combining the survey conducted the US and UK from 2018–2022. In the figures, each point represents a separate survey and the y-axis is the percentage of voters who selected each issue to be the most important issue in the survey according to the gender of the respondent.

Fig. 4.1. Dynamic Public Issue Priorities in the US – 2018-2021
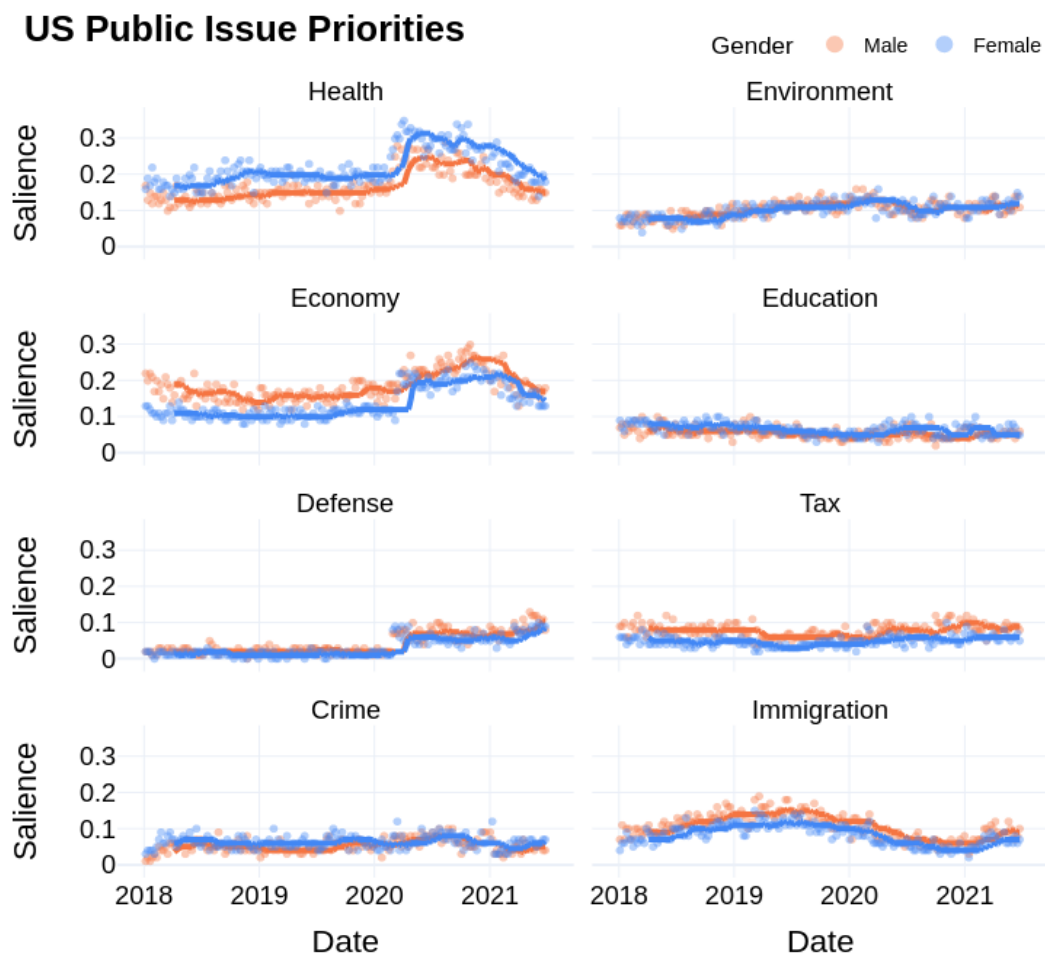
Note: The y-axis is the percentage of the population identifying an issue as one of the most important issues facing the country. Respondents may choose only one issue. Data combine 179 YouGov public opinion surveys conducted in the US from representative populations of men and women. Each point represents a separate survey.

Fig. 4.2. Dynamic Public Issue Priorities in the UK – 2018-2021
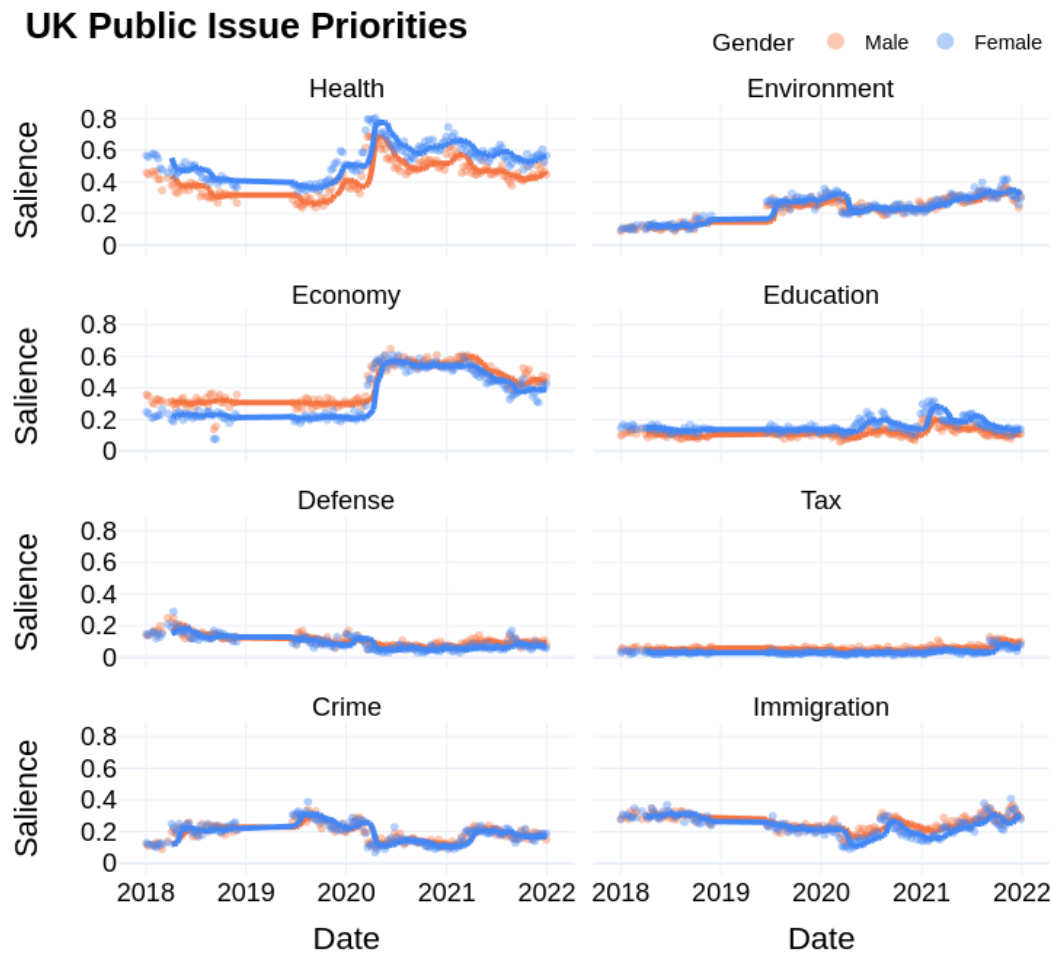
Note: The y-axis is the percentage of the population identifying an issue as one of the most important issues facing the country. Respondents may choose up to three issues. Data combine 172 YouGov public opinion surveys conducted in the UK from representative populations of men and women. Each point represents a separate survey. Surveys were unavailable from December 2018–June 2019.

4.3.2 Measuring Representatives' Issue Attention

In order to measure representatives' attention to the different issues for which public opinion data were available, I collected every publicly available tweet sent by elected legislators in

the US House of Representatives and MPs in the UK House of Commons from 2018–2022. Tweets sent from representatives were collected through the Twitter Academic Research Track API (Twitter 2021). Although no longer in use, the API had been made specifically for academic researchers and afforded expanded access to Twitter data for research purposes. In total, female representatives sent 1,032,650 tweets, while male representatives sent 2,133,249 tweets. The differential between men and women in Twitter engagement reflects the roughly two-to-one makeup of men and women in the two legislative bodies. I present descriptive statistics in Appendix C.2.

To measure representatives' attention to different issues from their Twitter messages, I classified the tweets according the eight issues for which public opinion data were available in both countries. For classification, I fine-tuned a pre-trained large language model using the BERT architecture (Devlin et al. 2018). BERT is a large language model that is pre-trained on a large corpus of text and can be fine-tuned for a variety of tasks. In this case, I fine-tuned the model to classify tweets according to the eight issues of interest. The tuning process included first annotating 6,000 tweets according to the issue the messages addressed. As many messages did not address a specific issue, I also included a ninth category for non-political messages. A non-political message might include, for example, "Happy New Years" or "Happy 4th of July". As these messages do not address a specific political issue, they were coded as such and were not considered in the analysis.[2]

After classification, I indexed the data by MP, issue and date. The dates used reflect the dates on which the public opinion surveys were conducted.[3] In order to account for the fact that representatives do not participate equally on Twitter, I additionally included the total number of tweets sent by each representative for each date period (regardless of the issue it

---

2. The model was fine-tuned on a sample of 4,000 of the 6,000 annotated messages. The additional 2,000 messages were held out in order to validate the trained model. The fine-tuned model achieved a weighted average F1 score of 0.65, which places it inline with other studies that use similar methods (Gilardi et al. 2022).

3. Surveys are conducted approximately every 1-2 weeks. Therefore, the final dataset is a repeated cross section in which the tweets and surveys are matched by issue and date and are repeated for each MP in each country.

addressed). This measure was included in all models as a control variable, and follows the logic that representatives' total attention is the number of total tweets they send about any issue. As legislators face real-world trade-offs in allocating their attention to different issues, a legislator's attention to a given issue can be understood as a proportion of attention to all issues (Baumgartner and Jones 1993).

After creating a new dataset that includes the number of tweets representatives sent about a given issue as well as their total tweets about all issues, the dataset was then merged with the public opinion data by matching on date, issue and country. Additionally, I included in the final dataset data on MPs' gender, party affiliation and age. These data were collected directly from the Wikidata API (Vrandečić and Krötzsch 2014). Descriptive statistics for the final dataset are provided in Appendix C.2.

What Does "Attention" Look Like?

During the time the data were collected, Twitter messages were limited to 280 characters, which is roughly equivalent to 50 words. As such, Twitter messages are not long enough to address a complex policy issue in detail. Instead, Twitter messages are often used to signal support or opposition to a policy or to highlight a specific aspect of an issue. These expressions constitute a representatives' attention to different issues. For example, the following is a tweet sent from Barry Gardiner, a UK Labour Party MP, in early 2021:

> If you really wanted safe and legal routes for refugees why did you close the Dubs Scheme, stop family reunion from Europe and restrict the Syrian Resettlement scheme? These plans create a limbo without hope for people fleeing violence and war.

The message references the UK government's vote against the Dubs Amendment, which would have allowed unaccompanied child refugees in the UK to reunite with their families.

While the message may not be long enough to address the issue in detail, it signals the representative's attention to immigration and was classified as such by the trained model.

Across the Atlantic in the US, representatives were similarly focusing on immigration policy on Twitter in early 2021. The following is a tweet sent from Republican Representative Steve Scalise in March 2021. With the message, Scalise shared a video of a Democratic official from Texas speaking about the situation at the US-Mexico border.

> Attention Joe Biden:
>
> A Texas DEMOCRAT who represents border towns is calling out your policies:
>
> "The way that we're doing it right now is catastrophic and is a recipe for disaster"
>
> "It won't be long before we have tens of thousands of people showing up to our border"

In the message, Scalise highlights the potential threat anticipated by a local official created by President Biden's immigration policies. This message addresses the issue of immigration and was classified by the model accordingly.

The two messages above are examples of how representatives use Twitter to signal their attention to a particular issue. However, both messages expressed opposition to existing policy. At the same time, representatives also use Twitter to signal support. For example, the following is a tweet sent from Democrat Representative Mary Scanlon in late 2021:

> We can't count on SCOTUS to protect our reproductive freedom. The Senate must pass the Women's Health Protection Act now.

The congresswomen displays her support for a women's health bill in calling for the Senate to support the bill. The message was classified as addressing the issue of health.

Representatives also show their attention to issues by highlighting constituency service or by advertising their own work on an issue. For example, the following is a tweet sent from Labour MP Marie Rimmer in mid-2019.

> I was glad to be able to meet with some of my constituents today to discuss the
> threat of the #ClimateEmergency and what actions I could take as an MP to help
> fight it. I constantly receive correspondence on this issue from constituents and
> I'm glad to support them #TheTimeIsNow

With the message, Rimmer shared an image of herself with several constituents at what appears to be a local climate protest. The message was classified by the model as addressing the issue of the environment.

Although each of the example messages above are different in their content, they all signal a representative's attention to a particular issue. Individually, there are limits to what can be learned from a single message. However, representatives send thousands of messages that similarly signal their attention to different issues. When combined over time, these messages can provide a temporal picture of a representative's attention to the issues that matter to constituents.

Figure 4.3 and Figure 4.4 present the levels of attention that male and female representatives give to each of the eight different issues. As mentioned previously, issue attention was calculated as a proportion of attention to a given issue by the amount of attention to all issues. For example, if an MP sends 10 tweets about the economy during a given time period, and sends 100 total tweets during the same time period, then attention to the economy would be 10% or 0.1. This measurement can be formalized mathematically as follows:

$$\text{Attention}_{[i,j,t]} = \frac{\text{Number of tweets legislator } i \text{ sends about issue } j \text{ at time } t}{\sum_{j'} \text{Number of tweets legislator } i' \text{ sends about issue } j' \text{ at time } t'}$$

Using the proportional value of attention, Figure 4.3 and Figure 4.4 present representatives' attention to the different issues by gender.

Fig. 4.3. Dynamic issue attention of United States representatives by gender
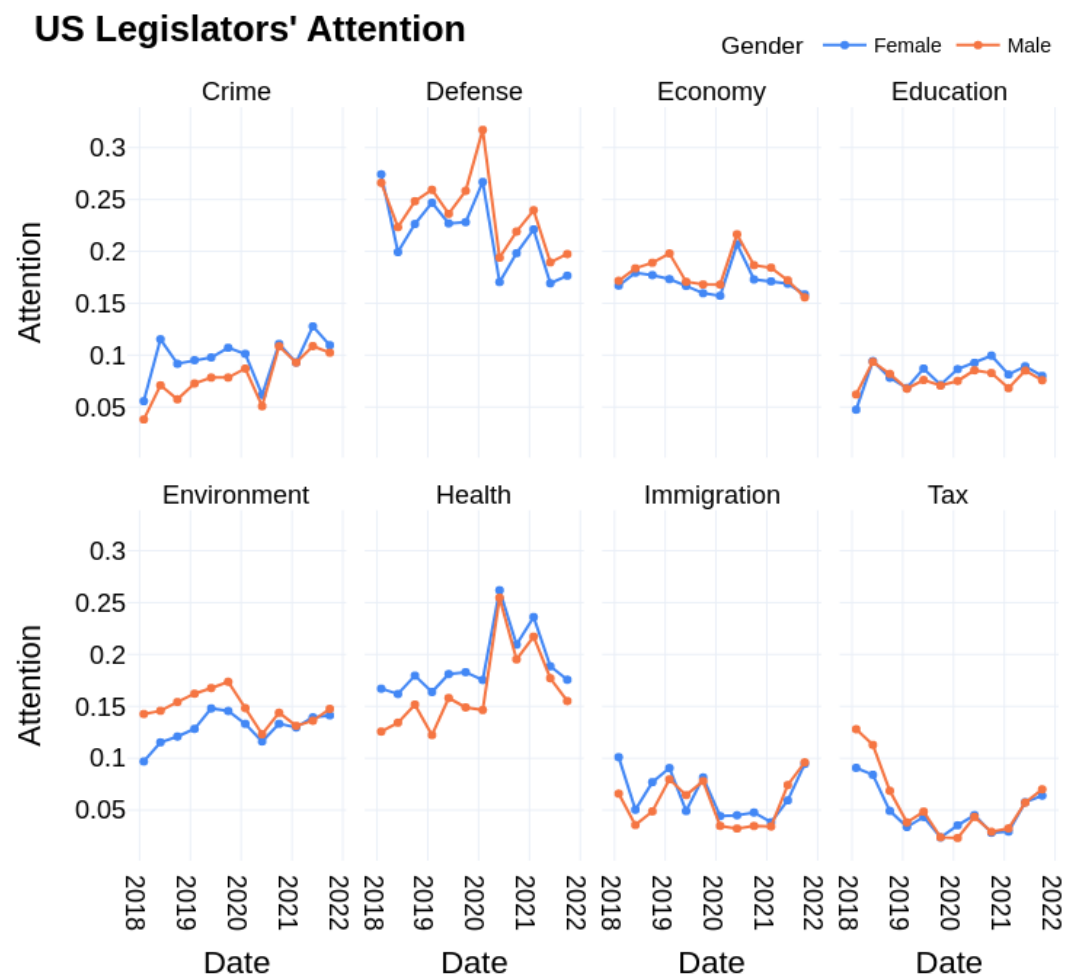
Note: The y-axis is percentage of representatives' Twitter messages that address a specific issue as a proportion of their messages about all issues. Data are presented using using 4-month time periods for attention. Descriptive statistics are available in Appendix C.2.

Fig. 4.4. Dynamic issue attention of United Kingdom representatives by gender
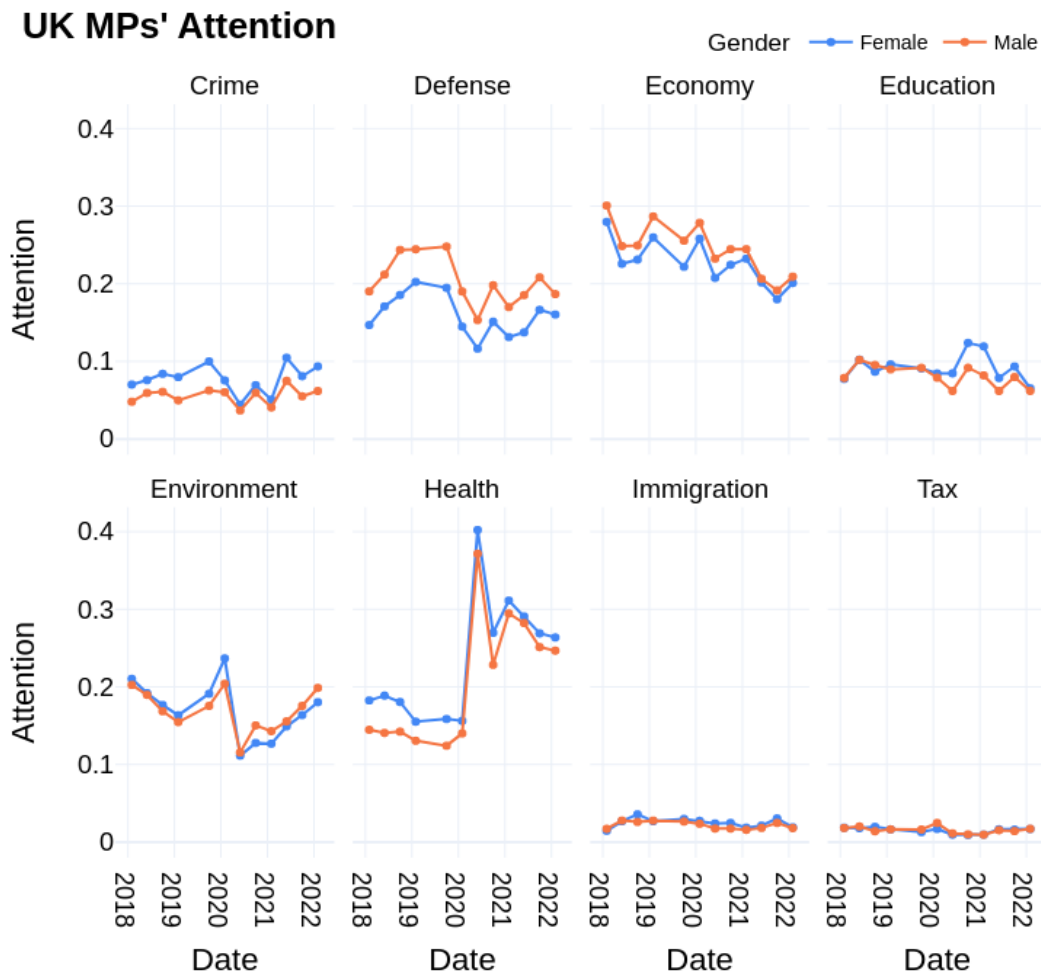
Note: The y-axis is percentage of representatives' Twitter messages that address a specific issue as a proportion of their messages about all issues. Data are presented using using 4-month rolling average. Descriptive statistics are available in Appendix C.2.

There are several key trends that can be observed in the attention data. First, several of the issues appear to have gender differences in the amount of attention devoted. Whereas issues such as defense and health have clear gender differences, issues such as immigration and tax do not appear to have the same gender gaps. We can also observe a considerable

increase in attention to health around the time of the initial outbreak of COVID-19. This increase similarly mirrors the increase in public salience of health observable in the public opinion data (see Figure 4.2 and Figure 4.1).

4.3.3 Estimation

Responsiveness to public issue priorities is measured as the statistical effect of public salience on representatives' attention to a given issue. For estimation, I use a series of random effects hierarchical Poisson models. The models regress the number of representatives' tweets about a given issue on the public salience of that issue, while including the number of the representatives' total tweets about all issues as a covariate. Given the nested structure of the data, each model includes a random intercept for each representative and another for each issue domain.

I also included additional models that lag the dependent variable further behind the independent variable by an additional one and two survey periods. The logic was that the lagged models would be necessary to give adequate time for representatives to perceive and respond to shifts in public sentiment. However, the lagged models did not appear to improve fit or change the results in any substantively meaningful way.

To understand differences in how men and women representatives respond to public issue priorities, a binary variable for legislators' gender is interacted with public issue priorities. Therefore, the interaction coefficient represents the marginal difference in responsiveness to public issue priorities for women legislators. All models are estimated using the `MixedModels` library (Bates et al. 2020) in the Julia programming language. The models are estimated using the following equation:

$$
\begin{aligned}
Y_{t,i,j} = & \alpha_{Legislator[i]} + \alpha_{IssueDomain[j]} \\
& + IssuePriorities_{(t-1),j,k} + LegislatorGender_i + \\
& \theta\left(IssuePriorities_{(t-1),j,k} \times LegislatorGender_i\right) + Z_{i,j} + \varepsilon_{t,i,j}
\end{aligned} \tag{4.1}
$$

Where Y is the number of legislator i's tweets about issue j at time t. The estimated responsiveness coefficient is θ, which captures the interaction between legislator i's gender (1 for woman, 0 for man) and the level of salience for constituents k (either men or women) at time t. Z is a matrix of legislator characteristics and control variables (i.e. party, age, etc.). $\alpha_{Legislator[i]}$ and $\alpha_{IssueDomain[j]}$ are random intercepts for each legislator and issue domain, respectively.

4.4 Results

4.4.1 Responsiveness to Public Issue Salience

I first considered the degree to which representatives are responsive to public issue priorities at the parliamentary level. This included regressing the number of representatives' tweets about a given issue on the public salience of that issue, as well as the series of covariates highlighted above, *without* the interaction term for representatives' gender. The results present a baseline understanding of the level of responsiveness.

Figure 4.5 presents the results of eight models. Additionally, models labeled with $(t-1)$ are lagged by one survey period. For each model, the plotted coefficient can be interpreted as the estimated logs of the expected number of messages sent by all representatives (in Congress or the House of Commons) in response to a 1 percentage point increase in public issue salience.

Substantively, the effect of a 1 percentage point increase can be understood in two different ways. First, we can multiply the exponentiated coefficient by the mean number of tweets to get the expected value of tweets in response to a 1 percentage point increase in salience. Second, we can simply subtract one from the exponentiated coefficient and multiply the value by 100 to get the expected percentage change in response to a 1 percentage point increase in salience. For example, in the first model that estimates the effect of women's issue salience in the US, the estimated coefficient is 1.638 and the mean number of tweets is 0.58 (see Appendix C.2). Therefore, the number of tweets in response to a 1 percentage point increase in salience for the female electorate in the US is about 2.98 tweets ($e^{1.638} \times 0.58$) from all US representatives. In contrast, the expected value of tweets in response to a 1 percentage point increase in public salience for the *male* electorate is 13.45 ($e^{3.144} \times 0.58$).

This difference is considerable and highlights a clear gender gap in the ways in which representatives respond to women and men in the US. Although the extent to which comparisons can be made between the two countries are limited by the fact that the surveys differ slightly between the US and the UK, there are apparent differences *within* each of the two countries that allow for statements about both. In both countries, representatives are more responsive to men in relation to women. It is also worth noting that there are not marginal gender differences in the number of messages legislators send on Twitter. Although not presented in the coefficient plots, the binary gender coefficient (presented in Appendix C.4) is not statistically significant in any of the models. This suggests that there are not clear differences in how men and women use Twitter to emphasize all issues. The full results of the models are presented in Appendix C.4.

Fig. 4.5. Responsiveness to Public Priorities

Responsiveness to Public Issue Priorities

Model: US Female Public Priorities (t)	1.638
Model: US Female Public Priorities (t-1)	1.649
Model: US Male Public Priorities (t)	3.144
Model: US Male Public Priorities (t-1)	3.097
Model: UK Female Public Priorities (t)	2.325
Model: UK Female Public Priorities (t-1)	2.23
Model: UK Male Public Priorities (t)	2.843
Model: UK Male Public Priorities (t-1)	2.686

Estimated Coefficient
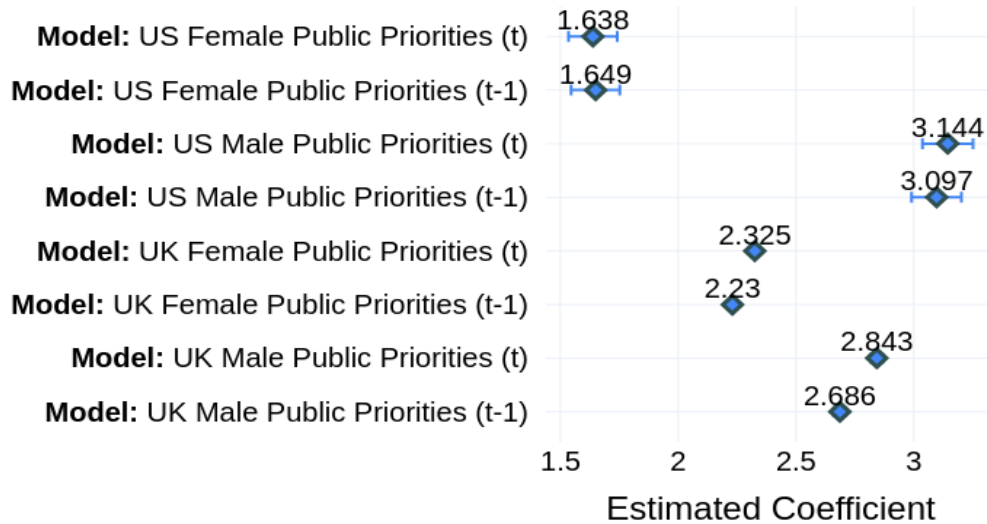
Results from eight hierarchical Poisson models with random intercepts for legislators and issue domains. The plotted coefficient is the estimated effect of public issue priorities on legislators' attention (number of tweets) to a given issue. Models include controls for gender, party affiliation, age (of legislator) and total number of tweets sent for the same time period. Models labeled with $(t-1)$ are lagged by one survey period. Full results in table form are provided in Appendix C.4.

4.4.2 Responsiveness to the Female Electorate

Building on the descriptive representation literature, the expectation from Hypothesis 1 is that women representatives are individually more responsive to women constituents than their male peers. Given that women's issue priorities gain less attention from Congress and the House of Commons (see Figure 4.5), greater responsiveness from women representatives may serve to close this gender gap.

Table 4.1 provides results for the estimated effect of women's issue salience on representatives' attention. The coefficient of interest is the interaction between representatives' gender and women's issue salience, which can be interpreted as the marginal difference in responsiveness from female representatives to the eight issues considered. The first three models present estimates for the US, while the second set of three models present estimates for the UK.

Across all six models, women representatives are more responsive to women than men representatives. In the US, the marginal effect of a legislators' gender on responsiveness to women's issue salience is approximately 64.8% greater or around 1.64 times greater ($e^{0.5} = 1.64$) for women in relation to men.

The result is similar in the UK. Women representatives respond to a 1 percentage point increase in women's issue salience with about 47% more or about 1.47 times more than men ($e^{0.39} = 1.47$). This lends strong support for the idea that women representatives are more responsive to women than their male colleagues in both the US and the UK.

Table 4.1. Responsiveness to Women's Issue Priorities

	US (t)	US ($t-1$)	US ($t-2$)	UK (t)	UK ($t-1$)	UK ($t-2$)
	(1)	(2)	(3)	(4)	(5)	(6)
Women's Issue Priorities	2.007***	2.030***	1.971***	2.560***	2.463***	2.377***
	(0.065)	(0.065)	(0.065)	(0.013)	(0.013)	(0.013)
Female Legislator	-0.079	-0.080	-0.077	-0.071	-0.069	-0.064
	(0.064)	(0.064)	(0.063)	(0.063)	(0.063)	(0.063)
Female Legislator × Women's Issue Salience	0.500***	0.513***	0.495***	0.393***	0.390***	0.374***
	(0.051)	(0.051)	(0.051)	(0.010)	(0.010)	(0.010)
Legislator Age	✓	✓	✓	✓	✓	✓
Total Tweets	✓	✓	✓	✓	✓	✓
Survey Period	✓	✓	✓	✓	✓	✓
Party	✓	✓	✓	✓	✓	✓
Estimator	Poisson	Poisson	Poisson	Poisson	Poisson	Poisson
N	592,384	589,056	585,728	804,960	800,280	795,600

Results from six hierarchical Poisson models with random intercepts for legislators and issue domains. Models labeled with ($t-1$) and ($t-2$) are lagged by one and two survey periods, respectively. Full results are provided in Appendix C.5.

4.4.3   Responsiveness to the Male Electorate

The results thus far have identified two gender gaps. First, there is a gender gap in the ways in which MCs in Congress and MPs in the House of Commons respond to men and women as a whole. In both cases, representatives were more responsive to men in relation to women. A second gender gap is also evident when considering differences in how men and women representatives respond to women constituents. In both countries, women representatives are more responsive to women than their male colleagues in Congress and the House of

Commons. This finding is in line with hypothesis 1 and illustrates that women in politics act as individuals to respond to the women they represent.

I now consider the degree to which representatives' gender influences responsiveness to men. Given that we cannot necessarily interpret the results of the regressions throughout the analyses causally, examining responsiveness to men's issue salience allows for distinguishing between whether women representatives simply have different issue priorities and therefore endogenously emphasize issues that are also popular with women, which is then observable as greater responsiveness, or if women representatives are also more responsive to shifts in issue salience in a more general sense.

Following the same format as the previous analysis, Table 4.2 presents the results from six models with the exception that the models include men's issue salience instead of women's. The first three models include the US data, while the second three models include the UK data.

Surprisingly, the results suggest that women representatives are more responsive than their male counterparts to male constituents as well. The coefficient of interest – the interaction between legislators' gender and men's issue salience – indicates that a one percentage point increase in the level of issue importance attributed by male constituents results in around 22% ($e^{0.2} = 1.22$) more messages from female legislators compared to male legislators in the US, and around 35% ($e^{0.3} = 1.349$) more messages from female MPs than male MPs in the House of Commons.

Table 4.2. Responsiveness to Men's Issue Priorities

	US (t)	US ($t-1$)	US ($t-2$)	UK (t)	UK ($t-1$)	UK ($t-2$)
	(1)	(2)	(3)	(4)	(5)	(6)
Men's Issue Priorities	1.465***	1.533***	1.400***	3.022***	2.857***	2.709***
	(0.070)	(0.070)	(0.071)	(0.015)	(0.015)	(0.015)
Female Legislator	0.043	0.042	0.044	0.035	0.029	0.029
	(0.064)	(0.063)	(0.063)	(0.063)	(0.063)	(0.063)
Female Legislator × Men's Issue Salience	0.187**	0.184**	0.208***	0.301***	0.285***	0.287***
	(0.059)	(0.059)	(0.059)	(0.012)	(0.012)	(0.012)
Legislator Age	✓	✓	✓	✓	✓	✓
Total Tweets	✓	✓	✓	✓	✓	✓
Survey Period	✓	✓	✓	✓	✓	✓
Party	✓	✓	✓	✓	✓	✓
Estimator	Poisson	Poisson	Poisson	Poisson	Poisson	Poisson
N	592,384	589,056	585,728	804,960	800,280	795,600

Results from six hierarchical Poisson models with random intercepts for legislators and issue domains. Models labeled with ($t-1$) and ($t-2$) are lagged by one and two survey periods, respectively. Full results are provided in Appendix C.6.

4.4.4 Alternative Modelling Specification

The results presented in the analysis paint a coherent picture, with women representatives more responsive in both countries and to both men and women constituents' issue priorities. To ensure the findings are robust to modelling decisions, I estimated a series of fixed effects models that include a fixed effect for each legislator. These models do not fit the hierarchical structure of the data as well as the random effects models, but they amount to a more conservative estimate and therefore a harder test of the results presented thus far.

I re-estimated the models presented in Table 4.1 and Table 4.2 using the `fixest` library in R (Bergé et al. 2018). The results are very similar to the results from the random effects models with one exception. The US models that estimate women representatives' responsiveness to men's issue salience no longer meet the threshold for statistical significance at convention levels. The results of these models are presented in Appendix C.7.

4.5   Discussion and Conclusion

The extent to which women's descriptive representation leads to greater substantive representation of women has been the subject of a number of important empirical studies (Lowande, Ritchie, and Lauterbach 2019; Ferland 2020; Höhmann 2020; Homola 2019; Funk and Philips 2019; Anzia and Berry 2011; Barnes, Beall, and Holman 2021; Dingler, Kroeber, and Fortin-Rittberger 2019). These studies, however, reach somewhat mixed results. One reason for this is likely the fact that many studies conceptualize descriptive representation in terms of the numerical composition of political parties. Although this idea follows the important contributions of critical mass theory (Kanter 1977; Dahlerup 1988), more recent studies have shown that institutional constraints mediate the extent to which women representatives can act in the interests of the women they represent (Höhmann 2020; Franceschet and Piscopo 2008). In response, studies have shown that when women in politics are able to act in an individual capacity, they indeed prioritize the interests of the women they represent (Lowande, Ritchie, and Lauterbach 2019; Funk and Philips 2019).

Yet, despite several important extant studies that show that women are proactive in pursuing issues that benefit women constituents, the extent to which female representatives are individually responsive to the changing priorities of the electorate has remained unclear. By focusing on a specific element of substantive representation – dynamic responsiveness to public issue salience – the findings of this chapter suggest that women indeed are individually more responsive to the electorate. Moreover, differences in responsiveness are not likely

to be statistical artifacts that capture women representatives simply pursuing their personal interests which in turn results in the coincidental representation (Enns 2015) of other women. Rather, representation appears to be dynamic, with women representatives responding to shifts in the electorate's issue salience in real time.

The findings of this study offer a new take on an old question: when and to what extent does descriptive representation further the substantive representation of women? In trying to answer this question, the study goes beyond existing studies that assume women's preferences for representation. Although the literature is quite clear that women have distinct preferences on numerous issues, empirical studies that examine the quality of substantive representation often take for granted women's preferences (Yildirim 2022; Celis et al. 2014). Campbell, Childs, and Lovenduski (2010, p. 174) argue that "one way to circumvent the vexed problem of defining [women's] 'objective' interests is to focus instead on preferences of constituents as expressed in survey data." Taking this recommendation seriously, I included over 350 separate public opinion surveys to understand shifts in the electorate's issue salience over time. These data were then paired with millions of messages that legislators sent on Twitter to understand how legislators responded to these shifts, offering a new approach to understanding dynamic responsiveness.

Using this approach, the results both confirm existing findings as well as offer some new ones. First, confirming existing research (Homola 2019), the results provide additional evidence of a gender gap in whose priorities matter to representatives. In both countries, women's priorities take a back seat to men's.

Second, the study contributes to our understanding of women's representative behavior by providing evidence that women representatives are more likely to shift their attention and emphasize issues that are in line with the priorities of the electorate compared to their male colleagues. This finding suggests that women's substantive representation by women representatives is not likely to be purely coincidental and dependent on a set of shared

preferences between women representatives and women constituents. While the findings do not challenge the idea that women enter office with priorities shaped by gendered experiences, it suggests that women representatives respond dynamically according to the priorities of the electorate. This finding is in line with Pitkin's conceptualization of substantive representation as acting in a manner responsive to one's constituents (Pitkin 1967). Evidence for greater responsiveness was highlighted not only when it came to women's priorities, but also in response to men's, adding further confirmation of dynamic responsiveness from women representatives.

Finally, the study highlights the normative value of women's descriptive representation by painting a picture of representation in two of the world's oldest and wealthiest democracies. In both countries, there is a deficit in responsiveness to women's priorities from the legislature. But in both countries, this gap is reduced by the increased presence of women in political institutions. Further, the substantive benefits women provide to their constituents are not limited to women constituents in isolation, rather, the male electorate similarly benefits from women representatives as well.

As with any study, there are limitations to the conclusions of this analysis. First, there is a limit to the extent to which representatives' communication on social media can be interpreted as substantive representation. Although studies find that social media (and Twitter in particular) is important for voters who indeed prefer their representative emphasize their issue priorities online (Giger et al. 2021), talk is cheap and representatives are not obligated to follow through on the promises made on social media. However, existing studies find high levels of correspondence between representatives' online behavior and their behavior within the legislature (Peeters, Van Aelst, and Praet 2021; Silva and Proksch 2022). Moreover, research also suggests that the public places a high value on the verbal representation of their issue priorities (Reher 2016), which indicates that voters may view this form of responsiveness as representation specifically. With that said, future studies could benefit

from extending a similar type of dynamic analysis to include other forms of representative behavior, such as bill sponsorship or voting behavior.

A second limitation to the findings is that the analysis does not causally identify the effect of gender. As there are infinite endogenous characteristics to gender, this limitation serves as a word of caution when interpreting the results of the study in a causal way. At the same time, the findings are remarkable similar across both the US and UK, and the marginal differences in responsiveness are quite large in statistical terms, which affords a degree of clarity about the substantive conclusions drawn in the analysis. Nonetheless, future studies may benefit from adopting a research design that allows for making more credible causal claims about the influence of gender on legislative behavior.

Chapter 5

The Limits of Group Loyalty in Congress

Downplaying the level of risk associated with COVID-19—along with opposition to public health measures aimed at containing the virus—became a rallying cry for certain legislators in the US Congress throughout the pandemic. Yet, to what degree are elites "blind partisans," willing to take on the positions of their parties regardless of potential consequences? In this chapter, we argue that elites' strategic motivations transcend partisan motivated reasoning when individuals realize a risk that is otherwise misperceived. We demonstrate our argument in the context of the COVID-19 pandemic by examining the effects of COVID-19 infection on opposition to COVID-19 mitigation policies among United States' legislators. After training a large language model to identify opposition messages from legislators, we adopt a staggered difference-in-difference design and use both Bayesian and frequentist perspectives to illustrate that COVID-19 infection caused a reduction of around 32 percent in legislators' expressed opposition to measures aimed at reducing the spread of COVID-19. Our findings highlight the limits of partisan motivated reasoning for an issue as salient as COVID-19 and in elites as polarized as US Members of Congress.

5.1 Introduction

It is no secret that democratic politics is increasingly characterized by partisan polarization. This is especially the case in the United States, where party polarization divides members from the two dominant political parties. Not only do partisans disagree on solutions to many of the greatest challenges we face, they disagree in many cases on the extent to which such challenges are a problem in the first place. One reason consensus seems increasingly further out of reach is because reasoning is increasingly motivated by partisan identity (Druckman, Peterson, and Slothuus 2013; Pennycook and Rand 2019; Bullock and Lenz 2019; Levendusky 2009). The extensive literature on partisan motivated reasoning demonstrates that interpretations of the world hinge on partisan affiliation. When faced with new information, partisans "systematically denigrate, depreciate, and counterargue evidence that is contrary to their political views," while at the same time uncritically accepting information that aligns with their partisan identity (Kraft, Lodge, and Taber 2015, p. 121). Although past studies show that partisanship shapes views on a range of issues from the state of the economy (Sorace and Hobolt 2021) to national security (Nyhan and Reifler 2010), we know surprisingly little about the limits of partisan motivated reasoning. Where this question has been investigated, there is some limited evidence that providing new and accurate information may promote reconsideration (Bisgaard 2015; Moon, Chung, and Jones-Jang 2022; Már and Gastil 2020). Yet, a number of studies also find the opposite, highlighting a "boomerang effect" where new information solidifies prior attitudes and amplifies partisan reasoning (Zhou 2016; Hart and Nisbet 2012).

The present study contributes to our understanding of the limits of partisan motivated reasoning by focusing on US Congressional elites and the highly salient and divisive issue of COVID-19. Despite conservatives often exhibiting greater fear and anxiety about perceived social dangers (Van Leeuwen and Park 2009), Republicans and conservative media organizations went to great lengths to minimize the level of risk associated with COVID-19 (Roberts

2022; Zhang, Chen, and Lukito 2022; Shin et al. 2022; Gollwitzer et al. 2020). In the first months following the discovery of the virus, then-President Donald Trump set the Republican Party agenda of downplaying and mis-characterizing the potential threat the virus posed (Paz 2020; Wolfe and Dale 2020; Gadarian, Goodman, and Pepinsky 2022). Republican elites followed, taking cues from President Trump by imitating derogatory language and touting unproven remedies as cures for infection (Cormack and Meidlinger 2021; Grossman et al. 2020). Before the virus was ever even transmitted in the United States, Trump activated partisan feelings about COVID-19 and widespread evidence suggests that voters quickly polarized on the issue (Pennycook et al. 2020; Rothgerber et al. 2020; Gollwitzer et al. 2020; Clinton et al. 2021).

Despite death and devastation caused by the spread of COVID-19, Trump and fellow Republicans appeared to remain loyal to the position that the virus would simply "disappear" (Wolfe and Dale 2020; Gadarian, Goodman, and Pepinsky 2022). Nonetheless, there was indeed a limit to legislators' willingness to downplay the virus and precautions aimed at slowing its spread. We argue that COVID-19 infection caused a change in legislators' world views and therefore constrained the degree to which they were willing to emphasize opposition to COVID-19 restrictions. In the first two years of the pandemic, nearly half of Congress experienced COVID-19 infection. We adopt a staggered difference-in-differences design to estimate the effects of COVID-19 infection on legislators' propensity to keep pace with their party in opposing COVID-19 mitigation measures. We focus on legislators' communication on Twitter, which served as a key forum for articulating views about the pandemic for members of both the House and Senate. In total, we identified over 80,000 tweets that focused on a COVID-19 related policy measure such as mask-wearing, social distancing, lockdowns and vaccine distribution and mandates. After fine tuning a large language model based on the BERT transformers architecture (Devlin et al. 2018) to identify messages that expressed opposition to COVID-19 mitigation policies, we classified all

COVID-19 related tweets sent by US national representatives for the first 28 months of the pandemic. We then use both Bayesian and frequentist approaches for estimation to show that COVID-19 infection reduced legislators' expression of opposition to COVID-19 policies by approximately 32 percent.

Our results show that there are indeed limits to the lengths legislators will go to remain loyal to their party's position, and suggest the existence of an "affective tipping point" at which individuals forego their party-driven pretenses and update their behavior according to new information. Our findings also highlight the role of changes in an individual's environment through the form of risk realization and the ways in which it may affect political behavior. In line with past studies that have shown that voters change their behavior regarding salient political issues such as climate change following a personal experience (Baccini and Leemann 2021), our results show that political elites changed their behavior in response to COVID-19 infection. Behavioral change in the form of elites' revealed preferences to realized risk is one of the few known phenomena that expose the limits of partisan motivated reasoning for political elites in a context as polarized as the United States.

In the rest of the chapter, we proceed by first highlighting the literature on partisan motivated reasoning. We then present our theoretical argument for the effects of COVID-19 infection. Section three provides the research design and methods used. Section four presents results and robustness checks. Section five offers a discussion and concludes with the implications of our findings.

5.2   Partisanship and Motivated Reasoning

Research on motivated reasoning characterizes the phenomenon as "an unstoppable partisan force that blinds everyone to everything" (Leeper and Slothuus 2014, p. 138). Rooted in the psychological literature, the cognitive processing of information (i.e. reasoning) can be motivated by directional or non-directional goals (Kunda 1990). Whereas non-directional

reasoning is motivated by accuracy and is independent of a specific conclusion, directional goals motivate individuals to reason with a specific conclusion in mind. All reasoning is motivated, but the latter – directionally motivated goals – are often the focus of studies examining the role of motivated reasoning as a driver of biased information processing. Reasoning through the lens of a specific directional outcome can result in seeking sources that confirm rather than disconfirm beliefs (confirmation bias), viewing congruent information more favorable than incongruent information (prior attitude effect), and can lead individuals to go to great lengths to downplay or counterargue incongruent information (disconfirmation bias) (Taber and Lodge 2006; Flynn, Nyhan, and Reifler 2017).

Education, expertise and political sophistication are far from cures for motivated reasoning. If fact, a number of studies find that these attributes have the opposite effect, increasing directional motivations in processing information. For example, Drummond and Fischhoff (2017) show that individuals with greater scientific knowledge and higher education levels are more likely to express polarized beliefs. Similarly, Kahan et al. (2017) finds that individuals who possess higher numerical skills selectively apply such skills when confronted with empirical tasks that amount to a conclusion incongruent with their political outlooks. Studies conducted on political elites similarly show that expertise is a barrier to openness to conflicting opinions (Pereira and Öhberg 2020). This observation is similar to what Broockman and Skovron (2018) call "disagreement discounting", which occurs when legislators systematically discount the opinions of constituents with whom they disagree.

No issues are out of bounds when it comes to partisan motivated reasoning. Not only does partisan affiliation shape perceptions of social conditions such as the state of the economy (Sorace and Hobolt 2021; Schaffner and Roche 2016), not even matters of "settled science" are immune (Nyhan and Reifler 2010; Hornsey et al. 2016; Kahan 2015). Studies have illustrated motivated reasoning on issues such as climate change (Hornsey et al. 2016), vaccine safety (Joslyn and Sylvester 2019), national security (Nyhan and Reifler 2010) and

most recently, COVID-19 (Pennycook et al. 2022; Altiparmakis et al. 2021; Sommer and Rappel-Kroyzer 2022; Druckman et al. 2021). On COVID-19 alone, studies find that partisan beliefs are correlated with COVID-19 risk perceptions, vaccine hesitancy and adherence with COVID-19 mitigation measures (Pennycook et al. 2022; Ye 2021; Gollwitzer et al. 2020; Grossman et al. 2020). Similarly, Rothgerber et al. (2020) find partisanship to be associated with perceived media accuracy in covering the pandemic, as well as the extent to which the severity of the virus is discounted.

5.2.1   Reducing Motivated Reasoning

The research on motivated reasoning convincingly illustrates that individuals are motivated to view the world through a partisan lens. Yet, at what point do individuals abandon their partisan pretenses? Although this question appears far less in the literature on motivated reasoning, there are several studies that shed light on the issue. The most applicable account comes from Redlawsk, Civettini, and Emmerson (2010, p. 564), who show that there is an "affective tipping point" at which voters "stop reinforcing their preferences, abandon motivated reasoning, and begin 'rational' updating." The authors present experimental evidence in which participants were exposed to a series of simulated primary election campaigns for four candidates that share a party identity with the participant. When initially presented with negative campaign information about co-partisan candidates, the participants evaluate the candidates higher in the short term, indicating the rejection of negative information about the candidate, before continuously lowering their evaluations over time, ultimately reducing evaluations to levels below their original assessments. The Redlawsk, Civettini, and Emmerson (2010) study is important not only because it confirms other findings that show that partisans initially react to unfavorable information by doubling down, but also because it shows that there is indeed a reasoning tipping point when a critical mass of changing environmental conditions lead individuals to reconsider their previous preferences.

Building on the work of Redlawsk, Civettini, and Emmerson (2010), Már and Gastil (2020) find support for the "affective tipping point" hypothesis in the context of a citizens' assembly in Oregon. The authors show that participating in the deliberative minipublic inspired accuracy rather than direction motivations in older voters on the issue of GMO seed bans. The results of the study encourage the idea that an affective tipping point exists; however, it is also likely that issue salience mediates the extent to which partisan affiliation motivates reasoning, with low salience issues being less polarizing (Druckman, Peterson, and Slothuus 2013; Guay and Johnston 2022).

Other studies have examined the extent to which misperceptions can be remedied by providing new information that contradicts a previous viewpoint. For example, Pereira (2021) argues that the personal biases of legislators shape their beliefs about public opinion. Two conditions – selective exposure and social projection bias – are given to explain legislators' overestimation of the preferences of privileged voters and their own personal positions. In a follow-up experiment, Pereira exposed politicians to further information about the composition of the electorates they represent. After exposure, the representatives were asked to consider the new information when estimating constituency support. Results indicate that exposure indeed reduces the extent to which representatives project their own views on to the public, but that new information did not go far enough to improve legislators' ability to correctly identify the majority opinion.

Each of the three aforementioned studies finds at least some support for the idea that providing accurate information to individuals who otherwise have directional motivations may reduce biases. Yet, one open question in this line of research is on the extent to which elites and the public systematically differ (Kertzer 2022). Although we might expect political elites to possess greater information about potential threats and therefore be more likely to reach consensus on potential dangers, a number of studies confirm similar patterns of biased information processing in elites (Broockman and Skovron 2018; Walgrave et al. 2023;

Pereira and Öhberg 2020). Moreover, to the extent that political elites are more politically sophisticated and educated than the general population, past findings indicate that these attributes further polarize opinions and may even exacerbate prior divides due to extensive counterarguing (Hart and Nisbet 2012).

Not all new information, however, is conveyed through verbal communication. What is common between the studies that identify an affective tipping point for motivated reasoning is that individuals are personally immersed in an environment that leads them to view the world differently. Instead of being told what to think, participants in the deliberative assembly (Már and Gastil 2020) or who witnessed simulated campaigns (Redlawsk, Civettini, and Emmerson 2010) were given the space to reach new conclusions on their own. A more pronounced example is demonstrated in the literature on exposure to extreme weather events and attitudes about climate change. For example, Baccini and Leemann (2021) find that exposure to a flood increases votes on pro-climate initiatives by around 20 percent. The authors do not explore the degree to which motivated reasoning played a role in pre-intervention attitudes, but the results nonetheless reveal that when a change to an individual's environment is realized, voters adjust their behavior on climate change related measures. Importantly, the authors show that exposure to an exogenous event leads to behavioral change (i.e. voting behavior) rather than changes in expressed preferences. In contrast, past research on the effects of climate change finds little, if any, support for the idea that exposure to an extreme weather event changes attitudes or beliefs about climate change (Carlton et al. 2016; Howe 2021). Consequently, while exposure to an exogenous event such as extreme weather may lead to behavioral changes, these changes may occur independent of a change in individuals' willingness to share that their prior attitudes have changed, which highlights the importance of observing individuals' revealed preferences.

We apply this perspective to outline our theoretical expectations for the effect of COVID-19 infection on legislators' revealed preferences regarding COVID-19 policies. A personal

experience with an event that causes harm or damage to an individual can have profound effects. In the context of COVID-19, research has shown that unlike social pressure or the advice of medical professionals, personal perceptions of risk shape the behavior of individuals (Sakakibara and Ozono 2020; Wise et al. 2020). For example, Wise et al. (2020) document that perceived probability of personally being infected is a strong predictor of compliance with protection measures. Essentially, when there are low perceptions of risk from being infected with COVID-19, it is easier to downplay the virus and ignore its potential effects.

We hypothesize that there are two co-constitutive factors at play that result from COVID-19 infection. First, infection reduces opposition to COVID-19 by causing legislators to update their perceptions of risk of infection. Legislators who downplayed the risks of the virus do so because their reasoning is shaped by their party identities, and they do not expect to face tangible personal repercussions from their policy positions on COVID-19. Once infected, legislators are no longer able to maintain the partisan illusion that COVID-19 does not pose a substantive threat to their own and others' well-being.

Second, legislators may reduce their expression of opposition to COVID-19 measures due to personal strategic considerations. Policy reversals are costly (i.e. 'flip-flopping'), so legislators face strong electoral incentives to "stick to their guns" as part of an attempt to maintain an image of competence (Andreottola 2021). This effect was likely further magnified because journalists were quick to point out the alleged hypocrisy of representatives whose behavior differed from their partisan claims about COVID-19 measures (LeBlanc 2020). Yet, not *all* policy reversals are costly. When representatives change positions to move in the direction of public opinion, the benefits of the reversal can outweigh the costs associated (Doherty, Dowling, and Miller 2016). Consequently, when representatives experience an environmental change in the form of COVID-19 infection, they may take the opportunity to strategically shift to be more in line with public opinion on the matter, as well as to avoid further scrutiny from both the media and voters.

We caveat our expectations with the possibility that the effect of COVID-19 infection on legislators' revealed preferences may be conditional on the severity of the infection. Moreover, legislators who are infected with COVID-19 but are asymptomatic may not experience the same effects as those who experience more severe symptoms, and therefore may not have the same incentive to respond to the infection. We still expect these legislators to update their risk perceptions for two reasons. First, even if they are asymptomatic, they are likely to be excluded from representative duties and therefore may still experience the same social pressure regardless of severity. Second, asymptomatic infection still carries with it the possibility of infecting the legislator's colleagues, family members and constituents. Therefore, asymptomatic individuals, or individuals that have only mild cases of COVID-19, may still update their prior beliefs about the chances of future infection for themselves and those around them.

5.3   Research Design

Since the beginning of the pandemic, COVID-19 infection was common among elected officials from around the world, including high profile politicians such as Boris Johnson, Joe Biden, Donald Trump, Emmanuel Macron, and Jair Bolsonaro, just to name a few. US politicians were no exception. Within three months of the first confirmed case in the US on January 21, 2020, 53 US members of Congress had been infected with the virus (GovTrack 2022). By the end of 2020, that number would rise to 118 congressmemebers. In total, from the time between January 2020 and May 2022, 230 legislators were infected with COVID-19. We focus on this time period in our analysis.

We refer to legislators' communication on Twitter to understand their opposition to policies aimed at reducing the spread of COVID-19. Communication on social media, and Twitter particularly, makes for an excellent source of measuring the political attitudes and preferences of elites. Twitter also likely provides legislators more leeway to dissent from their

party's position without facing the kinds of repercussions associated with breaking with the party in the legislature. Moreover, legislators regularly use Twitter to discuss political issues and communicate with constituents. For instance, Russell (2021b) shows that Twitter offers "a birds-eye view" of national public attention and that US representatives use Twitter to build policy reputations with constituents. Additionally, Twitter messages sent from politicians are excellent for understanding elites' political interests and issue priorities due to the level of conciseness required in a message that is limited to 280 characters (Barbera et al. 2019). Unlike political speeches or other lengthier forms of communication, tweets require clear and unambiguous declarations of interests which makes classification much easier. Finally, Twitter over-represents elites – nearly every US legislator has an active Twitter account and engages on the platform.

To understand elites' individual preferences on COVID-19 containment policies, we identified related tweets sent by elected representatives in the US House of Representatives and the Senate. We first collected every tweet sent from US legislators during the time period from January 2020–May 2022. The tweets were then filtered using keyword searches pertaining to COVID-19. We used the keywords "covid", "corona", "sars-cov-2", "vaccine", "virus", "mask", "lockdown", and "social distanc",[1] The aim of the keyword search was simply to identify tweets that explicitly concerned measures aimed at COVID-19 related issues. After the keyword search, there were 81,160 messages that were about COVID-19 and/or a policy aimed at reducing its impact.

The next step was to identify tweets that expressed opposition to efforts to slow the spread of COVID-19. For this, we fine-tuned a large language model (LLM) based on the BERT architecture (Devlin et al. 2018). The BERT transformer architecture allows for training and fine-tuning language models and achieves state-of-the-art performance on a number of different tasks. For our task, we used the BERTtweet model (Nguyen, Vu, and

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1. We used "social distanc" to capture both "social distance" and "social distancing." URLs were filtered out of messages before conducting the keyword searches.

Tuan Nguyen 2020), which was pre-trained on a corpus of 850 million English tweets, and then fine-tuned on an additional 23 million tweets related to COVID-19. Using this model as our base model, we then further fine-tuned the model on an additional 10,000 tweet sample from our dataset of 81,160 COVID-19-related tweets. This random sample of 10,000 tweets was hand-coded by the authors according to whether the messages expressed opposition to COVID-19 policies or procedures. We then used the trained model for inference on the remaining tweets. This method was impressively effective, and our model achieved an F1 score of 0.9537. Additional evaluation criteria and validation for the model is provided in Appendix D.1.

One of the most important steps in creating a supervised language model for classification is ensuring that the data used to train the model are accurate. The tweets varied widely, and ranged from messages that recommended outright refusal to wear masks, to false claims about the intention of government policies aimed at curbing COVID-19. The vast majority of the tweets were easy for label, however, a few were more challenging. For instance, a clear example of a tweet from the dataset that did not express opposition to COVID-19 policies includes the following, sent from Rep. Rob Wittman on May 28, 2020:

> "I will continue to lead our commonwealth as we navigate the federal, state, and local response to the health and economic impacts to the coronavirus. We must continue to practice social distancing to keep our nation and communities safe."

This instance clearly shows no indication of opposition to COVID-19 restrictions, and in fact encourages the public to take recommended precautions. The majority of messages about COVID-19 fell into this category (see Table 5.1 below). An example that we labelled as expressing opposition to COVID-19 measures includes the following, sent from Rep. Bob Good on July 28, 2021:

> "The House has reinstated its draconian mask mandate once again. My amend-
> ment would end taxpayer funding for mask mandates in the Capitol complex.
> Follow the science – no more mask mandates!"

From the message above, it is clear that Rep. Good opposes the mask mandates and even claims that his conclusion was reached by "following the science." This message was coded as expressing opposition.

It is also worth considering the types of messages that our model did not correctly classify. Although the model achieved high accuracy metrics, there are still some cases in which errors are made. To illustrate such an error, the following message from Thomas Massie in August, 2021 is an example of a tweet that our model incorrectly predicted did not express opposition:

> "On the subject of mandatory vaccines imposed by private employers... if this is
> a matter of private contracts, and not a matter of criminal law, what's the penalty
> for providing false vaccine information to an employer? termination? the same
> as refusing to take the vaccine?"

Although Rep. Massie does not explicitly challenge vaccine policies for private employers, he implies that individuals who find themselves in a situation in which they do not want to take the vaccine face the same risk (i.e. termination) regardless of whether they lie about taking the vaccine or outright refuse to take it. Implicit opposition to COVID-19 measures is harder to capture using text alone here, which is likely why the model mis-classified the tweet and did not identify it as expressing opposition. With that said, we do not expect these types of errors to bias estimates for two reasons. First, high precision and recall scores tell us that errors are rare. Second, given that the vast majority of tweets do not express opposition, classification errors are likely to favor the direction of failing to identify a message expressing opposition than the reverse. Consequently, estimates of opposition are likely conservative in the case of error.

After training and validating our model and classifying the remaining tweets, we created a new dataset with monthly measurements of tweets sent in opposition to COVID-19 restrictions, as well as monthly measurements of the total number of tweets sent about COVID-19 in general. These measurements were made at the individual legislator level for every elected legislator who sent a tweet about a COVID-19 measure at any point between January 2020 and May 2022. In the dataset, we also merged panel data on a number of items to use as covariates in the statistical models, which is explained further below. Because there are only two independent legislators, both of whom are Senators, we did not include data from legislators who were not in the Democratic or Republican parties. Table 5.1 presents descriptive statistics for the data.

Table 5.1. Descriptive Statistics

Party	Gender	N Legislators	N infected	N tweets	N opposition tweets
Democrat	Female	118	49	20,144	194
Democrat	Male	182	82	26,999	357
Republican	Female	45	14	4,468	1,638
Republican	Male	254	84	29,549	8,834
Total		602	230	81,160	11,023

5.3.1   Identification

The times at which legislators were infected ranged dramatically. As with fluctuations in public infection which corresponded to different variants of the virus, US legislators were infected at different times throughout the pandemic. Between January 2020 and May 2022, there were 230 legislators who were infected with COVID-19. Our identification therefore exploits variation in the times at which legislators were infected. Figure 5.1 presents the months at which legislators were infected with COVID-19. The figure also represents the

treatment schedule used in the analysis, with each time period representing a 1-month period

beginning in January 2020 and each unit representing an individual legislator ($N = 602$).

Fig. 5.1. Infection Status of US Legislators
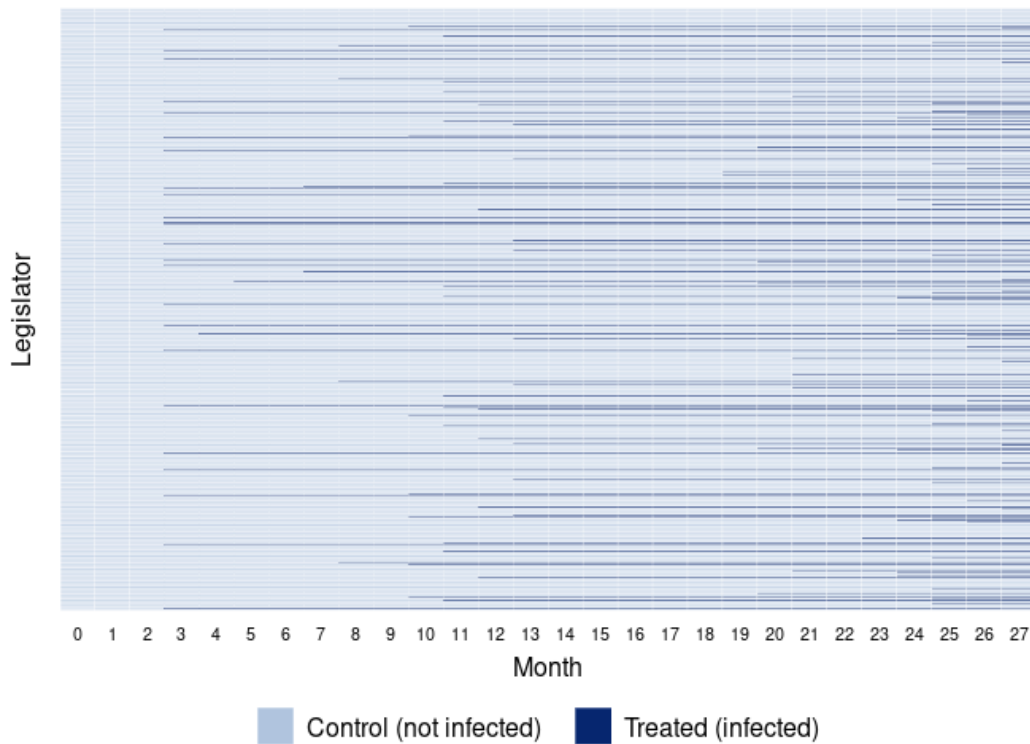
We rely on data from GovTrack (GovTrack 2022) for the dates at which legislators were

infected with COVID-19. The Govtrack team compiled the data on legislators' COVID-19

infections using a number of social and traditional media sources, and has produced high-

quality legislative data in other domains as well. Nonetheless, it is possible that legislators

were infected and kept their infection secret or did not show symptoms. In the latter scenario,

we do not expect an effect because COVID-19 itself would not have led to a change in the

individual's environment. However, the former scenario presents an opportunity for bias if

there are systematic differences between legislators who hid infection and legislators who

did not. There are a few reasons why we do not expect systematic biases in reporting about

COVID-19 infection among US legislators. First, legislators were required to be tested

during several periods (Bresnahan and Caygle 2020) in order to attend events such as the State of the Union address (NPR 2022). Second, hiding COVID-19 infection is likely to be a challenge for US legislators given a combination of age and public status. Individuals who are over 50 are at a significantly greater risk of hospitalization and mortality from COVID-19 (Biswas et al. 2021). Given that the average age of a US legislator is close to 60 (Cillizza 2021), it would be challenging to avoid requiring medical attention – along with the publicity that entails – in the case that legislators were hiding COVID-19 infection. Consequently, we proceed under the assumption that publicly available data on COVID-19 infection of US legislators are accurate.

We additionally considered several potential factors that may independently affect opposition to COVID-19 measures. Although we cannot demonstrate long-term parallel trends between infected and not-infected legislators given our staggered design, we present the mean opposition to COVID-19 measures while differentiating between the legislators who were infected with COVID-19 at any point during the time of our analysis and those who were not Figure 5.2. Here, mean opposition is the number of a legislator's opposition tweets divided by the number of her total tweets about COVID-19 for a given month.

From the figure, it does not appear that there are systematic differences between the average opposition between the two groups in the first year of COVID-19 measures. Additionally, opposition sharply increases around May 2021 for both groups. Around that time, the two groups separate in mean opposition and the control group remains higher for the rest of the time observed. The point of separation appears to align with the average month at which legislators were infected (May, 2021). It also appears that opposition increases for both groups at that point, but that it does not increase to the same degree for legislators who had not been infected by COVID-19.

Fig. 5.2. Proportion of Tweets Expressing Opposition to COVID-19 Measures

Proportion of Tweets Opposing COVID-19 Measures
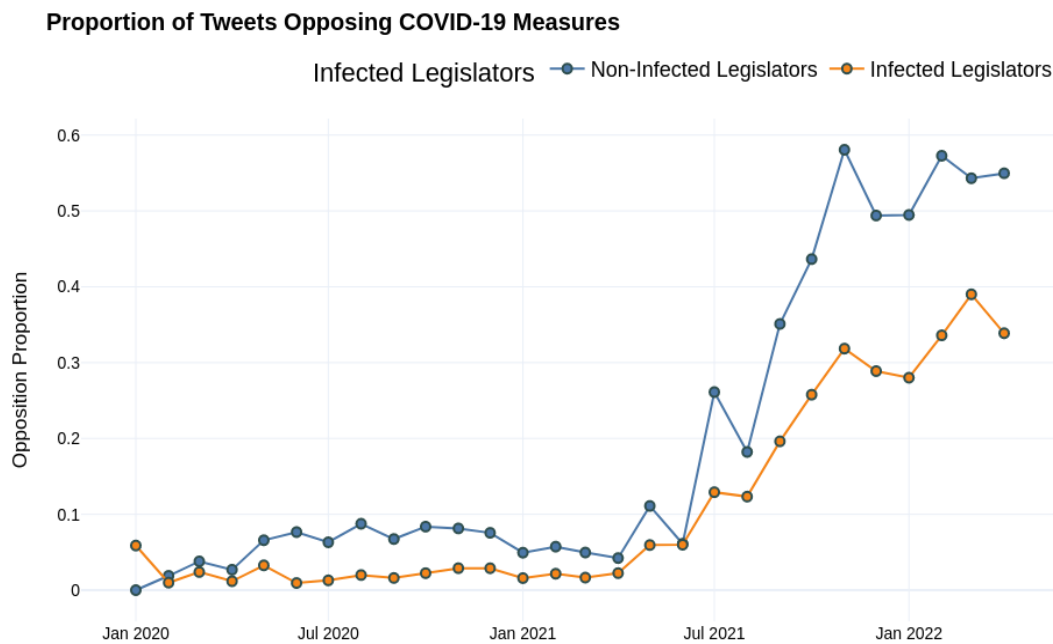
Note: Figure compares legislators who are infected at any point to those who are never infected (during the time period analyzed). The figure presents the proportion of tweets expressing opposition to COVID-19 measures for each group.

While it is uncontroversial to claim that legislators are unlikely to select to be infected with COVID-19, there are several imaginable scenarios in which legislators' behavior, adherence to safety measures, or pre-infection characteristics, such as age, gender, party affiliation or ideology could lead to systematic differences in the likelihood with which legislators were exposed to COVID-19 and therefore ultimately confound the relationship between infection and opposition. The most intuitive explanation is that Democratic legislators are less likely than Republican legislators to contract COVID-19 because Democrats placed a greater emphasis on public health and adherence to COVID-19 containment measures. This

scenario may be further illustrated when considering legislators' ideologies, with the most liberal/left-wing legislators being the most likely to observe public health guidelines and therefore the least likely to be infected with COVID-19. Yet, the infection rates across the two parties do not support this claim. Should party affiliation predict infection, we would expect higher infection rates for Republican legislators in relation to Democratic legislators. However, a greater percentage of Democratic legislators were infected with COVID-19 during the first 28 months of the pandemic. In total, 131 different Democrats were infected with COVID-19, compared to 99 different Republicans during the same time period.

This imbalance also cannot be accounted for by Congressional seats held. Democrats held 235 seats from the 2018 election and that number was reduced to 222 in the 2020 election. In contrast, Republicans held 199 seats from 2018 and increased seat count to 213 in 2020. Moreover, Republicans held a small majority in the Senate (8 seats in 2018, two in 2020). With those numbers in mind, the infection rate for Democrats was about 24 percent per seat held, while the infection rate for Republicans was about 19 percent, indicating that Democratic legislators in aggregate were more likely to be infected with COVID-19 than Republican legislators.

Although it does not appear that party affiliation predicts COVID-19 infection in the US Congress (at least in the way we might imagine), we also consider several additional factors that might influence the dependent variable. First and foremost, COVID-19 quickly became a partisan issue, with Democrats much more likely than Republicans to support greater restrictions aimed at curtailing the spread of the virus (Deane, Parker, and Gramlich 2021). Moreover, beyond party affiliation, there is also potential for within-party variation in opposition to COVID-19 measures, with more conservative legislators more vocally opposed to restriction and more left-wing legislators more in favor. Therefore, we included in the models data both on legislators' party affiliations and legislators' ideologies. For legislators' ideologies, we relied on DW-Nominate scores, which provide relative estimates based on

roll-call voting records according to both social and economic dimensions (Lewis et al. 2019; Poole and Rosenthal 1985). These measures were included to account for intra-party variation in ideology, and potential differences in how legislators would ultimately oppose government measures aimed at controlling public behavior.

Beyond party and ideology, we also included several covariates to account for additional factors that may influence the outcome variable: the level of support/opposition for COVID-19 containment measures. First, Algara, Fuller, and Hare (2020) identified a gender gap in support for government intervention and COVID-19 containment measures throughout the COVID-19 pandemic in the US. The authors find that women were more likely than men to support greater intervention. Therefore, we conditioned on gender in the models. Additionally, we included data on legislators' ages in our models. Older Americans were less in favor of greater COVID-19 restrictions in relation to younger Americans (Deane, Parker, and Gramlich 2021). This relationship likely also generalizes to US legislators as well, so we include age of legislator in the models.

Finally, we include measures of new COVID-19 cases and deaths to reflect the current severity of the COVID-19 pandemic at different times in each legislator's respective state. As cases increased, legislators intuitively gave more attention to COVID-19 (Kim et al. 2021). Considering this, as cases decreased, legislators may see less of a need for COVID-19 containment policies and may be more likely to express opposition to such policies. Therefore, the level of public threat posed by COVID-19, captured by change in the number of new infections in the public, is likely to be correlated with support/opposition for COVID-19 restrictions. We included covariates for monthly COVID-19 cases and monthly COVID-19 deaths (CDC 2022) according to the state each legislator represents. These measures are intended to reflect the conditions of each legislator's constituents.

Table 5.2 presents the pre-adjusted means of the confounding variables according to whether legislators were infected. As addressed previously, Democrats (0) were slightly more

likely to be infected with COVID-19 than Republicans. In line with this party imbalance, there is a small imbalance in ideological composition. This imbalance similarly reflects the fact that Democratic lawmakers, who occupy an ideological space to the left of Republicans on average, were more likely to be infected with COVID-19. To overcome these imbalances, we used entropy balancing (Hainmueller 2012) to balance pre-treatment covariates. Entropy balancing is a re-weighting technique used to adjust imbalance in representation between treated and untreated groups. We achieved pre-treatment balance on all covariates at a p-value of < 0.01.

Table 5.2. Balance of Covariates by Infection Before Entropy Balancing

	Party	Gender	Age	Ideology (economic)	Ideology (social)	Treated
Mean	0.427948	0.724891	59.271414	0.000257	-0.012557	True
Mean	0.543243	0.729730	59.950312	0.112824	0.017756	False
Std.	0.494823	0.446607	11.822871	0.447152	0.314438	True
Std.	0.498152	0.444122	12.462145	0.457051	0.296533	False

Note: Party: Democrats = 0, Republicans = 1; Gender: Men = 1, Women = 0.

5.3.2 Estimation

We adopt two different estimation strategies to estimate the effect of COVID-19 on legislators' opposition to COVID-19 containment policies. Our primary strategy relies on a Bayesian hierarchical model with a binomial likelihood in order to estimate the probability of a given legislator sending a tweet that opposes COVID-19 as a condition that the legislator sends a tweet about COVID-19. We additionally adopt frequentist panel data methods as a secondary estimation strategy, which is explained below. Our primary hierarchical modelling approach was taken for several reasons. First, our strategy allows for greater substantive interpretation.

For example, the posterior estimate for the COVID-19 infection parameter represents the expected value (in log likelihood) that a legislator's COVID-19-related tweet expresses opposition to COVID-19 policies after infection. Secondly, we model the data-generating process given that each respective tweet in the dataset reflects a legislator's interest in a COVID-19 policy, and each tweet exists as an separate occasion on which a legislator has two options – she can either express support for a policy or could express disapproval. Therefore, we model the data as a sequence of Bernoulli trials in which the number of times a legislator expresses opposition ("successes") is measured in relation to the number of times the legislator expresses approval ("failures") (Gelman et al. 2014). We aggregate these "trials" at monthly intervals for all legislators in the dataset to create a balanced panel.

Our dataset includes 602 legislators, 230 of which were infected with COVID-19 between March 2020 and May 2022. Consequently, we use the legislators who were not infected with COVID-19 as a control group. The outcome variable – expressed opposition to COVID-19 containment policies – is measured at a monthly interval and takes a value of the number of times a legislator expresses opposition out of the number of tweets the legislator sends about COVID-19 policies.

Our model selects minimally-informative priors and a binomial likelihood. In the models, we include a binary treatment variable that takes the value of 1 at the point at which a legislator is infected with COVID-19 and for the remaining observations of that legislator, and takes a value of 0 in the case that the legislator is not (or not yet) infected with COVID-19 (see Figure 5.1 for treatment schedule). For sampling from posterior distributions, we rely on the PyMC3 library in Python (Salvatier, Wiecki, and Fonnesbeck 2016). For our specific task, PyMC3 utilizes Metropolis-Hastings sampling, a popular and efficient Markov Chain Monte Carlo method. Posterior sampling is taken from eight chains using 2000 draws. We drop the first 1000 draws, which are used for tuning. The minimum acceptance probability for sampling from each chain was set to 95 percent and the mean acceptance probability

was 96.91 for the results presented in the analysis. We provide the full model and prior assumptions in Appendix D.2.

5.4   Results

Our theoretical expectations outlined above suggest that COVID-19 infection may lead legislators to reduce their expressed opposition to COVID-19 mitigation measures in relation to legislators who are not infected. Figure 3 plots the posterior distribution for the effect of COVID-19 infection on opposition. The "Treatment effect" posterior distribution represents the expected value in log-likelihood of expressing opposition to COVID-19 containment policies after being infected by COVID-19. This estimate is derived in relation to the control group, which consists of the 372 legislators who were not infected by COVID-19 during the time period analyzed.

From the posterior distribution for the treatment effect parameter, we can see that the sampling mean is -0.36, indicating that infection reduces opposition. The posterior distribution also tells us that 100 percent of the samples fall below zero, which represents the likelihood that the treatment effect is statistically differentiable from zero (i.e. the probability that COVID-19 infection reduced opposition to COVID-19 at least to some degree, given our model is accurately specified).

In order to understand the degree to which COVID-19 infection reduced opposition to COVID-19 measures in substantive terms, one way would be to interpret the posterior sampling mean as a point estimate. Therefore, we exponentiate the value given that the link function used in our model includes a logit transformation of the probability of success ($g(\mu_i)$ = $\log(\mu_i/(1 - \mu_i))$). Doing so with the sampling mean indicates a mean reduction of 30.3 percent in probability of expressing opposition to COVID-19 policies following COVID-19 infection ($e^\beta = 0.697$). The full results in table format are provided in Appendix D.2, and the full plot traces for each of the parameters in the model are provided in Appendix D.3.

Fig. 5.3. Posterior Sampling Distribution for the effect of COVID-19 Infection

Posterior Distribution: COVID-19 Infection
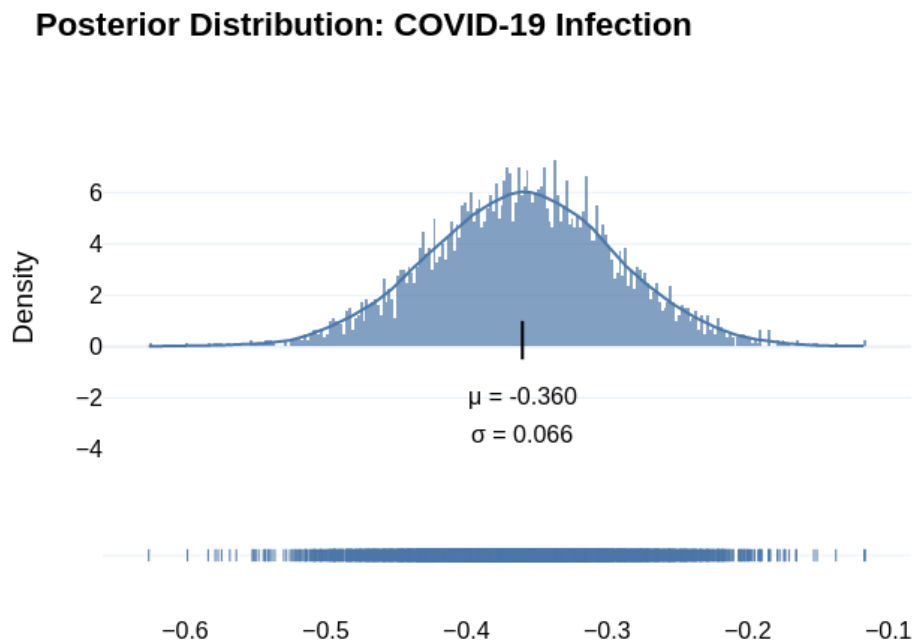
Note: Posterior sampling distribution for the effect of infection parameter. Full results available in Appendix D.2.

5.4.1 Frequentist Estimation

For robustness, we also modelled the data using freqentist methods. Traditionally, two-way fixed-effects (TWFE) equations where time and entity effects are fixed have been used to estimate DiD designs. However, TWFE estimation has increasingly come under scrutiny in the econometrics literature (Sun and Abraham 2021; Gardner 2022; Callaway and Sant'Anna 2021). One of the key shortcomings of TWFE estimation of staggered treatment in difference-in-differences designs is that newly-treated units are increasingly compared to already-treated units as time passes. For example, in our dataset, treatment effects for legislators who were first infected in mid-2022 would be compared in TWFE models to

legislators who were infected in March 2020, leading to improper comparisons. Consequently, difference-in-differences estimates using TWFE can result in biased estimates. Therefore, we estimated group–time average treatment effects ($ATT(g,t)$) using the doubly-robust group–time estimator outlined by Callaway and Sant'Anna (2021). The estimator considers each group (treated, untreated, not yet treated) and time period combination separately, which amounts to many estimates which can then be aggregated dynamically to provide an average treatment effect on the treated, amounting to a point estimate.

Using the Callaway and Sant'Anna group–time estimator, we estimated treatment effects using similar specifications. To account for the fact that our dependent variable is opposition tweets in reference to total tweets about COVID-19 policies, we used the proportion of opposition tweets to total tweets as the dependent variable in estimation. Additionally, standard errors were clustered at each legislator and we estimated models using both never-treated and not-yet-treated control groups as the counterfactual. As with the benchmark models, the control variables (pre-treatment) were balanced using entropy balancing.

Table 5.3 presents the results. In both models, the estimates indicate a reduction of ~ 3.5 percentage points in expressed opposition following infection with COVID-19. In numerical terms, this effect size appears much smaller than the effect identified in the Bayesian models. Yet, the dependent variable differs here in that we measured the proportion of opposition tweets to total tweets (see Figure 2). Mean expressed opposition from legislators in the control group (who were not infected with COVID-19) was about 10.06 percent, so a reduction of 3.5 percentage points indicates around a 35 percent decrease in the number of tweets expressing opposition. This estimate is very close to the Bayesian interpretation of the treatment effect using the posterior sampling mean which indicated a change of 30.3 percent, providing assurance that our results are not likely to be dependent on model specifications or statistical paradigm. All in all, our results lend strong support to the hypothesis that COVID-19 infection reduces opposition to COVID-19 mitigation measures among legislators.

Table 5.3. Doubly-robust estimation of COVID-19 infection on opposition to COVID-19 policies

	Model 1	Model 2
$ATT(g,t)$ by dynamic aggregation	−3.555**	
	(1.4578)	
$ATT(g,t)$ by dynamic aggregation		−3.5443**
		(1.508)
State COVID-19 cases	✓	✓
State COVID-19 deaths	✓	✓
Age	✓	✓
Num. Obs.	602	602
Std.Errors	Legislator	Legislator
Type	Dynamic	Dynamic
N Group	20.000	20.000
N Time	28.000	28.000
Control Group	Never treated	Not yet treated

*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Note: Standard errors were clustered by individual legislator and are provided in parentheses. The dependent variable was multiplied by 100 to provide an estimate in percentage points.

5.5 Discussion

As the world must increasingly grapple with the effects of crises such as climate change and pandemics, the electorate, as well as our political leaders, must update their worldviews according to new information. Reasoning through a partisan lens may offer ontological security, but it will do little to address the many challenges we face as a planet. As with climate change denial, skepticism and outright refusal of compliance with public health guidelines could be witnessed at nearly every position in government throughout the pandemic. Despite social and political pressure to take the virus more seriously, American legislators broadcast thousands of messages that expressed opposition to policies intended to slow the spread of COVID-19.

At the heart of why legislators downplayed the potential threat posed by the virus, we argue, is partisan motivated reasoning. Motivated reasoning plagues elites in the same way it might affect any other individual. Elites, like all of us, have a tendency to underestimate information perceived to be politically or personally damaging (Broockman and Skovron 2018). Although there is evidence that the media diets of partisans (Broockman and Kalla 2022), or trust in politicians (Saunders 2017), are drivers of polarization, the dominant explanation for partisan division identifies the role of elites in activating partisan attitudes among the electorate (Druckman, Peterson, and Slothuus 2013; Bolsen, Druckman, and Cook 2014; Nicholson 2012). Moreover, many of the most divisive issues become polarized in a similar fashion. Elites and more politically sophisticated individuals – both of whom are more polarized and more likely to reach conclusions that align with their partisan identities than the general electorate – articulate distinct conclusions about the same issue (Drummond and Fischhoff 2017; Bayes and Druckman 2021). As directions are set and in an effort to ensure that they are on the correct side of the argument, information that supports a certain viewpoint is amplified while conflicting information that challenges said viewpoint is simultaneously and systematically downplayed (Hart and Nisbet 2012; Broockman and Skovron 2018; Bayes and Druckman 2021).

The most recent and salient iteration of this top-down partisan process played out on the issue of COVID-19. From the time of the initial spread of COVID-19 in early 2020, then-President Donald Trump unleashed a number of false or misleading claims about the virus (Paz 2020; Wolfe and Dale 2020). At various points, Trump and fellow Republicans blamed Mexico, China, Democrats, immigrants, and the "mainstream media" for the spread of COVID-19 (Wolfe and Dale 2020; Paz 2020; LeBlanc 2020). When the buck could no longer be passed, Republicans, led by Trump, went to great lengths to downplay the threat of COVID-19, often sharing misinformation and conflicting public health advice from government officials (Cook and Choi 2020; Gollust, Nagler, and Fowler 2020). Trump's

rhetoric and position on COVID-19 set the agenda for the broader Republican party, with many members emphasizing a similar sentiment (Cormack and Meidlinger 2021). With this in mind, Republicans in Congress had strong incentives to continue on the same path of emphasizing opposition to COVID-19 measures and downplaying the risks of the virus.

At the time of the initial COVID-19 outbreak, Donald Trump and fellow Republicans were gearing up for the 2020 election. At that time, the US had its lowest unemployment rate in nearly a century, and the stock market was at all time highs (Reserve 2022; MarketWatch 2022). Republicans likely imagined translating these two predictors of incumbent success, as well as other positive elements of the economy at the time, into a 2020 electoral victory. Consequently, when faced with the dire impact that the COVID-19 pandemic would bring to the economy, Republicans were deeply opposed to measures to contain its spread because they saw such measures as a threat to the economy and therefore to their electoral futures. Consequently, the chosen pathway forward was to deny the potential risk posed by the virus in order to maintain their favorable electoral position. Yet, denying the severity of a potential risk becomes harder once that risk is realized, which occurred when legislators were infected with COVID-19.

In conclusion, this chapter makes two key contributions to our understanding of elites and the limits of motivated reasoning. First, our study confirms that an "affective tipping point" at which individuals abandon partisan motivations and reassess prior positioning indeed exists. Moreover, such a tipping point not only exists in an environment as polarized as the US, but for an issue as salient as COVID-19 and for individuals who are likely to be the most polarized – political elites in Congress. This finding is both encouraging and discouraging at the same time. While it is illuminating that partisan motivated reasoning may not be an "unstoppable force that blinds everyone to everything" (Leeper and Slothuus 2014, p. 138), it is discouraging that infection with a deadly virus is the point at which US legislators forego their partisan motivated pretenses.

Second, the chapter speaks to the research on the role of exogenous events and their influence on political behavior. Past studies have found conflicting results on the effect of extreme weather events and beliefs about climate change. Yet, there is evidence that climate events may change the political behavior of individuals (Baccini and Leemann 2021). Our study contributes to this research by showing that a behavioral change may occur even before individuals are willing to share that they have changed their attitudes. While our data do not allow us to explicitly test whether infection changed legislators' attitudes toward the virus, there is an argument to be made that behavioral change is much more important than changes in preferences. Furthermore, it is unlikely if not impossible that the former can occur without at least some change in the latter.

There are several directions for future research that can build on this study. First, research on the limits of motivated reasoning in elites is lacking. Unlike the wider public, elites are more educated and hold a higher status in society. These factors create a lower incentive for elites to update their views about the world (Tetlock 2017), and past studies indicate that elites' expertise acts as a constraint on their ability to adequately respond to changing conditions (Pereira and Öhberg 2020). With this in mind, greater focus on the ways in which cognitive biases and motivated reasoning may be remedied in elites is a challenging yet important path for future research. A second avenue for future research could investigate how the effects of exogenous events such as COVID-19 infection or exposure to extreme weather events play out over time. Do these events lead to transformative and long-lasting change, or do they simply reflect short-term strategic motivations? Given the novelty of the COVID-19 outbreak, the available data do not allow for answers to such a question, however, future research may explore time heterogeneity in the effect of COVID-19 infection or other similar exogenous events that lead to changes in political behavior.

Chapter 6

Conclusion

6.1   Conclusion

Throughout the thesis, I argued that group identity is key to understanding representatives' behavior. Drawing from the literature on social identity and descriptive representation, I argued that group identity can be a source of cooperation between groups, enhancing the representative relationship and leading to greater responsiveness. Yet, group identify can also act as a constraint on representation quality, redirecting representatives' attention to one group at the expense of another.

This was shown to be the case in the United Kingdom, where representatives' social class constrained the extent to which members of parliament echoed the issue concerns of the public. In chapter 3, I used attendance at one of the two Oxbridge universities – Oxford and Cambridge – as a proxy for social class, arguing that attendance captures several elements of social class in the UK that may be missed by examining occupational background alone. The findings of the chapter showed that MPs who attended Oxford or Cambridge lagged their parliamentary peers in responding to the issue priorities of the electorate via written and oral questions, as well as early day motions.

The explanatory power of group identity was further demonstrated in chapter 4, which took up an age-old question about the link between women's descriptive and substantive representation. Despite a wide and important body of literature on the topic (Mansbridge 1999; Phillips 1998; Campbell, Childs, and Lovenduski 2010; Celis and Childs 2012; Reingold 2008; Bratton and Ray 2002; Dovi 2007; Wängnerud 2009; Kittilson 2008; Carroll 2003), the empirical literature linking descriptive representation to enhanced responsiveness to women constituents reaches mixed conclusions.

In the chapter, I to add to the debate by examining the degree to which representatives in the US and UK use social media to speak to the issue priorities of their constituents. The chapter includes three key findings. First, the issue priorities of women in both countries are not taken up by representatives to the same extent as the issue priorities of men. Second,

female representatives offer greater responsiveness to the issue priorities of women con-
stituents compared to male representatives in both countries. Third, an enhanced relationship
between women representatives and female constituents does not come at a substantive cost
to men, as women representatives are also more responsive to men's issue priorities than
male representatives.

In chapter 5, (co-authored with Tevfik Murat Yildirim), we explored the bounds of group
loyalty based on party affiliation. The motivation for the chapter came from a desire to
understand the lengths political elites will go to remain loyal to their group identities when
they are salient. For this, we turned to the hyper-partisan context of the US Congress, where
affective polarization has increasingly solidified partisan group identities. Past research has
characterized partisan loyalty and partisan-based reasoning in the US is "an unstoppable
force...that blinds everyone to everything" (Leeper and Slothuus 2014, p. 138). Despite this,
our findings shows that when members experience an exogenous event that threatens their
own wellbeing, they change their behavior and break with their group's position, even when
both the issue and group identity are salient.

The substantive takeaway from this chapter is that group identity is not a static concept.
It is not a fixed characteristic that determines how representatives behave in all contexts.
Rather, group identity is a dynamic concept that can change over time. Moreover, there are
limits to the lengths individuals will go to remain loyal to their group identity. When personal
self-interests conflict with the preferences of the group, individuals update their behavior in
line with rational expectations.

Although representatives are loyal to their political parties and parties exert significant
influence on representatives, representatives must also navigate the influence of the media
and interest groups. In chapter 2, I showed that one such group that receives a considerable
response from representatives is multinational corporations. The chapter compares the
relative influence of bottom-up groups that advocate for specific causes in society with

the influence of multinational corporations, which often push for favorable regulations that benefit private interests. While organized groups such as corporate lobbyists have a long history of swaying politicians, the ways in which they have traditionally leveraged this influence is through private donations to campaigns or political organizations. Yet, corporations have grown increasingly willing to not only take controversial political stances, they now broadcast these stances online on social media platforms. The chapter shows that in the battle for representatives' attention between private and public interests, private interests consistently merit a greater response on social media from MPs in the House of Commons.

6.2 Methodological Contributions

The studies of this thesis rely on a number of ways to understand the representation relationship in terms of responsiveness to the public. Despite the primarily substantive aims of the thesis, I have also developed a number of ways to study representation and elite responsiveness that are worth highlighting. One of the key contributions comes in the use of social media behavior as a proxy for elite behavior. Never before have we had such rich data on the behavior of political elites. From the perspective of political elites, social media provides a platform to broadcast their views to the public. But from the perspective of the public and researchers alike, social media presents a unique opportunity to get inside the minds of the most powerful people in the world.

The opportunities presented by the study of social media behavior are not without problems – most notably the fact that social media data is not representative of the population. Such data are biased in favor of the young, the educated and the affluent. Moreover, not everyone uses social media in the same ways. Whereas some may use Twitter to post about the latest fashion trends, others may simply not post at all. Yet, these clear limitations are much less relevant for the study of elites because many politicians in the democratic world uses social media to broadcast their views to the public. Moreover, social media does not

appear to be biased in favor of any particular political party, ideology or demographic group. This positions social media as a strong medium to understand political elites' attitudes and behaviors.

Although I highlighted the potential benefits of using social media data throughout the thesis, it takes considerable computational and methodological effort to go from millions of sentences sent by hundreds of politicians on Twitter to weekly measures of elites' attention to a handful of different issues. One of the biggest methodological contributions of the thesis comes in developing a method of measuring elites' dynamic attention from text. Although a number of methods in the computer science literature address the classification or clustering of text using machine learning methods, there are clear limitations to these methods that make them unsuitable for the common research aims of scholars interested in the issues representatives emphasize. The two most common approaches can be divided between classification methods and clustering methods. Clustering methods categorize multiple texts according to their features, but the method is unsupervised, which means that ultimately the features for which the texts are categorized are unknown and cannot be reasonably pre-determined by the user. Latent Dirichlet Allocation (LDA) (Blei, Ng, and Edu 2003) is an example of a popular unsupervised method used to categorize multiple texts in this fashion, and the method has been used by other political scientists in past studies (Barbera et al. 2019). Yet, a serious drawback of LDA and other unsupervised methods is that issue categories cannot be previously defined by the user, so the study of how attention to specific issues for which public opinion data are available is near impossible.

At the other end of the spectrum are classification methods, which classify texts according to a pre-defined coding scheme. Classification methods are impressively accurate and currently achieve state-of-the-art performance on a number of tasks (Devlin et al. 2018). However, like unsupervised methods, classification methods have a clear drawback. Supervised methods rely on significant amounts of training data in order for a model to 'learn'

the features of the text that correspond to the a given coding scheme. Therefore, to train a supervised classification model to identify messages about even just two issues, the user must first manually assign one of two appropriate values to each of the messages to train the model. Some of the more advanced transformer-based models can likely make positive inferences for binary classification with a training dataset of a few thousand observations, but as the number of categories increases, the task of creating a training dataset that includes a few thousand instances for each category quickly becomes inaccessible.

In addition to the requirement of training data, another shortcoming of using classification methods to classify political text according to issue topics is the requirement that each text is ultimately assigned a category by design. This may not be an issue if each text can be neatly classified, but if, for example, the task is to classify tweets according to which political issue is addresses, one must take into consideration the fact that many tweets do not address any political issues. This is often the case even when tweets are sent by politicians and other political actors. Therefore, the task of assigning a class to each text is not always appropriate under a pre-defined coding scheme.

Because of the clear shortcomings of both supervised and unsupervised methods for the study of political texts such as social media messages, I created a method that combined the best of both worlds. The semi-supervised method articulated in chapter 2 is a hybrid method that includes first using unsupervised machine learning to train a language model on the available text. This is then followed by using the trained model to predict the most semantically similar keywords related to a desired issue. The keywords are then used to create dictionaries that can be used to classify messages that address certain issues while disregarding messages that do not address issues of interest.

This method is especially useful because it addresses the key shortcomings of classification and clustering methods outlined above. First, the method does not require hand-coded training dataset, which is the case with supervised methods. This saves significant time and

resources that are not likely to be available to some researchers. Second, the method allows a researcher to pre-define the issue(s) of interest. Unlike unsupervised methods such as LDA, the method I developed is able to classify text that addresses issues of interest without assigning inapplicable classes to text that does not address a pre-defined issue. Third, the method is able to classify text of different lengths. This is important because while the length of a tweet is limited to 280 characters, the length of a speech given in the House of Commons is not. In chapter 2, I detail the method further by providing validation and further examples. In terms of accuracy, I show that the method achieves multi-label F1 scores with nearly the same accuracy as supervised classification methods.

6.3   Limitations

As with any research, there are limitations to the findings of this thesis. Rather than highlighting the same limitations that are outlined in each chapter, I will highlight the limitations of the thesis as a whole. One limitation of the thesis is the reliance on social media data. Although social media has experienced a meteoric rise in the past decade or so and is a vital tool for politicians, there are several criticisms of the use of social media for the study of political behavior. The most common criticism my research has received is the idea that social media does not constitute political behavior, and rather that it is simply a tool that politicians use to bolster their own positions, advertise their accomplishments in office, or slander their political opponents.

Despite these criticisms, the use of political communication as a means of understanding the behavior of elites has a longstanding precedent. For example, countless previous studies dating back nearly a century have tried to further understanding of politics through the study of legislative speeches (Runion 1936), campaign statements (Lundberg 1926) and media portrayals (Rice 1938). The use of social media is simply an extension of this tradition.

As I argue throughout the thesis, social media offers a way of capturing the behavior of elites that is less constrained by institutional forces than other forms of political behavior. Unlike other forms of legislative behavior, representatives' behavior on social media is less constrained. Whereas countless institutional forces affect the ways in which representatives vote or the bills they propose, there are few if any barriers to expressing one's interests online. This provides a unique view into the unconstrained interests of representatives in a way that was not possible at a large scale before the invention of social media.

With that said, the reliance on social media as a means of understanding political behavior is a limitation of the thesis. I tried to incorporate other forms of political communication, such as written and oral questions and motions, but the thesis nonetheless heavily relied on social media data and Twitter data in particular.

A second limitation of the thesis is the reliance on communication data more broadly to understand representation. Although there is indeed a strong tradition of using politicians' communication to understand representation, talk is cheap and there is very little accountability when politicians deviate from previous verbal promises (Hanretty, Mellon, and English 2021). Although studies find strong associations between the issues politicians address on social media and their behavior in parliament (Peeters, Van Aelst, and Praet 2021; Silva and Proksch 2022), the reliance on communication data can be seen as a limitation to the findings of the thesis.

Another limitation to the findings is that group identity was inferred, rather than measured, throughout the thesis. Group identity is a complex and ongoing process, and although there are strong theoretical reasons to expect that groups formed around gender, social class and party affiliation are powerful, these identities are not static. Moreover, they are hard to measure and therefore were inferred throughout the thesis, which highlights a limitation.

6.4   Directions for Future Research

There are several directions for future research that could build on the findings of this thesis. Future research will hopefully build on the perspective of group representation as a framework for understanding differential responsiveness. Within this scope, there are several important questions, such as the question of how we can measure group identification in representatives and voters alike. To the extent that group identity leads to greater representation, and representatives are able to navigate multiple group affiliations, the degree to which representatives self-categorize with groups can shed light on future legislative behavior, as well as offer greater explanations for unequal representation and responsiveness.

In a similar vein, future research could explore the role of salience in group distinctions. Past research shows that group distinctions that are made salient activate more hostile views and increase intergroup conflict (Flynn, Nyhan, and Reifler 2017; Tajfel and Turner 1982). Is this relationship linear when it comes to representation in that group identity distinctions perpetuate unequal responsiveness in line with the salience of the identity? It is easy to imagine that this might not be the case given existing studies, but future research could explore this question in greater depth.

Further research could also build on the findings that different political actors wield influence of MPs' behavior online. Despite considerable focus on the online behavior of NGOs and civil society organizations in isolation, there has been almost no research that studies the behavior of these groups in relation to the behavior of elites. This is surprising given that NGOs and civil society organizations are often vocal critics of elite behavior, and often also have sway over segments of the electorate. Moreover, how corporations and other private interest groups fit into the online political environment is also an important question for future research. Although past research has shown that these groups may influence voters, their behavior online is still largely unexplored in the context of political elites.

Another area where more research should be welcomed is on the limits of group loyalty. There are a number of studies that highlight the effect of group based motivated reasoning, but there are only a handful of studies that look at limitations to group loyalty. This gap is even more apparent in the literature on elites and is completely lacking outside the American context. In order to understand the effects of group-based loyalty, we must also understand its bounds. Tracing such bounds will be an important pathway for future research.

Finally, it is my hope that future research will continue to build on the study of elites and their behavior online more generally. As tirelessly argued throughout the thesis, social media provides a unique opportunity to make non-trivial discoveries about the ways in which elites make decisions which ultimately have real-world impacts on each of our lives. Future researchers should be encouraged to explore novel ways and mediums for studying elites' behavior and political behavior more broadly. While this thesis represents my attempt at doing exactly that, new and innovative methods will be needed to further understand political behavior.

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Appendix A

The Relative Online Influence of NGOs, Corporations and the Media

A.1 Top-100 Corporations by Revenue Headquartered in the UK

Note: Corporations/NGOs with asterisk have valid Twitter accounts and were included in the analysis.

	Company & Sector	Company & Sector
1	Amcor Plc (packaging)	ITV Plc* (television)
2	Anglo American Plc* (mining)	J Sainsbury Plc* (food)
3	Antofagasta Plc* (mining)	JD Sports Fashion Plc* (fashion)
4	Ashtead Group Plc (industrials)	John Wood Group Plc (engineering)
5	Associated British Foods Plc (food)	Johnson Matthey Plc* (chemicals)
6	AstraZeneca Plc* (Pharmaceuticals)	Kier Group Plc (construction)
7	Aviva Plc* (insurance)	Kingfisher plc* (retail)
8	Babcock International Group Plc (defense)	Legal & General Group Plc* (banking)
9	BAE Systems Plc* (defense)	Liberty Global Plc* (telecommunications)
10	Balfour Beatty Plc (construction)	Linde Plc* (chemicals)
11	Barclays Plc* (banking)	Lloyds Banking Group Plc* (banking)
12	Barratt Developments Plc* (property development)	Lookers Plc* (automotive)
13	Bellway Plc (property development)	LyondellBasell Industries NV (chemicals)
14	BHP Group Plc* (mining)	M&G Plc* (finance)
15	BP Plc* (energy)	Marks & Spencer Group Plc (retail)
16	British American Tobacco plc* (tobacco)	Melrose Industries Plc (manufacturing)
17	BT Group Plc* (telecommunications)	Mondi Plc* (shipping)
18	Bunzl Plc* (outsourcing services)	National Grid Plc* (energy)
19	Capita Plc* (outsourcing services)	Nationwide Building Society* (finance)
20	Capri Holdings Ltd. (clothing)	NatWest Group Plc (banking)
21	Carnival Plc* (travel)	Next Plc* (retail)
22	Centrica Plc* (energy)	Pearson Plc* (education services)
23	Cineworld Group Plc (leisure)	Pendragon Plc* (automotive)
24	CNH Industrial NV* (industrials)	Persimmon Plc* (housebuilding)
25	Coca-Cola Europacific Partners Plc (food)	Petrofac Ltd. (energy)
26	Compass Group Plc* (food)	Phoenix Group Holdings Plc (insurance)
27	Computacenter Plc (outsourcing services)	Prudential Plc* (insurance)
28	Cushman & Wakefield Plc (real estate)	Quilter Plc (finance)
29	Diageo Plc* (food)	Reckitt Benckiser Group Plc (consumer goods)
30	Direct Line Insurance Group Plc* (insurance)	RELX Plc* (information services)
31	Dixons Carphone Plc* (telecommunications)	Rio Tinto Plc* (mining)
32	Drax Group Plc (energy)	Rolls-Royce Holdings Plc* (defense)
33	DS Smith Plc* (shipping)	Royal Mail Plc* (shipping)
34	easyJet Plc* (airline)	RPC Group Ltd. (packaging)
35	En Group International PJSC (energy)	RSA Insurance Group Plc (insurance)
36	Entain Plc* (gambling)	Smith & Nephew PLC* (medical equipment)
37	EVRAZ Plc (mining)	SSE Plc* (energy)
38	Ferguson Plc* (plumbing/heating)	St. James's Place Plc* (finance)
39	FirstGroup Plc* (shipping)	Standard Chartered Plc (banking)
40	Frasers Group Plc* (retail)	Taylor Wimpey Plc (housebuilding)
41	G4S Plc* (security)	TechnipFMC Plc (energy)
42	GlaxoSmithKline Plc (Pharmaceuticals)	Tesco Plc* (retail)
43	Hays plc* (recruitment)	The Go-Ahead Group Plc* (transport)
44	HSBC Holdings Plc* (banking)	Travis Perkins Plc (housebuilding)
45	IHS Markit Ltd.* (information services)	Unilever Plc* (consumer goods)
46	Imperial Brands Plc* (tobacco)	Vivo Energy Plc (energy)
47	Inchcape Plc (automotive)	Vodafone Group Plc* (telecommunications)
48	InterContinental Hotels Group Plc* (hospitality)	Willis Towers Watson Plc (insurance)
49	International Consolidated Airlines Group SA (airline)	Wm Morrison Supermarkets Plc* (retail)
50	Investec Plc* (banking)	WPP Plc* (PR)

A.2   UK Civil Society Groups

	Civil Society Group	Civil Society Group
1	Hearing Dogs for Deaf People*	BHF*
2	WaterAid Global*	Macmillan Cancer Support*
3	PDSA*	Marie Curie*
4	Versus Arthritis*	St John Ambulance*
5	Cats Protection*	Battersea*
6	Mental Health Foundation*	RSPCA*
7	Mencap*	Alzheimer's Research UK Drug Discovery @ UCL*
8	Stroke Association*	Samaritans*
9	@drinkaware*	Alzheimer's Society*
10	Movember USA*	Guide Dogs*
11	The Donkey Sanctuary*	British Red Cross*
12	Friends of the Earth (Action)*	RNLI Poole Lifeboats*
13	National MS Society*	WWF*
14	Amnesty International*	DofE*
15	Christian Aid*	Great Ormond Street Hospital*
16	Midlands Air Ambulance Charity*	Save the Children*
17	Young Lives vs Cancer*	National Trust*
18	The RSC*	Royal British Legion*
19	Blue Cross*	Dementia UK*
20	ymca*	RSPB*
21	Alder Hey Children's Charity*	NSPCC*
22	Scouts*	Prostate Cancer UK*
23	Children's Society*	keepbritaintidy*
24	GambleAware*	Mind*
25	Greenpeace*	BBC Children in Need*
26	Crisis*	London's Air Ambulance Charity*
27	Girlguiding*	Alzheimer's Association*
28	Black Lives Matter*	Help for Heroes*
29	Bridgend Foodbank*	Parkinson's UK*
30	National Trust for Scotland*	Age UK*
31	Scope*	Salvation Army USA*
32	Terrence Higgins Trust*	Barnardo's*
33	Dignity in Dying*	PrincesTrust*
34	World Animal Protection*	Breast Cancer Now*
35	Show Racism the Red Card*	Diabetes UK*
36	The Royal Marsden Cancer Charity*	Fairtrade Foundation*
37	ActionAid*	Oxfam International*
38	Centrepoint*	Teenage Cancer Trust*
39	MSF International*	RNIB*
40	Anthony Nolan*	Welsh Gardens Trust*
41	Action Mental Health*	Dogs Trust*
42	NewquayCLICSargent*	Woodland Trust*
43	Countryside Alliance*	Comic Relief*
44	StepChange*	Bowel Cancer UK*
45	Rape Crisis England & Wales*	Shelter*
46	Canal & River Trust*	Breast Cancer Now*
47	The Trussell Trust*	UNICEF*
48	Campaign against Climate Change*	National Autistic Society*
49	HFSG Official*	Kidney Research UK*
50	Cancer Research UK*	

A.3   Predicted Keywords from Word2Vec Model

The following included the predicted keywords for the issue dictionaries. In each column, the first word is the seed word, which is followed by the keyword and its cosine similarity to the seed word. Note that there are only 24 keywords. This is because the seed word is used as the 25th keyword.

Table A.1. Predicted Keywords from Word2Vec Model

#	Seed: Keyword (cosine similarity)	Seed: Keyword (cosine similarity)	Seed: Keyword (cosine similarity)	Seed: Keyword (cosine similarity)	Seed: Keyword (cosine similarity)	Seed: Keyword (cosine similarity)
0	Health: healthcare (0.777)	Housing: social housing (0.774)	Environment: protect environment (0.678) 1	Health: public health (0.756)	Housing: affordable housing (0.692)	Environment: natural environment (0.67)
2	Health: health service (0.712)	Housing: employment (0.651)	Environment: environmental (0.641) 3	Health: social care (0.687)	Housing: private rent (0.642)	Environment: agriculture (0.637)
4	Health: NHS (0.652)	Housing: accommodation (0.633)	Environment: nature (0.628) 5	Health: care (0.649)	Housing: affordable home (0.631)	Environment: food production (0.611)
6	Health: health wellbeing (0.643)	Housing: homelessness (0.616)	Environment: farming (0.605) 7	Health: education (0.643)	Housing: genuinely affordable (0.613)	Environment: biodiversity (0.602)
8	Health: wellbeing (0.638)	Housing: welfare (0.605)	Environment: planet (0.602) 9	Health: mental health (0.619)	Housing: housing crisis (0.572)	Environment: climate change (0.601)
10	Health: vital (0.612)	Housing: hmo (0.569)	Environment: climate (0.594) 11	Health: covid (0.609)	Housing: planning (0.563)	Environment: marine life (0.59)
12	Health: prioritise (0.609)	Housing: property (0.563)	Environment: wildlife habitat (0.588) 13	Health: medical (0.598)	Housing: social security (0.562)	Environment: amp (0.588)
14	Health: risk (0.591)	Housing: local authority (0.561)	Environment: sustainable (0.58) 15	Health: pandemic (0.585)	Housing: renter (0.558)	Environment: ecology (0.58)
16	Health: adult social (0.583)	Housing: transport (0.558)	Environment: countryside (0.579) 17	Health: welfare (0.582)	Housing: council (0.557)	Environment: air quality (0.578)
18	Health: safety (0.582)	Housing: health (0.555)	Environment: wildlife (0.575) 19	Health: social (0.58)	Housing: rent (0.547)	Environment: marine environment (0.572)
20	Health: ensure (0.578)	Housing: unaffordable (0.547)	Environment: infrastructure (0.569) 21	Health: crisis (0.577)	Housing: planning reform (0.542)	Environment: future (0.568)
22	Health: frontline (0.575)	Housing: finance (0.54)	Environment: conservation (0.568) 23	Health: work (0.572)	Housing: long term (0.538)	Environment: ecosystem (0.567)
24	Crime: violent crime (0.735)	Welfare: housing (0.605)	Defense: defence (0.584) 25	Crime: knife crime (0.707)	Welfare: social security (0.604)	Defense: testify (0.491)
26	Crime: criminality (0.656)	Welfare: legal protection (0.6)	Defense: state department (0.485) 27	Crime: heinous crime (0.653)	Welfare: safeguard (0.599)	Defense: foreign affairs (0.473)
28	Crime: domestic violence (0.638)	Welfare: ensure (0.585)	Defense: international trade (0.472) 29	Crime: terrorism (0.628)	Welfare: health (0.582)	Defense: federal (0.462)
30	Crime: pet theft (0.625)	Welfare: benefit (0.56)	Defense: civil (0.456) 31	Crime: violence (0.621)	Welfare: provision (0.56)	Defense: law enforcement (0.452)
32	Crime: police (0.62)	Welfare: employment right (0.56)	Defense: DOJ (0.449) 33	Crime: hate crime (0.619)	Welfare: safety (0.553)	Defense: veto (0.446)
34	Crime: policing (0.615)	Welfare: welfare system (0.552)	Defense: nuke (0.442) 35	Crime: unauthorised encampment (0.607)	Welfare: protection (0.551)	Defense: state (0.44)
36	Crime: dog theft (0.606)	Welfare: care (0.541)	Defense: trump (0.431) 37	Crime: offence (0.604)	Welfare: healthcare (0.541)	Defense: step aside (0.43)
38	Crime: criminal (0.604)	Welfare: income (0.535)	Defense: Blinken (0.426) 39	Crime: fly tip (0.6)	Welfare: employment (0.534)	Defense: faa (0.426)
40	Crime: perpetrator (0.6)	Welfare: provide (0.533)	Defense: constitutional (0.425) 41	Crime: violent (0.598)	Welfare: education (0.527)	Defense: impeachment (0.424)
42	Crime: re-offend (0.596)	Welfare: safety net (0.526)	Defense: cybersecurity (0.423) 43	Crime: trafficking (0.592)	Welfare: animal welfare (0.526)	Defense: democratic (0.421)
44	Crime: organise crime (0.591)	Welfare: proper (0.525)	Defense: rebuke (0.42) 45	Crime: abuse (0.589)	Welfare: prioritise (0.523)	Defense: senate (0.418)
46	Crime: antisocial behaviour (0.587)	Welfare: health safety (0.521)	Defense: foreign affair (0.418) 47	Crime: rape (0.585)	Welfare: benefit system (0.51)	Defense: house representatives (0.416)
48	Brexit: Brexit deal (0.814)	Economy: economic recovery (0.772)	Immigration: immigration policy (0.668) 49	Brexit: leave eu (0.765)	Economy: economic (0.756)	Immigration: migration (0.637)
50	Brexit: deal Brexit (0.763)	Economy: sector (0.748)	Immigration: home office (0.636) 51	Brexit: eu (0.755)	Economy: business (0.726)	Immigration: immigration system (0.635)
52	Brexit: eu trade (0.753)	Economy: global economy (0.719)	Immigration: point base (0.619) 53	Brexit: post brexit (0.726)	Economy: local economy (0.714)	Immigration: asylum system (0.618)
54	Brexit: no deal (0.72)	Economy: industry (0.705)	Immigration: asylum (0.616) 55	Brexit: brexit trade (0.703)	Economy: recovery (0.686)	Immigration: deportation (0.607)
56	Brexit: european union (0.701)	Economy: growth (0.685)	Immigration: hostile environment (0.598) 57	Brexit: brexit fishing (0.701)	Economy: automotive industry (0.682)	Immigration: policy (0.587)
58	Brexit: Brussels (0.694)	Economy: economic growth (0.68)	Immigration: hostile environment (0.566) 59	Brexit: ni protocol (0.687)	Economy: recession (0.669)	Immigration: legal (0.564)
60	Brexit: transition period (0.679)	Economy: livelihood (0.656)	Immigration: channel crossing (0.563) 61	Brexit: single market (0.662)	Economy: britain (0.654)	Immigration: immigration rule (0.549)
62	Brexit: referendum (0.654)	Economy: country (0.648)	Immigration: propose (0.547) 63	Brexit: dup (0.645)	Economy: pandemic (0.646)	Immigration: freedom movement (0.54)
64	Brexit: Brexiteer (0.643)	Economy: job (0.643)	Immigration: visa (0.539) 65	Brexit: deal (0.643)	Economy: Eurozone (0.639)	Immigration: enforcement (0.538)
66	Brexit: free movement (0.643)	Economy: protect job (0.638)	Immigration: employment (0.534) 67	Brexit: brexiter (0.64)	Economy: economy recover (0.635)	Immigration: law (0.532)
68	Brexit: trade talk (0.638)	Economy: long term (0.634)	Immigration: migrant (0.528) 69	Brexit: internal market (0.638)	Economy: tourism (0.633)	Immigration: health surcharge (0.524)
70	Brexit: trade deal (0.638)	Economy: market (0.627)	Immigration: asylum seeker (0.523) 71	Brexit: Brexit talks (0.627)	Economy: living standard (0.623)	Immigration: home secretary (0.522)
72	Education: learning (0.716)	Education: healthcare (0.641)	Education: youth (0.596) 73	Education: educational (0.71)	Education: wellbeing (0.631)	Education: opportunity (0.595)
74	Education: young people (0.681)	Education: mental health (0.618)	Education: skill (0.594) 75	Education: high education (0.678)	Education: disadvantaged pupil (0.611)	Education: nutrition (0.593)
76	Education: teaching (0.66)	Education: child (0.608)	Education: student (0.593) 77	Education: education system (0.656)	Education: employment (0.603)	Education: university (0.591)
78	Education: school (0.654)	Education: attainment (0.598)	Education: disadvantaged (0.587) 79	Education: health (0.643)	Education: social mobility (0.597)	Education: programme (0.584)

A.4   Descriptive Statistics: Issue Attention

Descriptive statistics for each actor's issue attention.

	count	mean	std	min	25%	50%	75%	max
Conservative Health	548.0	0.285971	0.062349	0.084615	0.247893	0.282398	0.316486	0.604222
Labour Health	548.0	0.277564	0.081904	0.102644	0.227340	0.270897	0.312240	0.870504
Corporation Health	548.0	0.177864	0.113257	0.000000	0.100000	0.156438	0.237319	0.913043
NGO Health	548.0	0.168632	0.069925	0.031250	0.130629	0.156619	0.190476	0.742640
Conservative Economy	548.0	0.141193	0.068429	0.020619	0.099128	0.131671	0.170516	0.719543
Labour Economy	548.0	0.103877	0.052665	0.000000	0.069801	0.092647	0.125231	0.412873
Labour Education	548.0	0.099097	0.048821	0.008621	0.067804	0.091169	0.121006	0.332000
Conservative Education	548.0	0.097563	0.045210	0.017045	0.066826	0.093900	0.119889	0.379947
NGO Education	548.0	0.088341	0.057716	0.000000	0.061359	0.078800	0.101189	0.642925
Labour Welfare	548.0	0.086753	0.036005	0.011327	0.061556	0.081266	0.105689	0.323575
Conservative Welfare	548.0	0.078183	0.029944	0.010309	0.057608	0.077161	0.095175	0.252955
Corporation Economy	548.0	0.078036	0.061781	0.000000	0.030233	0.066667	0.112812	0.361111
Media Brexit	548.0	0.073027	0.044042	0.023283	0.049337	0.061860	0.083651	0.604651
Conservative Brexit	548.0	0.071074	0.057306	0.000000	0.043439	0.058582	0.081726	0.578821
Media Health	548.0	0.067746	0.027068	0.023486	0.050472	0.061493	0.077157	0.198221
Labour Brexit	548.0	0.064720	0.044921	0.000000	0.041537	0.056743	0.074104	0.517321
Conservative Housing	548.0	0.060338	0.028883	0.004386	0.040754	0.055187	0.074127	0.192661
Labour Housing	548.0	0.055206	0.023062	0.007843	0.040624	0.052414	0.065809	0.193627
NGO Welfare	548.0	0.054493	0.035104	0.000000	0.036216	0.047840	0.063034	0.369822
Media Economy	548.0	0.054411	0.014942	0.022613	0.044485	0.052664	0.062401	0.113449
Corporation Welfare	548.0	0.045513	0.035293	0.000000	0.023530	0.039643	0.061896	0.241379
Corporation Education	548.0	0.043351	0.043672	0.000000	0.012195	0.031129	0.060332	0.250000
Conservative Environment	548.0	0.041081	0.033265	0.000000	0.017581	0.034685	0.055501	0.326797
Media Education	548.0	0.038969	0.017650	0.009615	0.026165	0.036318	0.047015	0.111691
Media Welfare	548.0	0.035456	0.013676	0.007452	0.025403	0.033514	0.043295	0.100093
Corporation Brexit	548.0	0.034417	0.032789	0.000000	0.015385	0.027972	0.046566	0.356021
Corporation Environment	548.0	0.033729	0.037718	0.000000	0.004033	0.024243	0.048328	0.280000
Labour Crime	548.0	0.033583	0.033867	0.000000	0.016722	0.026395	0.037854	0.348870
NGO Brexit	548.0	0.033204	0.015369	0.000000	0.022825	0.032030	0.041558	0.111801
Conservative Crime	548.0	0.032807	0.027024	0.000000	0.016157	0.026482	0.040768	0.251889
NGO Environment	548.0	0.029916	0.027288	0.000000	0.013333	0.021164	0.039506	0.207028
Labour Environment	548.0	0.028652	0.021733	0.000000	0.013944	0.023592	0.038941	0.142857
Media Crime	548.0	0.027043	0.014079	0.001931	0.017416	0.023938	0.032873	0.106557
Conservative Defense	548.0	0.026952	0.015385	0.000000	0.017987	0.024808	0.033841	0.229430
Media Defense	548.0	0.025198	0.008925	0.006353	0.019208	0.023886	0.029703	0.082297
NGO Economy	548.0	0.018167	0.011783	0.000000	0.010466	0.015966	0.023529	0.108571
Media Environment	548.0	0.017416	0.013435	0.000000	0.008065	0.013410	0.022735	0.125230
Labour Defense	548.0	0.016798	0.009903	0.000000	0.010468	0.015011	0.021231	0.094488
Corporation Defense	548.0	0.016177	0.020916	0.000000	0.000000	0.010724	0.022727	0.163265
Labour Immigration	548.0	0.014943	0.019099	0.000000	0.005330	0.010673	0.018951	0.305085
NGO Housing	548.0	0.013632	0.009893	0.000000	0.007061	0.012320	0.018547	0.060606
Conservative Immigration	548.0	0.012533	0.019697	0.000000	0.003427	0.007260	0.014551	0.238095
Corporation Housing	548.0	0.011900	0.015971	0.000000	0.000000	0.007169	0.017739	0.124294
NGO Defense	548.0	0.011822	0.009284	0.000000	0.006129	0.010372	0.015797	0.073171
Media Immigration	548.0	0.011552	0.010287	0.000000	0.005874	0.008815	0.014581	0.118697
NGO Crime	548.0	0.010999	0.009778	0.000000	0.004436	0.009091	0.014803	0.081301
Media Housing	548.0	0.009746	0.005679	0.000000	0.005766	0.008686	0.012440	0.041227
NGO Immigration	548.0	0.002984	0.005138	0.000000	0.000000	0.000000	0.004486	0.053030
Corporation Crime	548.0	0.001763	0.006219	0.000000	0.000000	0.000000	0.000000	0.068182
Corporation Immigration	548.0	0.000360	0.003146	0.000000	0.000000	0.000000	0.000000	0.050000

A.5   Details of Tweet Classification Method

Issue dictionaries were created for each of the target issues (for example, health, economy etc.). In order to establish keyword dictionaries in a manner that was as objective as possible, a Word2Vec skip-gram model was trained to predict such keywords based on their semantic similarity to each of the issues examined. Word2Vec is a machine learning method that converts input text into vectors across multiple dimensions to capture the underlying relationships and meanings between words (Mikolov, Sutskever, et al. 2013; Mikolov, Chen, et al. 2013). Once the model is trained on a given text, it can be used to predict semantically similar words based on a chosen seed word that corresponds to the issue of interest (such as "health", "economy" etc.). The Word2Vec model does this by converting words to vectors and then minimizing the cosine distance between vectors, which is ideal for keyword selection because keywords are based on the model's learned understanding of how each target issue is used in the tweets.

Before the Word2Vec model could be trained to predict keywords, tweets were "cleaned" using standard pre-processing steps. The goal for pre-processing the tweets was not to alter the text significantly given the ultimate task of simply predicting keywords, so pre-processing only included removing punctuation marks and non-character symbols such as emojis, as well as removing stop words. Stop words are words that do not add meaning to the text and often appear frequently throughout, such as "the", "and" or "it". Once the text was pre-processed, the model was trained using the combined tweets from all of the actors (media, MPs, NGOs and corporations) using the Gensim Word2Vec library in Python (Gensim 2020).[1] After training the model, keywords were predicted using the target issue as the seed word to gather the top-25 most semantically similar words.

Once keyword dictionaries were created for each issue, the dictionaries were then used for reference in classifying whether a tweet addressed a given issue. Ultimately, issue

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1. The final corpus contained 1,212,595 tokens after pre-processing (1,426,717 before) and included bigrams.

attention was measured as the daily frequency with which an issue was used as a proportion of the number of tweets sent by the same actor in given day. For example, if corporations send a total of 100 tweets in a given day and 30 of the tweets are about the economy, then corporations' issue attention to the economy is 0.3 for that day. This process is repeated for each actor and each issue for each day of the analysis. Each actor's agenda therefore consists of the actor's daily issue attention to each of the ten issues.

One feature of the method is that is does not "force" issue labels on tweets (such as with supervised classification methods) that do not address a political issue. This is an important feature given that all tweets are not exclusively political. The method is therefore able to "ignore" non-political tweets.

A.5.1   Validation of tweet classification method

To validate the tweet classification method, two samples of 1,000 messages were annotated by hand. The first sample was randomly drawn from the entire corpus of tweets from all actors and was therefore not limited to tweets that addressed a substantive issue. The second sample was drawn from the subset of tweets that addressed a substantive issue. To create this test sample, I continued sampling until I had a full 1,000 messages that addressed a substantive issue.

For validation metrics, I relied on the standard metrics of precision, recall and F1-score. Precision and recall are calculated as follows:

$$\text{Precision} = \frac{\text{True Positives}}{\text{True Positives} + \text{False Positives}}$$

$$\text{Recall} = \frac{\text{True Positives}}{\text{True Positives} + \text{False Negatives}}$$

F1-score, which is a standard metric for quantifying classification accuracy, is the harmonic mean of precision and recall. In addition to the F1 score, in multi-label classification settings, we can also calculate the precision and recall scores for each individual issue. This is useful because it allows us to see which issues are more difficult to classify.

Table A.2 presents the multi-label classification metrics for the first random sample, which includes messages that do not address a substantive issue. The weighted F1 score of 0.78 indicates that the method performs well in classifying random tweets. As we can see from the results, there is a high number of messages that are classified as not addressing a substantive issue. This is to be expected given that many of the tweets coming from corporations, the media and NGOs are not political.

Table A.3 presents the multi-label classification metrics for the sample of tweets that address a substantive issue. The weighted F1 score of 0.65 indicates that the method still performs well in classifying tweets that address a substantive issue but performs somewhat better on the completely random sample.

To contextualize the classification metrics, we can consider other studies that classify social media messages. For comparison, supervised classification methods on social media data – such as those used by Gilardi et al. (2022) – report F1 scores ranging from 0.65 to 0.88. Unsupervised classification methods – such as those used by Barbera et al. (2019) – report an F1 score of 0.71. Consequently, the dictionary method used here therefore performs strongly in comparison to other methods that are much more computationally expensive.

Table A.2. Classification metrics – Random sample

Class	Issue	Precision	Recall	F1-Score	Support
0.0	Brexit	0.79	0.90	0.84	41
1.0	Crime	1.00	0.44	0.61	16
2.0	Defense	0.47	1.00	0.64	8
3.0	Economy	1.00	0.83	0.91	133
4.0	Education	0.83	0.91	0.87	54
5.0	Environment	0.63	0.77	0.69	47
6.0	Health	0.70	0.82	0.76	118
7.0	Housing	0.02	0.17	0.03	6
8.0	Immigration	1.00	0.00	0.00	12
9.0	Other	0.83	0.77	0.80	528
10.0	Welfare	1.00	0.41	0.58	37
Accuracy				0.77	1000
Weighted Avg		0.83	0.77	0.78	1000

Table A.3. Classification metrics – Issue Sample

Class	Issue	Precision	Recall	F1-Score	Support
0.0	Brexit	0.72	0.88	0.79	136
1.0	Crime	1.00	0.57	0.73	40
2.0	Defense	0.20	0.59	0.30	29
3.0	Economy	0.80	0.57	0.67	259
4.0	Education	0.75	0.88	0.81	86
5.0	Environment	0.49	0.72	0.58	106
6.0	Health	0.82	0.72	0.76	199
7.0	Housing	0.24	1.00	0.38	10
8.0	Immigration	1.00	0.14	0.24	29
10.0	Welfare	0.43	0.25	0.32	106
Accuracy				0.64	1000
Weighted Avg		0.71	0.64	0.65	1000

Appendix B

Elite Legislators and Unequal Representation in the UK

B.1   Descriptive Statistics for PCRD Dataset

Descriptive statistics for MP data for the PCRD close elections dataset. The unit of analysis is MP per issue per date.

Issue	Issue Salience				Motions					Questions				
	mean	std	min	max	sum	mean	std	min	max	sum	mean	std	min	max
Crime	0.16	0.06	0.06	0.33	166.0	0.06	0.34	0.0	6.0	594.0	0.22	0.91	0.0	19.0
Defence and security	0.10	0.06	0.00	0.32	210.0	0.08	0.40	0.0	5.0	1899.0	0.70	8.20	0.0	234.0
Education	0.13	0.03	0.08	0.26	218.0	0.08	0.37	0.0	4.0	1578.0	0.58	4.57	0.0	199.0
Health	0.46	0.10	0.28	0.74	478.0	0.18	0.78	0.0	10.0	2542.0	0.94	2.92	0.0	58.0
Housing	0.16	0.03	0.09	0.26	115.0	0.04	0.25	0.0	3.0	687.0	0.25	1.08	0.0	19.0
Immigration & Asylum	0.28	0.09	0.13	0.71	146.0	0.05	0.29	0.0	4.0	438.0	0.16	0.80	0.0	16.0
The economy	0.44	0.14	0.24	0.71	380.0	0.14	0.72	0.0	13.0	789.0	0.29	1.15	0.0	28.0
The environment	0.22	0.08	0.07	0.37	282.0	0.10	0.49	0.0	8.0	463.0	0.17	0.77	0.0	12.0
Transport	0.02	0.01	0.01	0.05	215.0	0.08	0.40	0.0	6.0	1288.0	0.48	1.60	0.0	25.0
Welfare benefits	0.12	0.04	0.08	0.30	293.0	0.11	0.49	0.0	6.0	519.0	0.19	0.72	0.0	10.0
Mean	0.21					0.09					0.40			

B.2   Descriptive Statistics for Full Sample Dataset

	Issue salience				Motions					Questions				
	mean	std	min	max	sum	mean	std	min	max	sum	mean	std	min	max
Crime	0.16	0.06	0.06	0.33	4296.0	0.10	0.44	0.0	7.0	16061.0	0.38	2.38	0.0	137.0
Defence and security	0.10	0.06	0.00	0.32	7415.0	0.17	0.89	0.0	29.0	16693.0	0.39	3.05	0.0	234.0
Education	0.13	0.03	0.08	0.26	7365.0	0.17	0.75	0.0	16.0	21110.0	0.50	2.43	0.0	199.0
Health	0.45	0.10	0.28	0.74	12410.0	0.29	1.06	0.0	22.0	48464.0	1.14	3.97	0.0	134.0
Housing	0.16	0.03	0.09	0.26	3795.0	0.09	0.46	0.0	9.0	11985.0	0.28	1.36	0.0	51.0
Immigration & Asylum	0.29	0.10	0.13	0.71	3385.0	0.08	0.37	0.0	6.0	10169.0	0.24	1.18	0.0	74.0
The economy	0.42	0.14	0.24	0.71	14162.0	0.33	1.30	0.0	22.0	16913.0	0.40	1.39	0.0	47.0
The environment	0.21	0.08	0.07	0.37	5626.0	0.13	0.53	0.0	12.0	8700.0	0.20	1.08	0.0	55.0
Transport	0.02	0.01	0.01	0.05	6465.0	0.15	0.63	0.0	12.0	19880.0	0.47	1.83	0.0	57.0
Welfare benefits	0.12	0.04	0.08	0.30	9153.0	0.22	0.80	0.0	13.0	12863.0	0.30	1.29	0.0	74.0
Mean	0.21					0.17					0.43			

B.3   Descriptive Statistics for Public Opinion Data

Table B.1. Descriptive statistics for survey responses to "What is the most important problem facing the country?"

Issue	Count	Mean	Std.	Min	25%	50%	75%	Max
Crime	284.0	0.166549	0.064326	0.06	0.1175	0.15	0.2100	0.37
Defense and security	284.0	0.096972	0.061328	0.00	0.0600	0.09	0.1300	0.33
Education	284.0	0.132324	0.034388	0.07	0.1100	0.13	0.1425	0.27
Health	284.0	0.453803	0.102896	0.28	0.3700	0.44	0.5225	0.75
Housing	284.0	0.157500	0.032706	0.08	0.1400	0.16	0.1800	0.26
Immigration & Asylum	284.0	0.279683	0.089187	0.11	0.2200	0.26	0.3100	0.71
The economy	284.0	0.426725	0.144375	0.22	0.2800	0.42	0.5500	0.74
The environment	284.0	0.216549	0.084482	0.07	0.1200	0.24	0.2800	0.40
Transport	284.0	0.024683	0.010308	0.01	0.0200	0.02	0.0300	0.08
Welfare benefits	284.0	0.117007	0.036205	0.06	0.1000	0.11	0.1300	0.31

B.4   Close Election Balance – PRCD Design

The following table presents balance statistics for Oxbridge and non-Oxbridge candidates in close elections.

		Non-Oxbridge		Oxbridge			
		Mean	Std. Dev.	Mean	Std. Dev.	Diff. in Means	Std. Error
Votes received		20196.9	4549.9	21055.6	4587.3	858.8	531.1
Vote share		0.4	0.1	0.4	0.1	0.0	0.0
		N	Pct.	N	Pct.		
Party	Conservative	70	47.3	69	46.6		
	Democratic Unionist Party	0	0.0	3	2.0		
	Green	1	0.7	0	0.0		
	Labour	61	41.2	63	42.6		
	Liberal Democrat	11	7.4	11	7.4		
	Plaid Cymru	1	0.7	1	0.7		
	Sinn Fein	3	2.0	0	0.0		
	UK Independence Party	1	0.7	1	0.7		
Gender	Female	45	30.4	44	29.7		
	Male	103	69.6	104	70.3		

B.5 Classification Validation: Questions

For classification of all questions and EDMs, I use a large language model trained on over 100k annotated political texts to predict the corresponding issue of the text (Dickson 2023). For validation, I annotated a random sample of 1000 texts and then compared the model's predictions to the annotated labels. The results of the validation are presented in Figure B.1 as a confusion matrix and in Table B.2 as a multi-label classification report.

Fig. B.1. Confusion Matrix: Predicted vs. Annotated Issue Issue
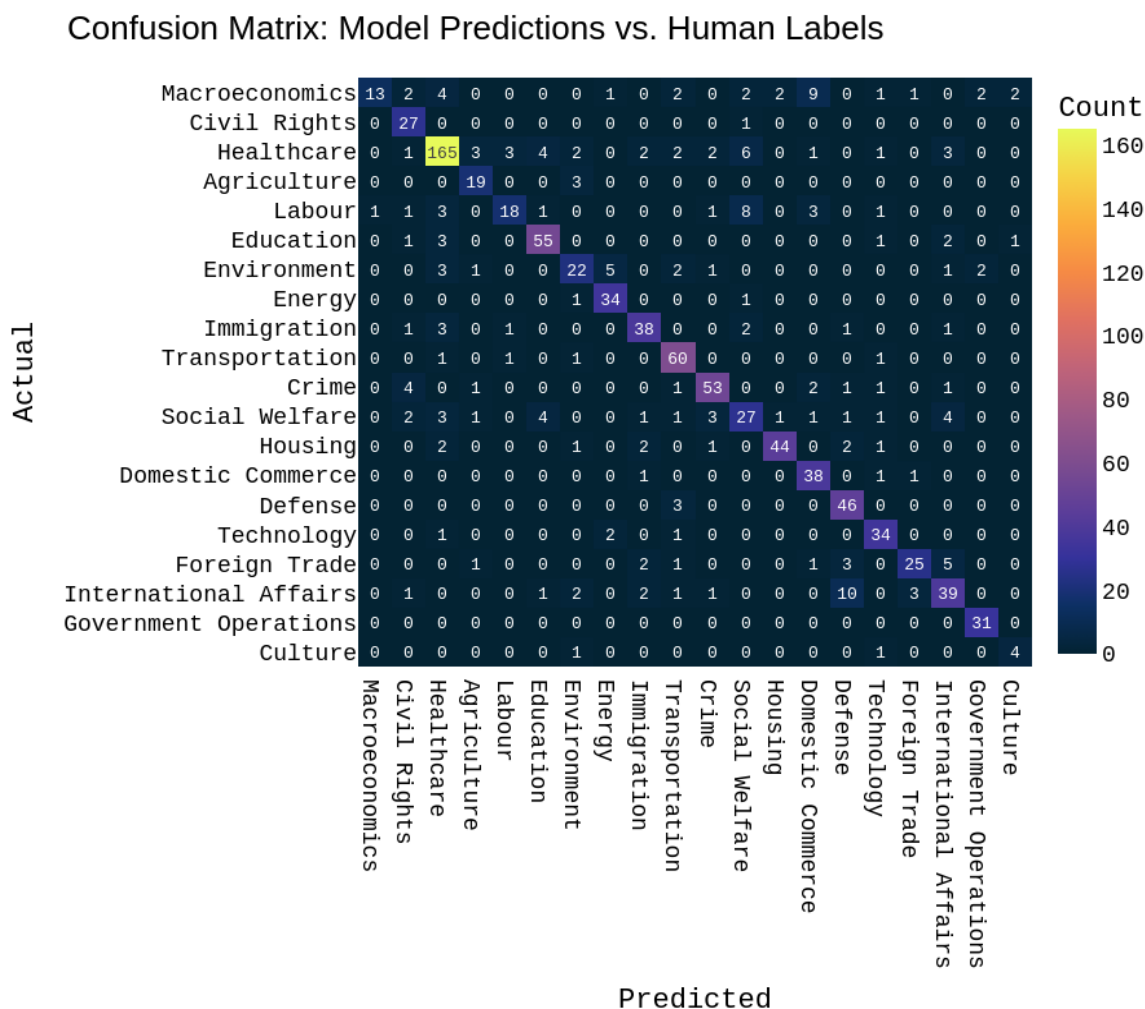
Table B.2. Classification Results: Questions

Label	Precision (%)	Recall (%)	F1-Score (%)	Support
Macroeconomics	0.93	0.32	0.47	41
Civil Rights	0.68	0.96	0.79	28
Healthcare	0.88	0.85	0.86	195
Agriculture	0.73	0.86	0.79	22
Labour	0.78	0.49	0.60	37
Education	0.85	0.87	0.86	63
Environment	0.67	0.59	0.63	37
Energy	0.81	0.94	0.87	36
Immigration	0.79	0.81	0.80	47
Transportation	0.81	0.94	0.87	64
Crime	0.85	0.83	0.84	64
Social Welfare	0.57	0.54	0.56	50
Housing	0.94	0.83	0.88	53
Domestic Commerce	0.69	0.93	0.79	41
Defense	0.72	0.94	0.81	49
Technology	0.77	0.89	0.83	38
Foreign Trade	0.83	0.66	0.74	38
International Affairs	0.70	0.65	0.67	60
Government Operations	0.89	1.00	0.94	31
Culture	0.57	0.67	0.62	6
Accuracy				0.79
Macro avg	0.77	0.78	0.76	1000
Weighted avg	0.80	0.79	0.78	1000

B.6   Classification Validation: Motions

The same procedure was followed to classify all motions. I annotated a random sample of 1,000 motions and then compared the model's predictions to the annotated motions. The results of the validation are presented in Figure B.2 as a confusion matrix and in Table B.3 as a multi-label classification report.

Fig. B.2. Confusion Matrix: Predicted vs. Annotated Issue

Confusion Matrix: Model Predictions vs. Human Labels
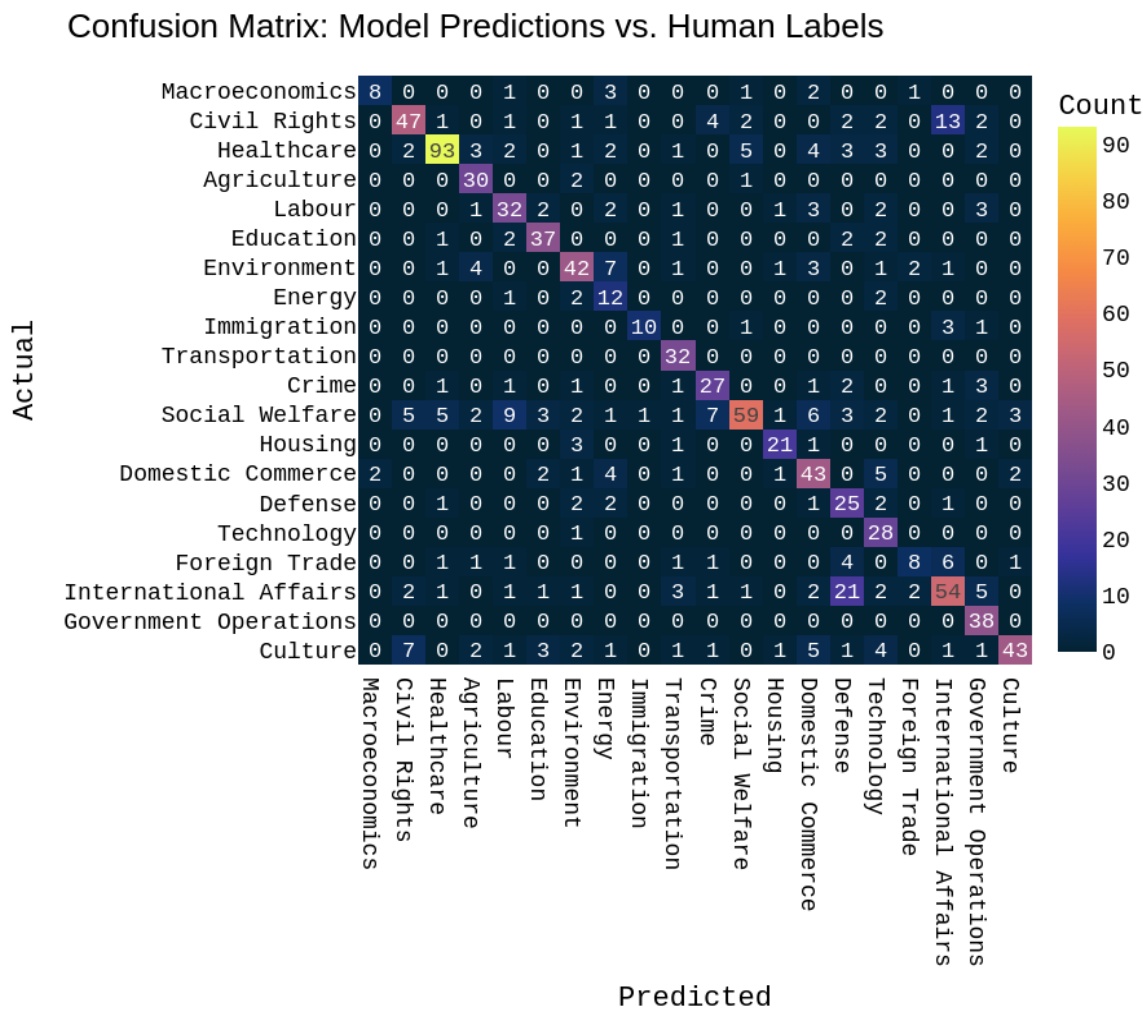
Table B.3. Classification Results: Motions

Label	Precision (%)	Recall (%)	F1-Score (%)	Support
Macroeconomics	0.80	0.50	0.62	16
Civil Rights	0.75	0.62	0.68	76
Healthcare	0.89	0.77	0.82	121
Agriculture	0.70	0.91	0.79	33
Labour	0.62	0.68	0.65	47
Education	0.77	0.82	0.80	45
Environment	0.69	0.67	0.68	63
Energy	0.34	0.71	0.46	17
Immigration	0.91	0.67	0.77	15
Transportation	0.71	1.00	0.83	32
Crime	0.66	0.71	0.68	38
Social Welfare	0.84	0.52	0.64	113
Housing	0.81	0.78	0.79	27
Domestic Commerce	0.61	0.70	0.65	61
Defense	0.40	0.74	0.52	34
Technology	0.51	0.97	0.67	29
Foreign Trade	0.62	0.33	0.43	24
International Affairs	0.67	0.56	0.61	97
Government Operations	0.66	1.00	0.79	38
Culture	0.88	0.58	0.70	74
Accuracy				0.69
Macro avg	0.69	0.71	0.68	1000
Weighted avg	0.73	0.69	0.69	1000

B.7   Results for Parliamentary Responsiveness

The following results are from the first regressions in which I estimate responsiveness to public salience without the interaction between Oxbridge and public salience. The posterior plot traces are followed by the results in table form.

Fig. B.3. Aggregate Parliamentary Responsiveness to Public Issue Salience via Questions in the House of Commons
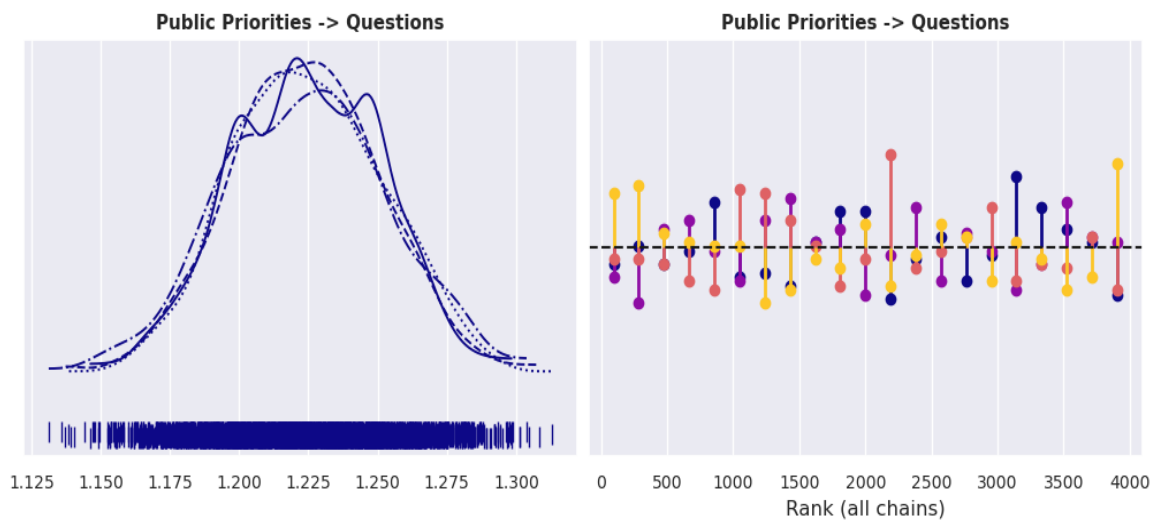
Note: Posterior plot trace for the effect of public salience on parliamentary responsiveness via Questions.

Fig. B.4. Aggregate Parliamentary Responsiveness to Public Issue Salience via Motions in the House of Commons
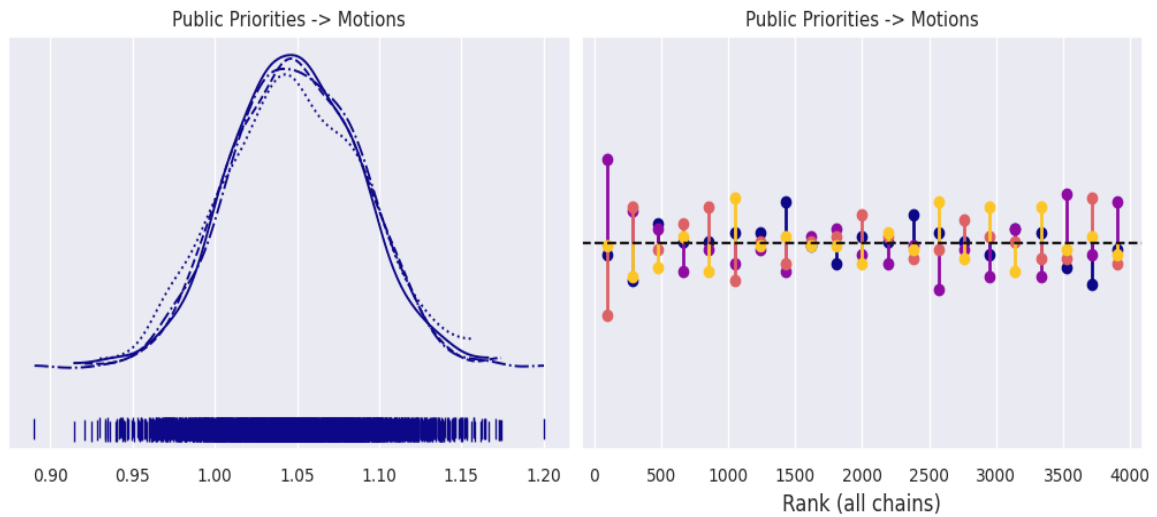
Note: Posterior plot trace for the effect of public salience on parliamentary responsiveness via Early Day Motions.

Table B.4. Parliamentary Responsiveness via Questions – Bayesian Hierarchical Models

	Mean	Std.	HDI 3%	HDI 97%	MCSE μ	MCSE σ	ESS bulk	ESS tail	$\hat{r}$
Intercept	-3.257	0.229	-3.683	-2.839	0.021	0.015	121.0	369.0	1.04
Public Salience	1.205	0.028	1.146	1.253	0.000	0.000	6046.0	2458.0	1.01
Oxbridge	-0.090	0.143	-0.333	0.188	0.025	0.018	33.0	34.0	1.09
MP Party	0.224	0.027	0.177	0.272	0.005	0.003	34.0	129.0	1.09
MP Gender (Male)	-0.111	0.116	-0.328	0.086	0.026	0.018	21.0	58.0	1.14
Time	0.005	0.000	0.005	0.005	0.000	0.000	3450.0	3363.0	1.00
Incumbency (first-time MP)	-0.210	0.010	-0.228	-0.191	0.000	0.000	3430.0	3520.0	1.00
Issue σ	0.532	0.157	0.289	0.814	0.005	0.004	788.0	1556.0	1.01
MP σ	1.442	0.046	1.351	1.525	0.004	0.003	125.0	297.0	1.01

Table B.5. Parliamentary Responsiveness via Motions – Bayesian Hierarchical Models

	Mean	Std.	HDI 3%	HDI 97%	MCSE μ	MCSE σ	ESS bulk	ESS tail	$\hat{r}$
Intercept	-8.739	0.378	-9.411	-8.026	0.031	0.022	148.0	488.0	1.03
Public Salience	1.049	0.040	0.972	1.122	0.000	0.000	6739.0	2915.0	1.00
Oxbridge	-1.124	0.300	-1.660	-0.554	0.028	0.020	120.0	357.0	1.06
MP Party	0.922	0.048	0.831	1.008	0.004	0.003	138.0	387.0	1.04
MP Gender (Male)	0.173	0.266	-0.318	0.651	0.047	0.033	33.0	133.0	1.10
Time	-0.010	0.000	-0.011	-0.010	0.000	0.000	4580.0	2574.0	1.00
Incumbency (first-time MP)	0.164	0.013	0.140	0.189	0.000	0.000	5252.0	2625.0	1.00
Issue σ	0.531	0.150	0.298	0.805	0.005	0.004	647.0	1232.0	1.01
MP σ	2.606	0.111	2.409	2.826	0.009	0.006	169.0	350.0	1.03

B.8   Model Priors for Bayesian Models

The following provides model details and prior assumptions for the Bayesian hierarchical models. The models are estimated using the `PyMC3` library in Python (Salvatier, Wiecki, and Fonnesbeck 2016). The models are estimated using the No-U-Turn Sampling (NUTS) (Hoffman and Gelman 2014). The priors are intended to be minimally informative.

B.8.1   Priors for Full Close Elections Model

Formula: Questions/Motions $\sim 1 + \text{Oxbridge} + \text{PublicIssueSalience}$

$+ \text{Oxbridge} \times \text{PublicIssueSalience} +$

$\text{ElectoralMargin}^4 + \gamma_{00}\text{MP} + \gamma_{01}\text{IssueDomain}$

Family: Poisson

Link: $\mu = \log$

Observations: $26,990$

Priors:

$\text{Target} = \mu$

Common-level effects:

$\text{Intercept} \sim \text{Normal}(\mu : 0.0, \sigma : 10.0)$

$\text{PublicIssueSalience} \sim \text{Normal}(\mu : 0.0, \sigma : 20.0)$

$\text{Oxbridge} \sim \text{Normal}(\mu : 0.0, \sigma : 10.0)$

$\text{PublicIssueSalience} : \text{Oxbridge} \sim \text{Normal}(\mu : 0.0, \sigma : 20.0)$

$\text{ElectoralMargin}^4 \sim \text{Normal}(\mu : 0.0, \sigma : 20.0)$

Group-level effects:

$\text{Intercept}|\text{IssueDomain} \sim \text{Normal}(\mu : 0.0, \sigma : \text{HalfNormal}(\sigma : 10.0))$

$\text{Intercept}|\text{MP} \sim \text{Normal}(\mu : 0.0, \sigma : \text{HalfNormal}(\sigma : 10.0))$

B.8.2 Priors for Full Sample Model

Formula: Questions/Motions $\sim 1 + \text{Oxbridge}$

$+ \text{PublicIssueSalience} + \text{PublicIssueSalience} \times$

$\text{Oxbridge} + \text{Party} + \text{Gender} + \text{Incumbent} + \text{Time}$

$+ \gamma_{00}\text{MP} + \gamma_{01}\text{IssueDomain}$

Family: Poisson

Link: $\mu = \log$

Observations: $424,840$

Priors:

$\text{Target} = \mu$

Common-level effects

$\text{Intercept} \sim \text{Normal}(\mu : 0.0, \sigma : 10.0)$

$\text{PublicIssueSalience} \sim \text{Normal}(\mu : 0.0, \sigma : 20.0)$

$\text{Oxbridge} \sim \text{Normal}(\mu : 0.0, \sigma : 10.0)$

$\text{PublicIssueSalience} : \text{Oxbridge} \sim \text{Normal}(\mu : 0.0, \sigma : 30.0)$

$\text{Party} \sim \text{Normal}(\mu : 0.0, \sigma : 10.0)$

$\text{Gender} \sim \text{Normal}(\mu : 0.0, \sigma : 10.0)$

$\text{Incumbent} \sim \text{Normal}(\mu : 0.0, \sigma : 10.0)$

Group-level effects

$\text{Intercept}|\text{IssueDomain} \sim \text{Normal}(\mu : 0.0, \sigma : \text{HalfNormal}(\sigma : 10.0))$

$\text{Intercept}|\text{MP} \sim \text{Normal}(\mu : 0.0, \sigma : \text{HalfNormal}(\sigma : 10.0))$

B.9   Bayesian Results from Close Elections

The following results are from the Bayesian hierarchical models estimated on the close elections sample. Priors for the models are presented in Appendix B.8. The models are estimated using the No-U-Turn Sampling (NUTS) (Hoffman and Gelman 2014). The priors are minimally informative.

Note: The exact point estimates may differ slightly from the point estimates presented in the main results. This is the result of estimating the same models multiple times.

Fig. B.5. Close Elections: Parliamentary Responsiveness to Public Issue Salience via Questions
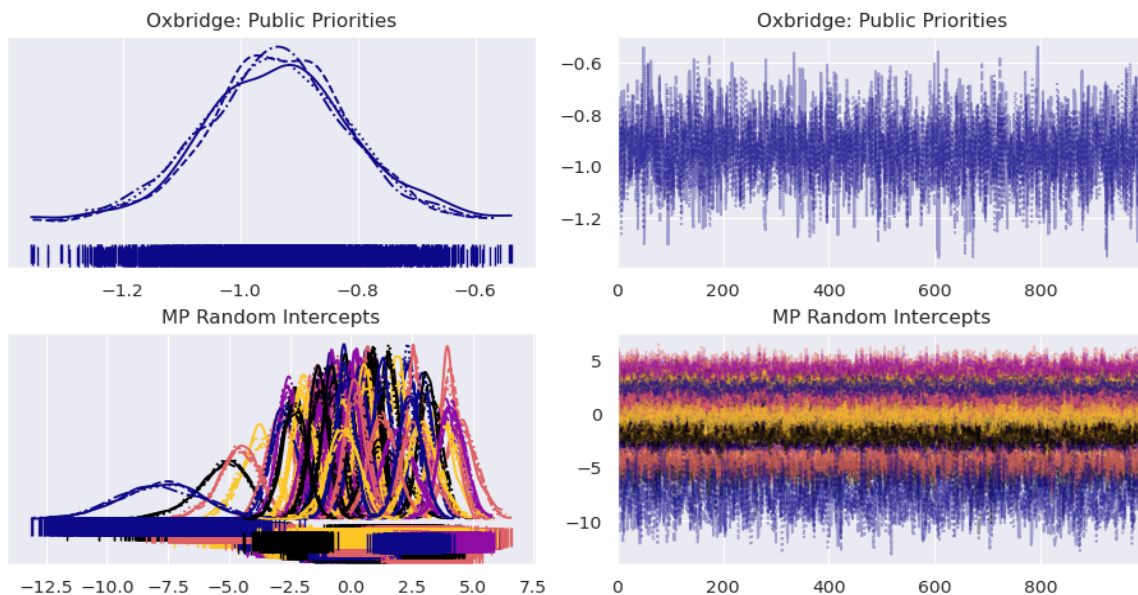
Note: Posterior plot trace for the effect of public salience on Oxbridge MPs' responsiveness via Questions. The second row plots the intercepts for each MP. Full results in table form are available in Appendix B.9.

Fig. B.6. Close Elections: Parliamentary Responsiveness to Public Issue Salience via Motions
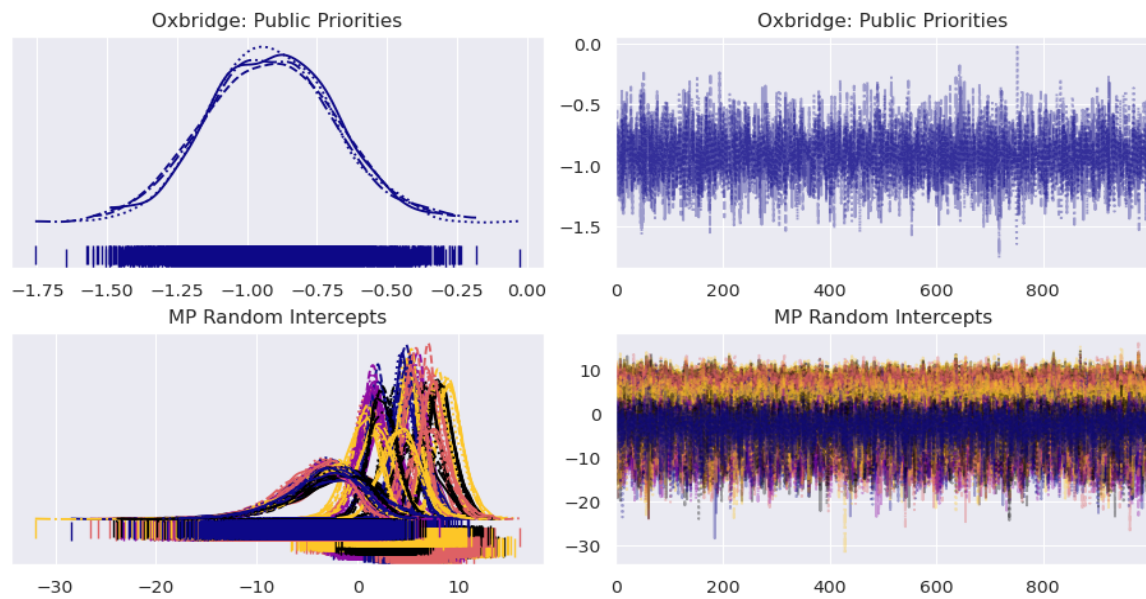
Note: Posterior plot trace for the effect of public salience on Oxbridge MPs' responsiveness via Early Day Motions. The second row plots the intercepts for each MP. Full results in table form are available in Appendix B.9.

Table B.6. Parliamentary Responsiveness in Close Elections via Questions – Bayesian Hierarchical Models

	Mean	Std.	HDI 3%	HDI 97%	MCSE μ	MCSE σ
Intercept	5.208000	1.771000	1.910000	8.497000	0.049000	0.035000
Public Salience	1.444000	0.165000	1.124000	1.748000	0.003000	0.002000
Oxbridge	0.100000	0.560000	-0.956000	1.170000	0.021000	0.016000
Oxbridge × Public Salience	-0.938000	0.124000	-1.174000	-0.696000	0.002000	0.001000
$f(Electoral margin = 1)$	-17.471000	2.146000	-21.555000	-13.566000	0.056000	0.040000
$f(Electoral margin = 2)$	-2.887000	1.696000	-5.949000	0.431000	0.053000	0.037000
$f(Electoral margin = 3)$	-7.385000	1.782000	-10.744000	-4.111000	0.053000	0.038000
$f(Electoral margin = 4)$	-7.055000	1.734000	-10.257000	-3.771000	0.053000	0.037000
Issue sigma	0.749000	0.215000	0.415000	1.126000	0.006000	0.004000
MP sigma	2.329000	0.230000	1.907000	2.764000	0.008000	0.006000

Table B.7. Parliamentary Responsiveness in Close Elections via Motions – Bayesian Hierarchical Models

	Mean	Std.	HDI 3%	HDI 97%	MCSE μ	MCSE σ
Intercept	-9.156000	4.377000	-17.561000	-1.201000	0.131000	0.093000
Public Salience	2.283000	0.262000	1.811000	2.793000	0.004000	0.003000
Oxbridge	-1.311000	1.488000	-4.185000	1.472000	0.070000	0.050000
Oxbridge × Public Salience	-0.914000	0.226000	-1.320000	-0.462000	0.003000	0.002000
$f(Electoral margin = 1)$	3.473000	7.226000	-10.850000	16.487000	0.193000	0.136000
$f(Electoral margin = 2)$	3.248000	4.096000	-4.716000	10.686000	0.126000	0.089000
$f(Electoral margin = 3)$	-1.454000	4.622000	-10.150000	7.311000	0.130000	0.092000
$f(Electoral margin = 4)$	2.608000	4.203000	-5.456000	10.477000	0.122000	0.086000
Issue sigma	0.414000	0.123000	0.234000	0.636000	0.003000	0.002000
MP sigma	5.246000	0.855000	3.635000	6.749000	0.029000	0.021000

B.10 Bayesian Results from Full Sample

The following results include the full regression results from the full sample models. The results are also presented in table format below the plot traces. Priors for the models are presented in Appendix B.8. The models are estimated using the No-U-Turn Sampling (NUTS) (Hoffman and Gelman 2014). The priors are minimally informative.

Fig. B.7. Parliamentary Responsiveness to Public Issue Salience via Questions in the House of Commons
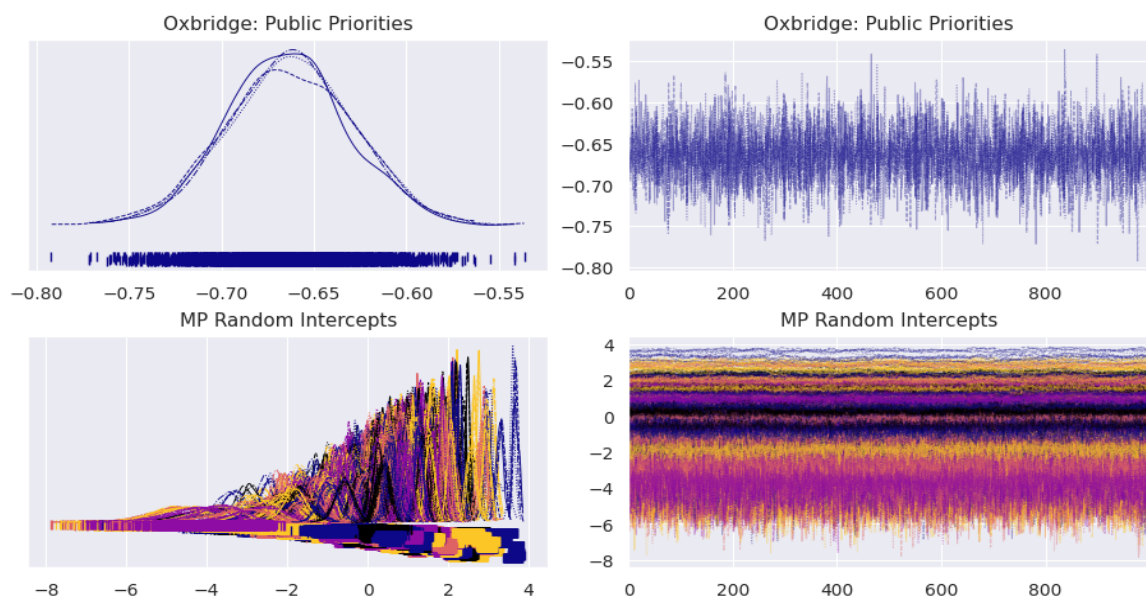
Note: Posterior plot trace for the effect of public salience on Oxbridge MPs' responsiveness via Early Day Motions. The second row plots the intercepts for each MP. Models include party affiliation, incumbency and gender of MP. Full results in table form are available in Appendix B.10.

Fig. B.8. Parliamentary Responsiveness to Public Issue Salience via Motions in the House of Commons
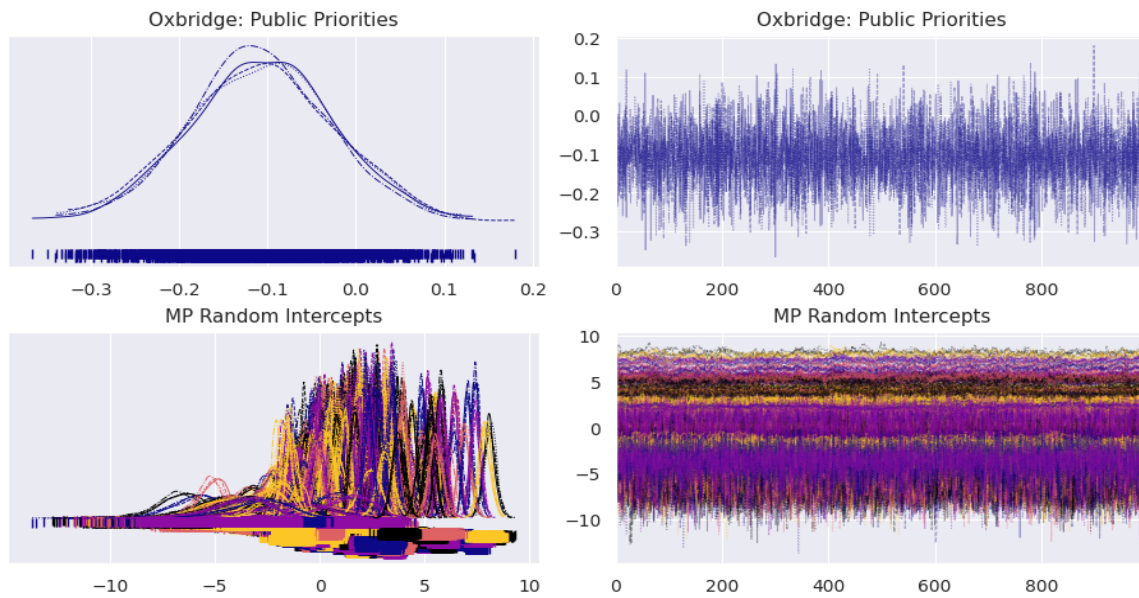
Note: Posterior plot trace for the effect of public salience on Oxbridge MPs' responsiveness via Early Day Motions. The second row plots the intercepts for each MP. Models include party affiliation, incumbency and gender of MP. Full results in table form are available in Appendix B.10.

Table B.8. Parliamentary Responsiveness via Motions – Bayesian Hierarchical Questions – Full Sample

	Mean	Std.	HDI 3%	HDI 97%	MCSE μ	MCSE σ
Intercept	-3.092	0.242	-3.544	-2.623	0.064	0.047
Public Salience	1.577	0.028	1.527	1.630	0.000	0.000
Oxbridge	0.016	0.135	-0.231	0.274	0.034	0.024
Oxbridge $\times$ Public Salience	-0.663	0.034	-0.724	-0.598	0.000	0.000
Party	0.216	0.028	0.167	0.267	0.010	0.008
Gender: Male	-0.166	0.119	-0.365	0.085	0.033	0.024
Incumbency (first-time MP)	-0.209	0.010	-0.227	-0.189	0.000	0.000
Issue Domain sigma	0.544	0.163	0.303	0.848	0.007	0.005
MP sigma	1.433	0.043	1.354	1.518	0.005	0.003

Table B.9. Parliamentary Responsiveness via Questions – Bayesian Hierarchical Models – Full Sample

	Mean	Std.	HDI 3%	HDI 97%	MCSE μ	MCSE σ
Intercept	-9.003	0.421	-9.781	-8.182	0.101	0.073
Public Salience	0.461	0.042	0.379	0.539	0.001	0.000
Oxbridge	-1.135	0.285	-1.668	-0.612	0.024	0.017
Oxbridge $\times$ Public Salience	-0.108	0.081	-0.260	0.047	0.001	0.001
Party	0.909	0.052	0.800	1.002	0.011	0.008
Gender: Male	0.112	0.277	-0.374	0.634	0.081	0.059
Incumbency (first-time MP)	0.164	0.013	0.138	0.188	0.000	0.000
Issue Domain sigma	0.544	0.161	0.299	0.841	0.005	0.004
MP sigma	2.595	0.107	2.411	2.810	0.009	0.006

B.11 Frequentist MLE Hierarchical Models

This section replicates each of the analyses using frequentist maximum likelihood estimation with hierarchical models. These models use the same formula as the Bayesian hierarchical models. Table B.10 presents estimates of aggregate parliamentary responsiveness. The model includes random intercepts for issue domain and MP. Table B.11 presents estimates for the close elections data. The model includes random intercepts for issue domain and MP. The models are labelled accordingly.

Table B.10. Frequentist MLE Hierarchical Models – Without Interaction

	Questions	Motions
	(1)	(2)
(Intercept)	-0.805	-0.631
	(1.396)	(0.258)
Public Salience	1.206***	1.055***
	(0.028)	(0.040)
Oxbridge	-0.143	-0.814***
	(0.141)	(0.296)
Incumbency (first-time MP)	-0.211***	0.163***
	(0.010)	(0.012)
Time	0.005***	-0.010***
	(0.000)	(0.000)
Party: Birkenhead Social Justice Party	-0.417	0.788
	(1.956)	(0.597)
Party: Conservative	-1.933	-6.415***
	(1.386)	(0.262)
Party: Democratic Unionist Party	-0.019	-0.616
	(1.467)	(0.571)
Party: Green	1.050	1.376**
	(1.955)	(0.563)
Party: Independent	-2.367	-11.217***
	(1.711)	(1.472)
Party: Labour	-0.547	-2.548***
	(1.386)	(0.257)
Party: Liberal Democrat	-0.436	-1.104**
	(1.440)	(0.440)
Party: Plaid Cymru	-0.018	-0.762
	(1.547)	(0.498)
Party: Scottish National Party	-1.119	0.128
	(1.401)	(0.364)
Party: Sinn Fein	-1.460	-0.128
	(1.958)	(0.583)
Party: Ulster Unionist Party	-0.734	0.672
	(1.956)	(0.583)
MP sigma	1.381822	2.3745
Issue sigma.	0.588196	0.3915
Issue Domain groups	10	10
MP groups	617	617
Estimator	MLM	MLM
Likelihood	Poisson	Poisson
Observations	424840	424840
Log Likelihood	-395314.7	-130193.1
AIC	634659.9	260422.3
BIC	790665.5	260619.5

Table B.11. Frequentist MLE Hierarchical Models – Close Elections

	Questions	Motions
	(1)	(2)
(Intercept)	−3.499***	−7.574***
	(0.411)	(0.976)
Oxbridge × Public Salience	−1.015***	−0.917***
	(0.123)	(0.229)
Oxbridge	0.054	−1.475
	(0.488)	(1.439)
Public Salience	1.699***	2.264***
	(0.165)	(0.257)
$f(margin, degree = 1)$	30.124	−118.451
	(27.525)	(90.682)
$f(margin, degree = 3)$	−8.861	32.450
	(25.535)	(91.207)
$f(margin, degree = 3)$	−127.874***	103.184
	(19.993)	(114.183)
$f(margin, degree = 4)$	120.991***	7.049
	(15.534)	(90.956)
Time	0.022***	−0.010***
	(0.001)	(0.002)
MP sigma	2.018	4.856
Issue sigma	0.626	0.342
Num.Obs.	26 990	26 990
R2 Marg.	0.182	0.052
R2 Cond.	0.733	0.714
AIC	48 992.8	9234.3
BIC	49 083.0	9324.5
ICC	0.7	0.7
RMSE	3.06	0.37

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

Table B.12. Frequentist MLE Hierarchical Models – Full Sample

	Questions (1)	Motions (2)
(Intercept)	−1.142***	−0.517
	(0.338)	(2.437)
Oxbridge × Public Salience	−0.606***	−0.114
	(0.035)	(0.087)
Oxbridge	0.020	−0.954**
	(0.144)	(0.291)
Public Salience	1.402***	1.121***
	(0.030)	(0.046)
Party: Birkenhead Social Justice Party	−0.401	0.163
	(1.038)	(3.425)
Party: Conservative	−2.133***	−6.691**
	(0.312)	(2.430)
Party: Democratic Unionist Party	−0.720	−0.711
	(0.556)	(2.572)
Party: Green	1.324+	0.997
	(0.715)	(3.433)
Party: Independent	−2.795***	−15.110
	(0.576)	(150.301)
Party: Labour	−0.819**	−2.676
	(0.316)	(2.431)
Party: Liberal Democrat	−0.768+	−1.103
	(0.454)	(2.529)
Party: Plaid Cymru	0.247	−0.705
	(0.414)	(2.720)
Party: Scottish National Party	−1.200***	−0.067
	(0.360)	(2.454)
Party: Sinn Fein	−1.283	−0.167
	(1.316)	(3.434)
Party: Ulster Unionist Party	−0.723	0.253
	(0.734)	(3.425)
Gender: Male	0.011	0.207
	(0.125)	(0.241)
Incumbency (first-time MP)	-0.210***	0.169***
	(0.010)	(0.013)
Time	0.007***	−0.011***
	(0.000)	(0.000)
MP sigma	1.411	2.421
Issue sigma	0.429	0.382
Estimator	MLM	MLM
Num.Obs.	391 360	391 360
R2 Marg.	0.109	0.359
R2 Cond.	0.563	0.696
AIC	727 809.4	233 356.0
BIC	728 016.1	233 562.7
ICC	0.5	0.5
RMSE	2.06	0.60

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

 Note: Models use random intercepts for issue domain and MP. Observations are dropped in the case that they cannot be estimated. This is due to zero values in the outcome variable due to the fact that some MPs do not put forward any motions or questions on a given issue or for a given time period.

B.12   Fixed Effects Estimates

In this section, I replicate the main analysis using fixed effects regressions. For the first strategy using the PCRD design, I estimate the following regression using the MPs who were elected by a close margin in one of the three UK Elections (2015, 2017, 2019):

$$Y_{i,j,t} = \tau_t + \phi_c + \zeta_j + \beta \text{Oxbridge}_i \times \text{PublicIssueSalience}'_{j,t} + \gamma f(\text{OxbridgeMargin})_{i,t}$$
$$+ \lambda \left[(\text{Oxbridge} \times \text{PublicIssueSalience}'_j) \times \text{OxbridgeMargin} \right]_{i,t} + \varepsilon_{i,j,t}$$

Where Y is the number of either questions or EDMs for MP i that address issue j at time t. Oxbridge$_{it}$ is a binary variable that equals 1 if MP i attended Oxford or Cambridge and 0 otherwise, Margin$_{it}$ is the margin of victory, with a cutoff of 0, and (Oxbridge $\times$ PublicIssueSalience$'_j$ $\times$ OxbridgeMargin)$_{i,t}$ is the interaction between public issue salience, Oxbridge attendance, and the margin of victory. τ, ϕ and ζ are fixed effects for time, constituency and issue, respectively.

The parameter of interest is β, which captures the effect of electing an Oxbridge MP in a close election on responsiveness to public issue salience. In other words, β estimates the difference between an Oxbridge MP and a non-Oxbridge MP in close elections, which amounts to the average difference in responsiveness to dynamic public issue salience across each of the 10 issues.

For the full sample estimations, I rely on fixed-effects regressions using the full sample of MPs in the House of Commons. The effect of education is not identified in these models, but the estimates serve to describe the differences in responsiveness between Oxbridge-educated MPs and MPs educated elsewhere. The regressions are formalized in the following:

$$Y_{i,j,t} = \tau_t + \phi_c + \zeta_j + \text{Oxbridge}_i + \text{PublicIssueSalience}'_{j,t}$$
$$+ \beta \text{Oxbridge}_i \times \text{PublicIssueSalience}'_{j,t} + \theta X'_{i,j,t} + \varepsilon_{i,t}$$

Where Y is the number of questions or early day motions put forward for issue j at time t. β captures responsiveness to issue j by interacting MPs' education background ($Oxbridge = 1$) with a repeated vector of public issue salience that is matched by issue domain and time with the outcome variable. τ, ϕ and ζ are fixed effects for time, constituency and issue, respectively.

B.12.1   Fixed Effects Results

Following the same format as the main analysis, the first set of results (Table B.13) display aggregate parliamentary responsiveness. The second estimations include the close elections sample (Table B.14). The third estimations include the full sample of MPs (Table B.15). In all fixed effects models, observations are lost in the case that no outcomes are observed for parameters with fixed effects. In the aggregate data models, I also include OLS models with logged outcomes and inverse hyperbolic sine transformations. The results are consistent across all models. This approach (i.e. including the logged OLS models) is not taken for the other models given the frequency of zero values.

Table B.13. Parliamentary Responsiveness to Public Issue Salience Without Interaction – Fixed Effects Models

	EDMs Count Poisson	EDMs Log+1 OLS	EDMs InvHSin OLS	Questions Count Poisson	Questions Log+1 OLS	Questions InvHSin OLS
Public Issue Salience	0.732***	0.047***	0.062***	0.988***	0.171***	0.218***
	(0.085)	(0.006)	(0.008)	(0.086)	(0.009)	(0.011)
FE: Issue domain	X	X	X	X	X	X
FE: Time	X	X	X	X	X	X
Num.Obs.	390 050	424 840	424 840	413 270	424 840	424 840
R2	0.067	0.032	0.032	0.087	0.046	0.046
R2 Adj.	0.067	0.032	0.032	0.087	0.046	0.046
R2 Within	0.001	0.000	0.000	0.002	0.001	0.001
R2 Within Adj.	0.001	0.000	0.000	0.002	0.001	0.001
AIC	445 909.1	182 380.3	398 750.9	979 105.7	522 487.8	727 369.2
BIC	446 931.2	183 498.1	399 868.8	980 187.9	523 605.7	728 487.0
RMSE	0.80	0.30	0.39	2.21	0.45	0.57

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: Standard errors are clustered by time and are presented in parentheses. Observations are removed in the case that no outcomes are observed for fixed effects estimations. Time-invariant factors (gender, party etc.) are not included.

Table B.14. Responsiveness to Issue Salience in Close Elections – Fixed Effects Models

	Questions (1)	Motions (2)
Oxbridge × Public Salience	−0.950**	−0.979***
	(0.315)	(0.216)
Public Salience	1.567***	2.158***
	(0.405)	(0.441)
$f(margin, degree = 1)$	−2858.878**	−4977.408**
	(1009.456)	(1627.194)
$f(margin, degree = 2)$	2766.829**	3769.406**
	(976.203)	(1255.486)
$f(margin, degree = 3)$	−1692.787**	
	(552.405)	
$f(margin, degree = 4)$	681.674**	
	(198.492)	
FE: Constituency	X	X
FE: Issue	X	X
FE: Time	X	X
Num.Obs.	23 380	9000
R2	0.350	0.430
R2 Adj.	0.346	0.412
R2 Within	0.427	0.008
R2 Within Adj.	0.427	0.007
AIC	43 532.0	7736.0
BIC	44 821.5	8567.3
RMSE	3.20	0.56

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

 Note: Standard errors are clustered by time and are presented in parentheses. Observations are removed in the case that no outcomes are observed for fixed effects estimations. All models include fixed effects for Constituency, Issue, and Time. Models use a Poisson likelihood.

Table B.15. Responsiveness to Issue Salience in Full Sample – Fixed Effects Models

	Questions (1)	Motions (2)
Public Salience	1.201***	0.778***
	(0.163)	(0.069)
Oxbridge × Public Salience	−0.601+	−0.129
	(0.344)	(0.251)
FE: Constituency	X	X
FE: Issue	X	X
FE: Time	X	X
Num.Obs.	373 860	246 850
R2	0.314	0.440
R2 Adj.	0.313	0.438
R2 Within	0.002	0.002
R2 Within Adj.	0.002	0.002
AIC	680 778.4	209 917.5
BIC	688 393.0	214 854.9
RMSE	2.08	0.70

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

 Note: Standard errors are clustered by time and are presented in parentheses. Observations are removed in the case that no outcomes are observed for fixed effects estimations. All models include fixed effects for Constituency, Issue, and Time. Models use a Poisson likelihood.

B.13 Participation Differences by Oxbridge MPs

The following results do not take into consideration public issue salience and are only meant to show differences in participation (e.g. the number of questions/motions raised) from MPs in House of Commons.

Table B.16. Participation Differences by Oxbridge MPs

	Questions (1)	Motions (2)
(Intercept)	1.591	2.049
	(1.208)	(2.407)
Oxbridge	−0.103	−0.719**
	(0.159)	(0.265)
Gender: Male	0.133	0.387+
	(0.140)	(0.230)
Party: Birkenhead Social Justice Party	−0.670	0.548
	(2.237)	(3.406)
Party: Conservative	−2.016	−5.380*
	(1.588)	(2.419)
Party: Democratic Unionist Party	−0.157	0.145
	(1.680)	(2.562)
Party: Green	1.978	2.356
	(2.241)	(3.414)
Party: Independent	−3.266+	−6.871*
	(1.953)	(3.249)
Party: Labour	−0.526	−1.660
	(1.590)	(2.422)
Party: Liberal Democrat	−0.506	−0.561
	(1.651)	(2.518)
Party: Plaid Cymru	0.797	0.248
	(1.771)	(2.710)
Party: Scottish National Party	−0.497	1.176
	(1.605)	(2.444)
Party: Sinn Fein	−1.214	−0.006
	(2.243)	(3.414)
Party: Ulster Unionist Party	−0.409	0.941
	(2.237)	(3.406)
MP sigma	1.578	2.401
Num.Obs.	621	621
AIC	8534.9	5746.4
BIC	8601.4	5812.9
RMSE	0.62	0.37

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

 Note: Models use random intercepts for MPs. The outcome variable is the number of questions or motions put forward by an MP, regardless of the issue domain it falls under.

Appendix C

The Gender Gap in Elite-Constituent Responsiveness Online

C.1 Public Opinion Data

Although all surveys used throughout the analysis were conducted by YouGov, the wording, date, and surveys differ in subtle ways. First, surveys conducted in the US require that respondents select only one issue that they identify as the most important issue facing the country. Surveys in the UK allow respondents to select up to three of the most important issues identified by the respondent. For this reason, I do not combine the two styles of surveys in the analysis and cross-country comparisons (i.e between Figures 1 and 2) should be made with caution.

C.1.1 UK Survey Data

YouGov UK survey question wording: *"Which of the following do you think are the most important issues facing the country at this time? Please tick up to three."*

1. Health

2. Immigration & Asylum

3. Crime

4. The economy

5. Education

6. Tax

7. Pensions

8. Family life & childcare

9. Britain leaving the EU

10. Transport

11. Welfare benefits

12. Defence and security

13. Afghanistan

C.1.2 US Survey Data

YouGov US survey question wording: *"Which of these is the most important issue for you? Please note the following answer options were recorded:"*

1. Abortion

2. Civil rights and civil liberties

3. Climate change and the environment

4. Crime and criminal justice reform

5. Education

6. Foreign policy

7. Gay rights

8. Gun control

9. Health care

10. Immigration

11. Jobs and the economy

12. Medicare

13. National Security and foreign policy

14. Social security

15. Taxes

16. Taxes and government spending

17. Terrorism

18. The budget deficit

19. The economy

20. The environment

21. The war in Afghanistan

22. Civil rights

23. Guns

24. Civil liberties

25. National Security

26. Crime

27. Criminal justice reform

C.1.3 Descriptive Statistics for Survey Data

Table C.1. Public Opinion Survey Data for United States

	Health	Environment	Economy	Education	Defense	Tax	Crime	Immigration
count	179.00	179.0	179.00	179.00	179.00	179.00	179.00	179.00
mean	16.91	10.4	18.40	5.64	4.15	7.73	5.32	10.64
std	4.31	2.2	3.94	1.51	3.01	1.78	1.80	3.42
min	10.00	5.0	12.00	2.00	0.00	4.00	1.00	3.00
25%	14.00	9.0	16.00	5.00	2.00	6.00	4.00	8.00
50%	16.00	10.0	17.00	5.00	3.00	8.00	5.00	10.00
75%	19.00	12.0	21.00	6.50	7.00	9.00	6.00	13.00
max	29.00	16.0	30.00	10.00	13.00	12.00	10.00	19.00

Table C.2. Public Opinion Survey Data for United Kingdom

	Health	Environment	Economy	Education	Defense	Tax	Crime	Immigration
count	173.00	173.00	173.00	173.00	173.00	173.00	173.00	173.00
mean	43.76	23.41	42.65	11.90	10.66	5.68	19.04	25.58
std	10.57	7.28	11.91	2.93	3.87	1.94	5.63	4.93
min	24.00	9.00	14.00	6.00	5.00	2.00	9.00	13.00
25%	36.00	20.00	31.00	10.00	8.00	4.00	14.00	22.00
50%	45.00	25.00	43.00	11.00	10.00	5.00	19.00	25.00
75%	50.00	29.00	54.00	13.00	13.00	6.00	23.00	29.00
max	70.00	38.00	65.00	24.00	25.00	13.00	34.00	37.00

C.2   Descriptive Statistics for Twitter Data

The following tables present descriptive statistics for the dataset used in the analysis. The unit of analysis is legislator i for issue j at time (survey period) t. Descriptive statistics only include tweets that address an issue.

Table C.3. US Descriptive Statistics for Tweets

| | Tweets about issue | | | | | Total tweets | | | | |
	sum	mean	std	min	max	sum	mean	std	min	max
Crime	30733.00	0.41	0.90	0.0	16.00	345701.0	4.64	4.96	0.0	97.0
Defense	77348.00	1.04	1.43	0.0	33.00	345701.0	4.64	4.96	0.0	97.0
Economy	62280.00	0.84	1.29	0.0	32.00	345701.0	4.64	4.96	0.0	97.0
Education	27883.00	0.37	0.82	0.0	18.00	345701.0	4.64	4.96	0.0	97.0
Environment	49083.00	0.66	1.20	0.0	68.00	345701.0	4.64	4.96	0.0	97.0
Health	64166.00	0.86	1.35	0.0	29.00	345701.0	4.64	4.96	0.0	97.0
Immigration	18651.00	0.25	0.73	0.0	30.00	345701.0	4.64	4.96	0.0	97.0
Tax	15557.00	0.21	0.63	0.0	18.00	345701.0	4.64	4.96	0.0	97.0
Total	345701.00	4.64	8.35	0.0	244.00	2765608.0	37.14	39.71	0.0	776.0
mean	43212.62	0.58	1.04	0.0	30.50	345701.0	4.64	4.96	0.0	97.0
std	23179.85	0.31	0.31	0.0	16.65	0.0	0.00	0.00	0.0	0.0
min	15557.00	0.21	0.63	0.0	16.00	345701.0	4.64	4.96	0.0	97.0
max	77348.00	1.04	1.43	0.0	68.00	345701.0	4.64	4.96	0.0	97.0

Table C.4. UK Descriptive Statistics for Tweets

| | Tweets about issue | | | | | Total tweets | | | | |
	sum	mean	std	min	max	sum	mean	std	min	max
Crime	60502.00	0.60	1.98	0.0	111.00	949228.0	9.38	16.78	0.0	751.0
Defense	169479.00	1.67	4.51	0.0	410.00	949228.0	9.38	16.78	0.0	751.0
Economy	216612.00	2.14	5.15	0.0	462.00	949228.0	9.38	16.78	0.0	751.0
Education	80449.00	0.79	2.61	0.0	383.00	949228.0	9.38	16.78	0.0	751.0
Environment	150971.00	1.49	3.65	0.0	246.00	949228.0	9.38	16.78	0.0	751.0
Health	236925.00	2.34	4.88	0.0	257.00	949228.0	9.38	16.78	0.0	751.0
Immigration	20961.00	0.21	0.90	0.0	66.00	949228.0	9.38	16.78	0.0	751.0
Tax	13329.00	0.13	0.70	0.0	47.00	949228.0	9.38	16.78	0.0	751.0
Total	949228.00	9.36	24.40	0.0	1982.00	7593824.0	75.03	134.25	0.0	6008.0
mean	118653.50	1.17	3.05	0.0	247.75	949228.0	9.38	16.78	0.0	751.0
std	86759.05	0.86	1.76	0.0	161.53	0.0	0.00	0.00	0.0	0.0
min	13329.00	0.13	0.70	0.0	47.00	949228.0	9.38	16.78	0.0	751.0
max	236925.00	2.34	5.15	0.0	462.00	949228.0	9.38	16.78	0.0	751.0

C.3   Validation of Language Model

To validate the fine-tuned language model, I used 2,000 of the 6,000 annotated messages created for training the model. After training the model on the remaining 4,000 messages, I used the model to predict the labels for the 2,000 messages. I then compared the predicted labels to the original labels.

Table C.5. Classification Report for Fine-Tuned Language Model

	Precision	Recall	F1-score	Support
Economy	0.85	0.68	0.76	293
NA	1.00	0.54	0.70	103
Education	0.86	0.85	0.86	196
Immigration	0.86	0.92	0.89	220
Defense	0.13	0.20	0.15	140
Health	0.50	0.49	0.49	381
Environment	0.08	0.26	0.12	65
Crime	0.91	0.51	0.66	414
Tax	0.77	0.95	0.85	188
Accuracy			0.62	2000
Macro Avg	0.66	0.60	0.61	2000
Weighted Avg	0.72	0.62	0.65	2000

Fig. C.1. Confusion Matrix for Model Predictions

Confusion Matrix: Model Predictions vs. Annotated Labels
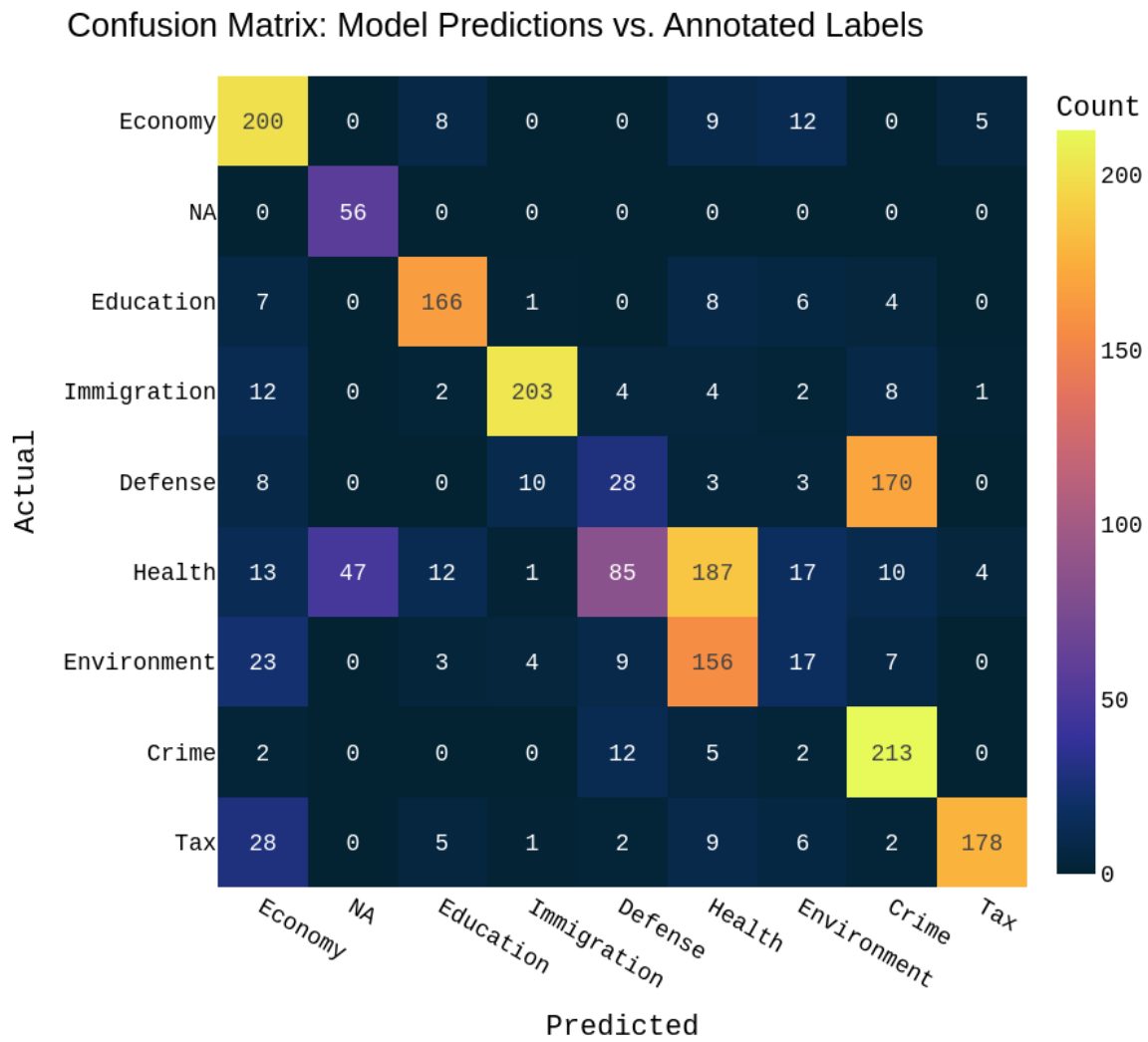
C.4   Responsiveness to Public Issue Priorities

The following results are the output from the first regressions that do not include the interaction between legislators' gender and public issue priorities.

	US	US ($t-1$)	US	US ($t-1$)	UK	UK ($t-1$)	UK	UK ($t-1$)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Women's Issue Salience	1.638***	1.649***			2.325***	2.230***		
	(0.053)	(0.053)			(0.011)	(0.011)		
Men's Issue Priorities			3.144***	3.097***			2.843***	2.686***
			(0.051)	(0.051)			(0.013)	(0.013)
Female Legislator	-0.022	-0.021	-0.018	-0.018	0.062	0.062	0.061	0.062
	(0.063)	(0.063)	(0.062)	(0.062)	(0.063)	(0.063)	(0.063)	(0.063)
Legislator Age	-0.006**	-0.006**	-0.006**	-0.006**	0.007**	0.007**	0.007**	0.007**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Total tweets	0.093***	0.094***	0.099***	0.099***	0.013***	0.013***	0.013***	0.013***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Date	0.004***	0.003***	0.003***	0.003***	0.004***	0.004***	0.004***	0.004***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Party: Republican	-0.109*	-0.108*	-0.106*	-0.106*				
	(0.052)	(0.051)	(0.051)	(0.051)				
Party: UK Conservative					-0.912	-0.905	-0.913	-0.906
					(0.690)	(0.690)	(0.690)	(0.691)
Party: UK DUP					-1.186	-1.178	-1.188	-1.179
					(0.744)	(0.745)	(0.744)	(0.745)
Party: UK Green Party					0.236	0.245	0.238	0.241
					(0.977)	(0.977)	(0.976)	(0.977)
Party: UK Independent					-0.289	-0.280	-0.288	-0.282
					(0.797)	(0.797)	(0.797)	(0.798)
Party: UK Labour					-0.414	-0.405	-0.414	-0.406
					(0.691)	(0.692)	(0.691)	(0.692)
Party: UK Liberal Democrat					-0.522	-0.512	-0.523	-0.514
					(0.718)	(0.719)	(0.718)	(0.719)
Party: UK Plaid Cymru					-0.580	-0.571	-0.582	-0.572
					(0.796)	(0.796)	(0.795)	(0.796)
party: Scottish National Party					-0.559	-0.550	-0.559	-0.551
					(0.697)	(0.697)	(0.696)	(0.697)
Party: UK Sinn Fein					-0.979	-0.972	-0.980	-0.972
					(0.737)	(0.737)	(0.736)	(0.737)
Party: Social Democratic and Labour Party					-0.312	-0.306	-0.313	-0.307
					(0.845)	(0.845)	(0.844)	(0.845)
Party: UK Speaker					-1.063	-1.059	-1.065	-1.059
					(0.975)	(0.976)	(0.975)	(0.976)
(Intercept)	10.343**	10.037*	9.184*	9.079*	-13.691***	-13.735***	-13.768***	-13.814***
	(3.961)	(3.943)	(3.910)	(3.904)	(4.051)	(4.053)	(4.049)	(4.053)
N	595,712	592,384	595,712	592,384	809,640	804,960	809,640	804,960
R^2	Poisson	Poisson	Poisson	Poisson	Poisson	Poisson	Poisson	Poisson

Note: All models have random intercepts for each representative and each issue domain. Models 1–4 are US models. Models 5-8 are UK models. Models labelled $t-1$ are lagged one survey period (approximately 1–2 weeks).

C.5 Responsiveness to Women's Issue Priorities

Table C.6. Responsiveness to Women's Issue Priorities

	US (t)	US ($t-1$)	US ($t-2$)	UK (t)	UK ($t-1$)	UK ($t-2$)
	(1)	(2)	(3)	(4)	(5)	(6)
Women's Issue Salience	2.007***	2.030***	1.971***	2.560***	2.463***	2.377***
	(0.065)	(0.065)	(0.065)	(0.013)	(0.013)	(0.013)
Female Legislator	0.079	0.080	0.077	0.071	0.069	0.064
	(0.064)	(0.063)	(0.063)	(0.063)	(0.063)	(0.063)
Female Legislator × Women's Issue Salience	0.500***	0.513***	0.495***	0.393***	0.390***	0.374***
	(0.051)	(0.051)	(0.051)	(0.010)	(0.010)	(0.010)
Total tweets	0.093***	0.094***	0.094***	0.013***	0.013***	0.013***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Legislator Age	-0.006**	-0.006**	-0.006**	0.007**	0.007**	0.007**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Party: Republican	-0.109*	-0.108*	-0.108*			
	(0.052)	(0.051)	(0.051)			
Party: UK Conservative				-0.912	-0.904	-0.901
				(0.690)	(0.691)	(0.692)
Party: UK DUP				-1.186	-1.178	-1.174
				(0.745)	(0.745)	(0.746)
Party: UK Green Party				0.234	0.244	0.249
				(0.977)	(0.977)	(0.979)
Party: UK Independent				-0.291	-0.282	-0.279
				(0.797)	(0.798)	(0.799)
Party: UK Labour				-0.413	-0.405	-0.400
				(0.692)	(0.692)	(0.693)
Party: UK Liberal Democrat				-0.522	-0.512	-0.507
				(0.719)	(0.719)	(0.720)
Party: UK Plaid Cymru				-0.580	-0.571	-0.567
				(0.796)	(0.796)	(0.798)
party: Scottish National Party				-0.558	-0.550	-0.545
				(0.697)	(0.697)	(0.698)
Party: UK Sinn Fein				-0.978	-0.971	-0.969
				(0.737)	(0.737)	(0.739)
Party: Social Democratic and Labour Party				-0.312	-0.306	-0.301
				(0.845)	(0.845)	(0.847)
Party: UK Speaker				-1.063	-1.059	-1.071
				(0.975)	(0.976)	(0.977)
Date	0.004***	0.003***	0.003***	0.004***	0.004***	0.004***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
(Intercept)	10.316**	10.009*	9.828*	-13.776***	-13.819***	-13.855***
	(3.961)	(3.943)	(3.926)	(4.052)	(4.054)	(4.060)
N	592,384	589,056	585,728	804,960	800,280	795,600
Estimator	Poisson	Poisson	Poisson	Poisson	Poisson	Poisson

C.6 Responsiveness to Men's Issue Priorities

Table C.7. Responsiveness to Men's Issue Priorities

	US (t)	US ($t-1$)	US ($t-2$)	UK (t)	UK ($t-1$)	UK ($t-2$)
	(1)	(2)	(3)	(4)	(5)	(6)
Men's Issue Salience	1.465***	1.533***	1.400***	3.022***	2.857***	2.709***
	(0.070)	(0.070)	(0.071)	(0.015)	(0.015)	(0.015)
Female Legislator	0.043	0.042	0.044	0.035	0.029	0.029
	(0.064)	(0.063)	(0.063)	(0.063)	(0.063)	(0.063)
Female Legislator × Men's Issue Salience	0.187**	0.184**	0.208***	0.301***	0.285***	0.287***
	(0.059)	(0.059)	(0.059)	(0.012)	(0.012)	(0.012)
Total tweets	0.093***	0.094***	0.094***	0.013***	0.013***	0.013***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Legislator Age	-0.006**	-0.006**	-0.006**	0.007**	0.007**	0.007**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Party: Republican	-0.109*	-0.108*	-0.108*			
	(0.052)	(0.051)	(0.051)			
Party: UK Conservative				-0.913	-0.905	-0.902
				(0.690)	(0.691)	(0.691)
Party: UK DUP				-1.187	-1.178	-1.176
				(0.744)	(0.745)	(0.746)
Party: UK Green Party				0.237	0.240	0.251
				(0.976)	(0.977)	(0.978)
Party: UK Independent				-0.290	-0.284	-0.276
				(0.797)	(0.798)	(0.798)
Party: UK Labour				-0.414	-0.405	-0.402
				(0.691)	(0.692)	(0.693)
Party: UK Liberal Democrat				-0.522	-0.514	-0.508
				(0.718)	(0.719)	(0.719)
Party: UK Plaid Cymru				-0.581	-0.572	-0.568
				(0.795)	(0.796)	(0.797)
party: Scottish National Party				-0.559	-0.550	-0.547
				(0.696)	(0.697)	(0.698)
Party: UK Sinn Fein				-0.980	-0.972	-0.971
				(0.737)	(0.737)	(0.738)
Party: Social Democratic and Labour Party				-0.313	-0.307	-0.302
				(0.844)	(0.845)	(0.846)
Party: UK Speaker				-1.065	-1.059	-1.074
				(0.975)	(0.976)	(0.977)
Date	0.004***	0.003***	0.003***	0.004***	0.004***	0.004***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
(Intercept)	10.366**	10.055*	9.877*	-13.829***	-13.871***	-13.881***
	(3.965)	(3.946)	(3.929)	(4.049)	(4.054)	(4.057)
Estimator	Poisson	Poisson	Poisson	Poisson	Poisson	Poisson
N	592,384	589,056	585,728	804,960	800,280	795,600

C.7   Fixed Effects Estimation

The following results use fixed effects Poisson regressions. High dimension fixed effects are included for each legislator, each issue domain, party, legislator age and each survey period. Standard errors are clustered by each legislator. Models are estimated using the `fixest` package in R (Bergé et al. 2018).

Table C.8. Responsiveness to Women's Issue Priorities – Fixed Effects Models

	UK: t	UK: $t-1$	UK: $t-2$	US: t	US: $t-1$	US: $t-2$
Model:	(1)	(2)	(3)	(4)	(5)	(6)
Variables						
Women's Issue Salience	1.364***	1.273***	1.191***	2.490***	2.463***	2.352***
	(0.0571)	(0.0535)	(0.0653)	(0.2552)	(0.2680)	(0.2149)
Total Tweets	0.0096***	0.0096***	0.0096***	0.0923***	0.0921***	0.0920***
	(0.0027)	(0.0027)	(0.0027)	(0.0056)	(0.0056)	(0.0056)
Female Legislator × Women's Issue Salience	0.3939***	0.3906***	0.3783***	0.5069***	0.5299***	0.5218***
	(0.0939)	(0.0951)	(0.0977)	(0.1477)	(0.1448)	(0.1460)
Fixed-effects						
Legislator Age	Yes	Yes	Yes	Yes	Yes	Yes
Party	Yes	Yes	Yes	Yes	Yes	Yes
Date	Yes	Yes	Yes			
Issue	Yes	Yes	Yes	Yes	Yes	Yes
Legislator	Yes	Yes	Yes	Yes	Yes	Yes
Date				Yes	Yes	Yes
Fit statistics						
Observations	804,960	800,280	795,600	592,384	589,056	585,728
Squared Correlation	0.29039	0.29031	0.29407	0.22228	0.22296	0.22273
Pseudo R^2	0.37459	0.37454	0.37416	0.28649	0.28601	0.28545
BIC	2,374,902.4	2,366,567.4	2,360,388.2	983,834.5	980,315.9	977,416.7

Signif. Codes: ***: 0.01, **: 0.05, *: 0.1

Note: Results from six fixed-effects Poisson models. Models labeled with $(t-1)$ and $(t-2)$ are lagged by one and two survey periods. Standard errors are clustered by Legislator and presented in parentheses.

Table C.9. Responsiveness to Men's Issue Priorities – Fixed Effects Models

	UK: t	UK: $t-1$	UK: $t-2$	US: t	US: $t-1$	US: $t-2$
Model:	(1)	(2)	(3)	(4)	(5)	(6)
Variables						
Men's Issue Salience	1.818***	1.681***	1.506***	1.714***	1.719***	1.577***
	(0.0663)	(0.0724)	(0.0797)	(0.1680)	(0.1414)	(0.0845)
Total Tweets	0.0096***	0.0096***	0.0096***	0.0923***	0.0921***	0.0920***
	(0.0027)	(0.0027)	(0.0027)	(0.0056)	(0.0056)	(0.0056)
Female Legislator × Men's Issue Salience	0.3127***	0.2986***	0.2994***	0.1996	0.2056	0.2330
	(0.0773)	(0.0765)	(0.0755)	(0.1249)	(0.1387)	(0.1505)
Fixed-effects						
Legislator Age	Yes	Yes	Yes	Yes	Yes	Yes
Party	Yes	Yes	Yes	Yes	Yes	Yes
Date	Yes	Yes	Yes	Yes	Yes	Yes
Issue	Yes	Yes	Yes	Yes	Yes	Yes
Legislator	Yes	Yes	Yes	Yes	Yes	Yes
Fit statistics						
Observations	804,960	800,280	795,600	592,384	589,056	585,728
Squared Correlation	0.29138	0.29330	0.29300	0.22147	0.22138	0.22167
Pseudo R^2	0.37508	0.37503	0.37433	0.28601	0.28556	0.28499
BIC	2,373,069.4	2,364,722.9	2,359,754.2	984,491.8	980,922.0	978,031.9

*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Note: Results from six fixed-effects Poisson models. Models labeled with $(t-1)$ and $(t-2)$ are lagged by one and two survey periods. Standard errors are clustered by Legislator and presented in parentheses.

Appendix D

The Limits of Group Loyalty in Congress

D.1 BERT Model Evaluation

BERT Model: Upon cross-validation, our model achieves a precision score of 0.9509 (true positive / (true positive + false positive) and a recall score of 0.9567 (true positive / (true positive + false negative), which gives the model an F1 score of 0.9537 (the weighted harmonic mean of the precision and recall scores).

For validation, we trained the model using 9,000 of the 10,000 hand coded tweets and performed validation metrics on the remaining 1,000. For robustness, we verified the F1 score by iterating through 10,000 random samples of 500 observations of the test set and taking the mean value of the scores. The result is presented below, indicating an even higher F1 score. However, the main text cites the lower F1 score (0.9537), which was calculated on all 1,000 values at a single point.
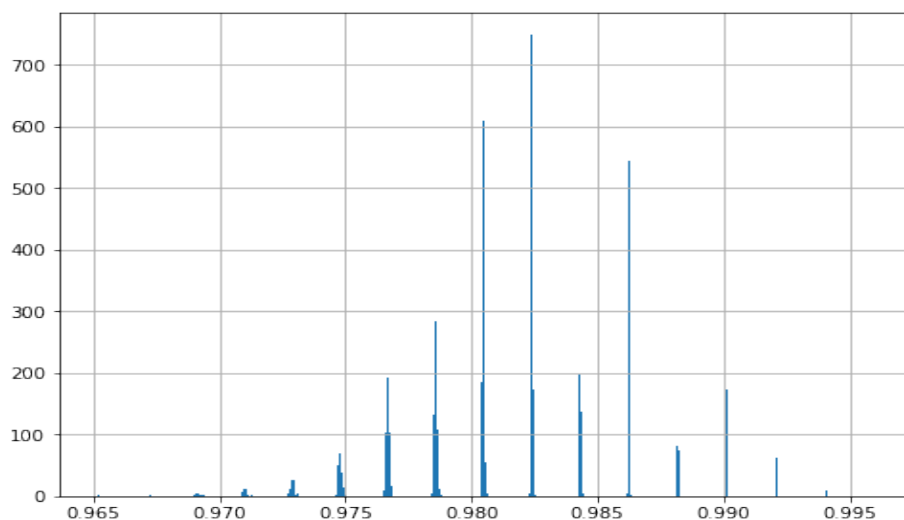
Model Details
- Train Loss: 0.1007
- Train Sparse Categorical Accuracy: 0.9591
- Validation Loss: 0.0913
- Validation Sparse Categorical Accuracy: 0.9627
- Optimizer: Adam
- Learning rate: 5e-07

Note: The trained model is publicly available on Hugging Face.

D.2   Bayesian Model Priors

Formula: $p(\text{OppositionTweets} \mid \text{TotalCOVIDTweets}) \sim$

$1 + \text{Infected} + \text{Gender} + \text{Party} + \text{Age} + \text{EntropyBalancingWeights} +$

$\text{TimePeriod} + \text{StateCOVIDCases} + \text{StateCOVIDDeaths} +$

$\text{LegislatorIdeologyEcon} + \text{LegislatorIdeologySocial} + (1 \mid \text{Legislator})$

Family: binomial

Link: $p = \text{logit}$

Observations: 16856

Priors:

Common-level effects:

$\text{Intercept} \sim \text{Normal}(\mu : 0.0, \sigma : 25.0)$

$\text{Infected} \sim \text{Normal}(\mu : 0.0, \sigma : 15.0)$

$\text{LegislatorGender} \sim \text{Normal}(\mu : 0.0, \sigma : 10.0)$

$\text{LegislatorParty} \sim \text{Normal}(\mu : 0.0, \sigma : 10.0)$

$\text{LegislatorAge} \sim \text{Normal}(\mu : 0.0, \sigma : 25.0)$

$\text{EntropyBalancingWeights} \sim \text{Normal}(\mu : 0.0, \sigma : 20.0)$

$\text{TimePeriod} \sim \text{Normal}(\mu : 0.0, \sigma : 5.0)$

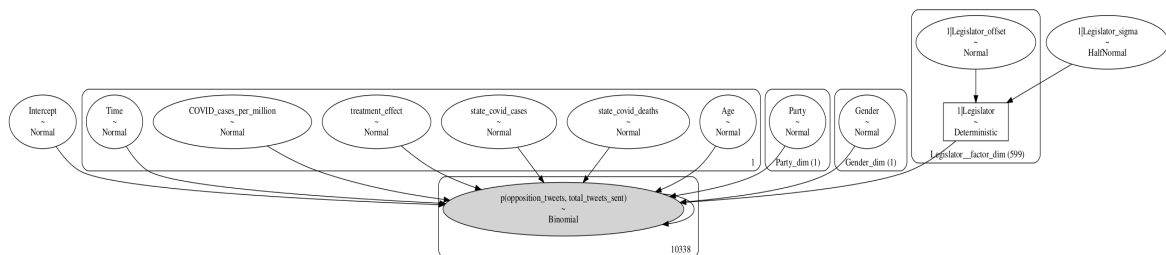$\text{StateCOVIDCases} \sim \text{Normal}(\mu : 0.0, \sigma : 3.0)$

$\text{StateCOVIDDeaths} \sim \text{Normal}(\mu : 0.0, \sigma : 3.0)$

$\text{LegislatorIdeologyEcon} \sim \text{Normal}(\mu : 0.0, \sigma : 10.0)$

$\text{LegislatorIdeologySocial} \sim \text{Normal}(\mu : 0.0, \sigma : 10.0)$

Group-level effects:

$1 \mid \text{Legislator} \sim \text{Normal}(\mu : 0.0, \sigma : \text{HalfNormal}(\sigma : 25.0))$

Results from Bayesian Hierarchical Model

	Mean	SD	HDI 3%	HDI 97%	MCSE Mean	MCSE SD	ESS bulk	ESS tail	r-hat
Intercept	-7.166	0.443	-8.024	-6.350	0.020	0.014	495.0	1033.0	1.01
COVID Infection	-0.360	0.066	-0.485	-0.237	0.002	0.001	1347.0	1965.0	1.00
Time period	0.153	0.003	0.148	0.158	0.000	0.000	3460.0	3416.0	1.00
Gender[M]	-0.040	0.141	-0.304	0.218	0.008	0.006	312.0	560.0	1.02
Party[Republican]	1.840	0.336	1.201	2.459	0.010	0.007	1150.0	2486.0	1.01
Age	-0.012	0.005	-0.022	-0.003	0.000	0.000	356.0	822.0	1.01
Entropy Weights	1.076	0.216	0.693	1.501	0.010	0.007	505.0	1048.0	1.01
State COVID-19 cases	0.060	0.018	0.027	0.094	0.000	0.000	1994.0	2791.0	1.00
State COVID-19 deaths	-0.076	0.021	-0.115	-0.036	0.000	0.000	1961.0	2666.0	1.00
Ideology (econ)	2.410	0.309	1.832	2.977	0.014	0.010	472.0	984.0	1.01
Ideology (social)	0.213	0.213	-0.182	0.618	0.012	0.009	295.0	637.0	1.01

D.3   Posterior Plot Trace